Obstetrics Simplified

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DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

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Department started in 1978. It has 48 beds. Divided into 4 units, each is supervised by a professor.

The department has the following specialized units:

- Endoscopic Surgery.
- Ultrasonography.
- Colposcopy.
- Cytology.
- Fetal monitoring.

- Assisted reproductive techniques (in development).

There are 4 operative lists every week. Emergency cases are around 15-30 cases / day. The department has its annual international congress.

It organizes bi-annual training courses in:

- diagnostic and operative laparoscopy and hysterescopy,
- basic and advanced ultrasonography,
- colposcopy,
- cytology,
- fetal monitoring.

The degrees that are given by the department are :

- Diploma in Obstetrics and Gynecology.
- Master degree (M.Sc.) in Obstetrics and Gynecology.
- Medical doctorate (M.D.) in Obstetrics and Gynecology.

Book

- Obstetrics Simplified - D. El-Mowafi

Scientific papers

- Chlamydia trachomatis in women with intermenstrual bleeding using different methods of contraception - D. El-Mowafi, U. El-Hendy
- Dilapan versus Prostaglandin E1 in Induction of Midtrimester Abortion - D. El-Mowafi, N. El-Orabi, I. El-Arousi
- Fallopian Tube - D. El-Mowafi, M.P. Diamond
- Gynecologic surgery and subsequent bowel obstruction - D. El-Mowafi, M.P. Diamond
- Laparoscopically Assisted Vaginal Hysterectomy: A Gimmick or An Advance? - D. El-Mowafi, Ch. Lall
- Maternal and Umbilical Cord Plasma Renin Activity in Pregnancy Induced Hypertension - S. Saad, M. Abd El-Hadi, D. El-Mowafi, F. El-Shenawy, A. El-Metwally
- Pelvic Adhesions - D. El-Mowafi, M.P. Diamond
- Peritoneal fluid embryotoxicity and cytokine (TNF-alpha) level in endometriosis associated infertility - D. El-Mowafi, W. El-Mosallamy, E. Basiony, S. Ghany, R. Arafa, U. El-Hendy
- Peritoneal fluid mediated embryotoxicity in unexplained infertility - D. El-Mowafi, U. El-Hendy, R. Arafa, W. El-Mosallamy, E. Basiony, E. Ghany
- Placental Localization by Transperineal Sonography in Antepartum Hemorrhage - D. El-Mowafi, A.-F. Hegazi
- Transvaginal Sonography and Hysteroscopy Versus Histopathology in Postmenopausal

Bleeding - D. El-Mowafi, A. Farid, A. El-Badawi

- Ultrasonographic Versus Laparoscopic Control of Hysteroscopic Surgery - D. El-Mowafi
- Vaginal Dopamine Agonists: Biochemical and Clinical Responses - A New Trial - D. El-Mowafi, M. Youssef, M.A. Hassan

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Obstetrics Simplified

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Physiology of Reproduction

Pregnancy occurs when a mature liberated ovum is fertilized by a mature capacitated spermatozoon.

The Sperm:

- The spermatozoa leave the testis carrying 23 chromosomes but not yet capable of fertilization.
- Their maturation is completed through their journey in the 6 meters of the epididymis and when mixed with the seminal plasma from the epididymis, seminal vesicle and prostate gland.
- After semen is ejaculated, the sperms reach the cervix by their own motility within seconds leaving behind the seminal plasma in the vagina.
- At time of ovulation, the cervical mucous is in the most favourable condition for sperm penetration and capacitation as:

  - It becomes more copious, less viscous and its macromolecules arrange in parallel chains providing channels for sperms passage.

  - Its contents from glucose and chloride are increased.

- The sperms ascent through the uterine cavity and Fallopian tubes to reach the site of fertilization in the ampulla by:

  1. its own motility,
  2. uterine and tubal peristalsis which is aggravated by the prostaglandins in the seminal plasma.

- The sperms reach the tube within 30-40 minutes but they are capable of fertilization after 2-6 hours. This period is needed for sperm capacitation.
- Capacitation of sperms is the process after which the sperm becomes able to penetrate the zona pellucida,that surrounding the ovum and fertilize it. The cervical and tubal secretions are mainly responsible for this capacitation. Capacitation is believed to be due to :

  a. increase in the DNA concentration in the nucleus,

  b. increase permeability of the coat of sperm head to allow more release of hyaluronidase.

The ovum:

- The ovum leaves the the ovary after rupture of the Graafian follicle, carrying 23 chromosomes and surrounded by the zona pellucida and corona radiata.
- The ovum is picked up by the fimbriated end of the Fallopian tubes and moved towards the ampulla by the ciliary movement of the cells and rhythmic peristalsis of the tube.

Fertilization:

- Millions of sperms ejaculated in the vagina, but only hundreds of thousands reach the outer portion of the tubes. Only few succeed to penetrate the zona pellucida, and only one spermatozoon enters the ovum transversing the perivitelline space.
- After penetration of the ovum by a sperm, the zona pellucida resists penetration by another sperms due to alteration of its electrical potential.
- The pronucleus of both ovum and sperm unite together to form the zygote (46 chromosomes).

Sex Determination:

The mature ovum carries 22 autosomes and one X chromosome, while the mature sperm carries 22 autosomes and either an X or Y chromosome. If the fertilizing sperm is carrying X chromosome the baby will be a female (46 XX), if it is carrying Y chromosome the baby will be a male (46 XY).

Cleavage and blastocyst formation:

- On its way to the uterine cavity, the fertilized ovum (zygote) divides into 2,4,8 then 16 cells *(blastomeres*). This division (cleavage) starts within 24 hours of fertilization and occurs nearly every 12 hours repeatedly the resultant 16 cells mass is called *morula* which reaches the uterine cavity after about 4 days from fertilization.
- A cavity appears within the morula converting it into a cystic structure called *blastocyst*. In which the cells become arranged into an inner mass (embryoblast) which will form all the tissues of the embryo, and an outer layer called *trophoblast* which invade the uterine wall.
- The blastocyst remains free in the uterine cavity for 3-4 days, during which it is nourished by the secretion of the endometrium (uterine milk).

Implantation (nidation) :

The decidua:

It is the thickened vascular endometrium of the pregnant uterus. It is called so because it casts of after parturition. The glands become enlarged, tortuous and filled with secretion. The stroma cells become large with small nuclei and clear cytoplasm, these are called decidual cells.

The decidua, like secretory endometrium, consists of three layers:

- the superficial compact layer,

- the intermediate spongy layer,

- the thin basal layer.

The separation of placenta occurs through the spongy layer while the endometrium regenerates again from the basal layer.

- The trophoblast of the blastocyst invades the decidua to be implanted in:

  - the posterior surface of the upper uterine segment in about 2/3 of cases,

  - the anterior surface of the upper uterine segment in about 1/3 of cases.

- After implantation the decidua becomes differentiated into:

  - decidua basalis; under the site of implantation.

  - decidua capsularis; covering the ovum.

  - decidua parietalis or vera; lining the rest of the uterine cavity.

As the conceptus enlarges and fills the uterine cavity the decidua capsularis fuses with the decidua parietalis. This occurs nearly at the end of 12 weeks.

The decidua has the following functions:

1. It is the site of implantation.
2. It resists more invasion of the trophoblast.
3. It nourishes the early implanted ovum by its glycogen and lipid contents.
4. It shares in the formation of the placenta.

Chorion:

- After implantation, the trophoblast differentiates into 2 layers:

  a. an outer one called *syncytium (syncytiotrophoblast)* which is multinucleated cells without cell boundaries,

  b. an inner one called *Langhan's layer (Cytotrophoblast)* which is cuboidal cells with simple cytoplasm.

A third layer of mesoderm appears inner to the cytotrophoblast.

- The trophoblast and the lining mesoderm together form the ***chorion.***
- Mesodermal tissue (connecting stalk) connects the inner cell mass to the chorion and will form the umbilical cord later on.
- Spaces (lacunae) appear in the syncytium, increase in size and fuse together to form the *" **chorio-decidual space" or " intervillus space**"*. Erosion of the decidual blood vessels by the trophoblast allows blood to circulate in this space.

- The outer syncytium and inner Langhan's cells form buds surrounding the developing ovum called ***primary villi.***

When the mesoderm invades the center of the primary villi they are called ***secondary villi***. When blood vessels (branches from the umbilical vessels) develop inside the mesodermal core, they are called ***tertiary villi.***

- At first, the chorionic villi surround the developing ovum. After the 12th week, the villi opposite the decidua capsularis atrophy leaving the chorion laeve which forms the outer layer of the foetal membrane and is attached to the margin of the placenta. The villi opposite the decidua basalis grow and branch to form the ***chorion frondosum*** and together with the decidua basalis will form the placenta. Some of these villi attach to the decidua basalis (the basal plate) called the ***"anchoring villi"***, other hang freely in the intervillous spaces called ***"absorbing villi"***

Amnion:

- After implantation, 2 cavities appear in the inner cell mass; the amniotic cavity and yolk sac and inbetween these 2 cavities the mesoderm develops.
- The layer of cells at the floor of the amniotic cavity will give the ectodermal structures of the foetus and the layer of cells at the roof of the yolk sac will give the endodermal structures of the foetus and the mesoderm inbetween will give the mesodermal structure.

Phases of conceptus development:

1. The ovum: the products of conception in the first 2 weeks after fertilization.
2. The embryo: from 3 to 5 weeks.
3. The foetus: the developing infant (6-40 wks).

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The Placenta

Origin:

The placenta develops from the chorion frondosum (foetal origin) and decidua basalis (maternal origin).

Anatomy At Term:

Shape: discoid. *Diameter* **:** 15-20 cm. *Weight :* 500 gm.

Thickness: 2.5 cm at its center and gradually tapers towards the periphery.

Position : in the upper uterine segment (99.5%), either in the posterior surface (2/3) or the anterior surface (1/3).

Surfaces:

a. Foetal surface: smooth, glistening and is covered by the amnion which is reflected on the cord. The umbilical cord is inserted near or at the center of this surface and its radiating branches can be seen beneath the amnion.

b. Maternal surface: dull greyish red in colour and is divided into 15-20 cotyledons. Each cotyledon is formed of the branches of one main villus stem covered by decidua basalis.

Functions Of The Placenta:

(1) Respiratory function:

O_2 and CO_2 pass across the placenta by simple diffusion. The foetal haemoglobin has more affinity and carrying capacity than adult haemoglobin. 2,3 diphosphoglycerate (2,3-DPG) which competes for oxygen binding sites in the haemoglobin molecule, is less bounded to the foetal haemoglobin (HbF) and thereby allows a greater uptake of O_2 (O_2 affinity). The rate of diffusion depends upon:

a. maternal/ foetal gases gradient.

b. maternal and foetal placental blood flow.

c. placental permeability.

d. placental surface area.

(2) Nutritive function:

The transfer of nutrients from the mother to the foetus is achieved by :

- Simple diffusion : e.g. water and electrolytes.

- Facilitated diffusion: e.g. glucose.

- Active diffusion: e.g. aminoacids.

- Pinocytosis: e.g. large protein molecules and cells.

(3) Excretory function:

Waste products of the foetus as urea are passed to maternal blood by simple diffusion through the placenta.

(4) Production of enzymes:

e.g. oxytocinase, monoamino oxidase, insulinase, histaminase and heat stable alkaline phosphatase.

(5) Production of pregnancy associated plasma proteins (PAPP):

e.g. PAPP-A, PAPP-B, PAPP-C, PAPP-D and PP5. The exact function of these proteins is not defined.

(6) Barrier function:

The foetal blood in the chorionic villi is separated from the maternal blood, in the intervillous spaces, by the placental barrier which is composed of :

(i) endothelium of the foetal blood vessels,

(ii) the villous stroma,

(iii) the cytotrophoblast, and

(iv) the syncytiotrophoblast.

However, it is an incomplete barrier. It allows the passage of antibodies (IgG only), hormones, antibiotics, sedatives, some viruses as rubella and smallpox and some organisms as treponema pallida. Substances of large molecular size as heparin and insulin cannot pass the placental barrier.

(7) Endocrine function:

(A) Protein hormones:

1- Human chorionic gonadotrophin (hCG):

- It is a glycoprotein produced by the syncytiotrophoblast.

- It supports the corpus luteum in the first 10 weeks of pregnancy to produce oestrogen and progesterone until the syncytiotrophoblast can produce progesterone.

- HCG molecule is composed of 2 subunits:

  a. alpha subunit which is similar to that of FSH, LH and TSH.

  b. beta subunit which is specific to hCG.

- HCG rises sharply after implantation, reaches a peak of 100.000 mIU/ml

about the 60th day of pregnancy then falls sharply by the day 100 to 30.000 mIU/ml and is maintained at this level until term.

- Estimation of beta-hCG is used for:

a) diagnosis of early pregnancy.

b) diagnosis of ectopic pregnancy.

c) diagnosis and flow-up of trophoblastic disease.

2- Human placental lactogen (hPL):

- It is a ploypeptide hormone produced by the syncytiotrophoblast.

- The supposed actions of hPL include:

a. lipolysis: increasing free fatty acids which provide a source of energy for mother and foetal nutrition.

b. inhibition of gluconeogenesis: thus spare both glucose and protein explaining the anti-insulin effect of hPL.

c. somatotrophic : i.e. growth promotion of the foetus due to increased supply of fatty acids, glucose and amino acids.

d. mammotropic and lactogenic effect.

- HPL can be detected by the 5-6th week of pregnancy, rises steadily until the 36th week to be 6m g/ml.

- Its level is proportional to the placental mass.

3- Human chorionic thyrotrophin (hCT):

No significant role has been established for it, but it is probably responsible for increased maternal thyroid activity and promotion of foetal thyroid development.

4- Hypothalamic and pituitary like hormones:

e.g. gonadotropin releasing hormone (GnRH) ,corticotropin releasing factor (CRF), ACTH and melanocyte stimulating hormone.

5- Others as inhibin, relaxin and beta endorphins.

(B) Steroid Hormones:

1- Oestrogens:

- They are synthetized by syncytiotrophoblast from their precursors dehydroepiandrosterone sulphate (DHES) or its 16a -hydroxy (16a - OH- DHES).

- Near term, 50% of DHES is drived from the foetal adrenal gland and 50% from maternal adrenal. It is transformed in the placenta into oestradiol- 17b (E_2).

- On the other hand , 90% of 16a - OH - DHES is drived from foetal origin after hydroxylation of DHES in the foetal liver, while only 10% is drived from the mother by

the same way.

- Oestrogens are excreted in the maternal urine as oestriol (E_3), oestradiol (E_2) and oestrone (E_1). Oestriol (E_3) is the largest portion of them.

- Maternal urinary and serum oestriol level is an important index for foetal wellbeing as its synthesis depends mainly on the integrity of the foetal adrenal and liver as well as the placenta (foeto- placental unit).

- Urinary oestriol increases as pregnancy advances to reach 35-40 mg per 24 hours at full term. Progressive fall in urinary oestriol indicates that the foetus is jeopardous.

- Oestrogens are responsible with progesterone for the most of the maternal changes due to pregnancy especially that in genital tract and breasts.

2- Progesterone:

- It is synthetized by syncytiotrophoblast from the maternal cholesterol.

- Excreted in maternal urine as pregnandiol.

- Increasing gradually during pregnancy to reach a daily production of 250 mg per day in late normal single pregnancy.

- It provides a precursor for the foetal adrenal to produce glucocorticoids and mineralocorticoids.

Abnormalities Of The Placenta

(A) Abnormal Shape:

1. ***Placenta Bilobata:*** The placenta consists of two equal lobes connected by placental tissue.
2. ***Placenta Bipartita*****:** The placenta consists of two equal parts connected by membranes. The umbilical cord is inserted in one lobe and branches from its vessels cross the membranes to the other lobe. Rarely, the umbilical cord divides into two branches, each supplies a lobe.
3. ***Placenta Succenturiata:*** The placenta consists of a large lobe and a smaller one connecting together by membranes. The umbilical cord is inserted into the large lobe and branches of its vessels cross the membranes to the small succenturiate (accessory) lobe. The accessory lobe may be retained in the uterus after delivery leading to postpartum haemorrhage. This is suspected if a circular gap is detected in the membranes from which blood vessels pass towards the edge of the main placenta.
4. ***Placenta Circumvallata:*** A whitish ring composed of decidua, is seen around the placenta from its foetal surface. This may result when the chorion frondosum is two small for the nutrition of the foetus, so the peripheral villi grow in such a way splitting the decidua basalis into a superficial layer (the whitish ring) and a deep layer. It can be a cause of abortion, antepartum haemorrhage, premature labour and

intrauterine foetal death.

5. ***Placenta Fenestrata:*** A gap is seen in the placenta covered by membranes giving the appearance of a window.

(B) Abnormal Diameter:

Placenta membranacea: A great part of the chorion develops into placental tissue. The placenta is large, thin and may measure 30-40 cm in diameter. It may encroach on the lower uterine segment i.e. placenta praevia.

(C) Abnormal Weight:

The placenta increases in size and weight as in congenital syphilis, hydrops foetalis and diabetes mellitus.

(D) Abnormal Position:

Placenta Praevia: The placenta is partly or completely attached to the lower uterine segment.

(E) Abnormal Adhesion:

Placenta Accreta: The chorionic villi penetrate deeply into the uterine wall to reach the myometrium, due to deficient decidua basalis. When the villi penetrate deeply into the myometrium, it is called ***"placenta increta"*** and when they reach the peritoneal coat it is called ***"placenta percreta".***

(F) Placental Lesions:

1- Placental Infarcts:

Seen in placenta at term, mainly in hypertensive states with pregnancy.

a. White infracts: due to excessive fibrin deposition. Normal placenta may contain white infracts in which calcium deposition may occur.

b. Red infarcts : due to haemorrhage from the maternal vessels of the decidua. Old red infarcts finally become white due to fibrin deposition.

2- Placental Tumour:

Chorioangioma is a rare benign tumour of the placental blood vessels which may be associated with hydramnios.

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The Umbilical Cord

Anatomy

Origin : It develops from the connecting stalk.

Length: At term, it measures about 50 cm.

Diameter: 2 cm.

Structure: It consists of mesodermal connective tissue called Wharton's jelly, covered by amnion. It contains:

- one umbilical vein carries oxygenated blood from the placenta to the foetus,

- two umbilical arteries carry deoxygenated blood from the foetus to the placenta,

- remnants of the yolk sac and allantois.

Insertion: The cord is inserted in the foetal surface of the placenta near the center " eccentric insertion" (70%) or at the center "central insertion" (30%).

Abnormalities Of The Umbilical Cord

(A) Abnormal cord insertion:

1. Marginal insertion : in the placenta (battledore insertion).

2. Velamentous insertion: in the membranes and vessels connect the cord to the edge of the placenta. If these vessels pass at the region of the internal os , the condition is called " vasa praevia". Vasa praevia can occur also when the vessels connecting a succenturiate lobe with the main placenta pass at the region of the internal os.

(B) Abnormal cord length:

1. Short cord which may lead to :

i- intrapartum haemorrhage due to premature separation of the placenta,

ii- delayed descent of the foetus druing labour,

iii- inversion of the uterus.

2. Long cord which may lead to:

i- cord presentation and cord prolapse,

ii- coiling of the cord around the neck,

iii- true knots of the cord.

(C) Knots of the cord:

1. True knot: when the foetus passes through a loop of the cord. If pulled tight, foetal asphyxia may result.

2. False knot: localised collection of Wharton’s jelly containing a loop of umbilical vessels.

(D) Torsion of the cord:

may occur particularly in the portion near the foetus where the Wharton's jelly is less abundant.

(E) Haematoma :

Due to rupture of one of the umbilical vessels.

(F) Single umbilical artery :

may be associated with other foetal congenital anomalies.

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The Foetal Membranes

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(1) The chorion: is the outer membrane. It is in contact with the uterine wall. It is attached to the margins of the placenta.

Histologically, it is composed of 4 layers:

i) Cellular layer

ii) dense reticulum

iii) pseudo - basement membrane

iv) outer trophoblast.

(2) The amnion : is a transparent greyish membrane which lines the chorion. It covers the foetal surface of the placenta and the umbilical cord. The amniotic sac contains the foetus swimming in the liquor amnii.

Histologically, it is composed of 5 layers:

i) cellular layer

ii) basement membrane,

iii) compact layer

iv) fibroblast layer

v) outer spongy layer adherent to the cellular layer of the chorion.

THE AMNIOTIC FLUID (THE LIQUOR AMNII)

Nature:

- It is a clear pale, slightly alkaline (pH 7.2) fluid.

- It is about 400 ml at mid pregnancy, reaches about 1000 ml at 36-38 weeks then decreases later on to be scanty in post-term pregnancy.

Composition:

- Water (98-99%),
- carbohydrates (glucose and fructose), proteins (albumin and globulins), lipids, hormones (oestrogen and progesterone), enzymes (alkaline phosphatase),

- minerals (sodium, potassium and chloride),
- suspended materials as vernix caseosa, lanugo hair, desquamated epithelial cells and meconium.

Circulation of amniotic Fluid:

The amniotic fluid is not in a static state but is in a continuous turn over, 500 ml of it are replaced each hour.

Origin:

(1) Foetal:

a. Active secretion from the amniotic epithelium.

b. Transudation from the foetal circulation.

c. Foetal urine.

(2) Maternal :

Transudation from maternal circulation.

- The foetal origin contributes more in the production of the amniotic fluid.
- Uptake of amniotic fluid is by absorption through the amnion to the maternal circulation and by foetal swallowing.

Functions:

(A) During pregnancy:

1. Protects the foetus against injury.
2. A medium for free foetal movement.
3. Mantains the foetal temperature.
4. Source for nutrition of the foetus.
5. A medium for foetal excretion.

(B) During Labour:

1. The fore-bag of water helps the dilatation of the cervix during labour.
2. It acts as an antiseptic for the birth canal after rupture of the membranes.

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Maternal Changes Due to Pregnancy

(I) THE GENITAL SYSTEM

(A) The Ovaries:

- Both ovaries are enlarged due to increased vascularity and oedema particularly that containing the corpus luteum.
- Corpus luteum starts to degenerate after the 10th week when the placenta is formed.
- Corpus luteum secretes oestrogen, progesterone and relaxin.
- Relaxin is a protein hormone. Its exact role in pregnancy is unknown. It may induce softness and effacement of the cervix.
- Ovulation ceases during pregnancy due to pituitary inhibition by the high levels of oestrogen and progesterone.

(B) The Fallopian Tubes:

The musculature hypertrophies and the epithelium becomes flattened.

(C) The Uterus:

1- Size: increases from 7.5´ 5 ´ 2.5 cm in non-pregnant state to 35 ´ 25 ´ 20 cm at term.

2- Weight: increases from 50 gm in non-pregnant state to 1000 gm at term. This is due to:

i- hypertrophy of the muscle fibres (oestrogen effect) and their multiplication (progesterone effect).

ii- increase in the mass of elastic connective tissue.

3- Capacity: increases from 4 ml in non-pregnant state to 4000 ml at term.

4- Shape : becomes globular by the 8th week and pyriform by the 16th week till term.

5- Position: with ascent from the plevis, the uterus usually undergoes rotation with tilting to the right (dextro-rotation), probably due to presence of the rectosigmoid colon on the left side.

6- Consistency: becomes progressively softer due to:

(i) increased vascularity, (ii) the presence of amniotic fluid.

7- Contractility : from the first trimester onwards, the uterus undergoes irregular

contractions called *Braxton Hicks Contractions*, which normally are painless. They may cause some discomfort late in pregnancy and may account for false labour pain.

8- Uteroplacental blood flow: uterine and ovarian vassels increase in diameter, length and tortuosity. Uterine blood flow increases progressively and reaches about 500 ml/ minute at term.

9- Formation of lower uterine segment: After 12 weeks, the isthmus (0.5cm) starts to expand gradually to form the lower uterine segment which measures 10 cm in length at term.

	Upper Uterine Segment	Lower Uterine Segment
Peritoneum	Firmly-attached.	Loosely-attached.
Myometrium	3 layers; outer longitudinal, middle oblique and inner circular. The middle layer forms 8-shaped fibres around the blood vessels to control postpartum haemorrhage (living ligatures).	2 layers; outer longitudinal and inner circular.
Decidua	Well-developed.	Poorly-developed.
Membranes	Firmly-attached.	Loosely- attached.
Activity	Active, contracts, retracts and becomes thicker during labour.	Passive, dilates, stretches and becomes thinner during labour.

(D) The Cervix:

- It becomes hypertrophied, soft and bluish in colour due to oedema and increased vascularity.
- Soon after conception, a thick cervical secretion obstructs the cervical canal forming a mucous plug.
- The endocervical epithelium proliferates and / or everted forming cervical ectopy (previously called erosion).

(E) The Vagina:

The vagina becomes soft, warm, moist with increased secretion and violet in colour (Chadwick's sign) due to increased vascularity.

(F) The Vulva:

It becomes soft, violet in colour. Oedema and varicosities may develop.

(II) THE BREASTS

- In the early weeks, the pregnant woman experiences tenderness and tingling of the breasts.
- After the second month the breasts increase in size and become nodular as a result of hypertrophy of the mammary alveoli. Delicate veins becomes visible beneath the skin.

- The *primary areola* becomes deeply pigmented. The nipples become larger, deeply pigmented and more erectile.
- *Montgomery's follicles,* which are hypertrophic sebaceous glands, appear as non-pigmented elevations in the primary areola.
- Nearly after the third month *colostrum,* which is a thick yellowish fluid, can be expressed from the nipples.
- During the fifth month, a pigmented area appears around the primary areola called *secondary areola.*

(III) THE SKIN

(A) Pigmentation:

This is due to increased production of melanocyte stimulating hormone (MSH).

- *Chloasma gravidarum (pregnancy mask):* A butterfly pigmentation appears on the checks and nose. It usually disappears few months after labour.
- *Breasts :* increased pigmentation of the nipples and primary areolae and appearance of the secondary areolae.
- *Linea nigra:* A dark line extending from the umbilicus to the symphysis pubis.
- *Other areas* as axilla, vulva and recent scars.

(B) Striae gravidarum:

These are reddish, slightly depressed streaks appear in the later months of pregnancy in the abdomen and sometimes breasts and thighs. It may be due to mechanical stretching or increased glucocorticoids which results in rupture of the elastic fibres in the dermis and exposure of the vascular subcutaneous tissues. After delivery, they become white in colour but do not disappear and called *" striae albicans"*.

(C) Vascular changes:

There is increase in the skin blood flow and temperature.

(D) Secretions:

Increase in sweat and sebaceous glands activity.

(IV) HEMATOLOGIC CHANGES

(A)Blood Volume.

- The total blood volume increases steadily from early pregnancy to reach a maximum of 35-45% above the non-pregnant level at 32 weeks.
- Plasma volume increases by 40% whereas red cell mass increases by 20% leading

to haemodilution *(Physiological anaemia)*.

(B) Blood Indices:

1. Erythrocytes : decrease during pregnancy from 4.5 millions to 3.7 millions /mm^3 relative to the increase in plasma volume. Its contents from 2,3 diphosphoglycerate increase which competes for oxygen binding sites in the haemoglobin molecule thus release more O_2 to the foetus.
2. Haemoglobin concentration: falls from 14 gm/dl to 12 gm/dl.
3. Leucocytes: increases from 7000/mm^3 to 10.500/mm during pregnancy and up to 16000/mm^3 during labour.
4. Fibrinogen: increases from 200-400 mg/dl to 400-600 mg/dl.
5. Erythrocyte sedimentation rate : increases from 12 to 50 mm/hour.

(V) CARDIOVASCULAR SYSTEM

(A) Heart

1. *Position:* As the diaphragm is elevated progressively during pregnancy the apex is displaced upwards and to the left so that it lies in the 4th intercostal space outside the midclavicular line.
2. *Rate:* The resting pulse rate increases by 10-15 beats per minute during pregnancy.
3. *Cardiac output:* increases mainly by increased stroke volume rather than increased heart rate reaching a maximum of 40% above the non-pregnant level at 20 weeks to be maintained till term.
    - During labour cardiac output increases more, particularly during the second stage due to pain, uterine contractions and expulsive efforts pushing the blood into the general circulation.
    - Postpartum, the increased COP is maintained for up to 4 days and then declines rapidly.

(B) Arteries:

- Arterial blood pressure usually declines during the second trimester due to peripheral vasodilatation caused by oestrogens and prostaglandins.
- The posture of the pregnant woman affects arterial blood pressure. Typically, it is highest when she is sitting, lowest when lying in the lateral recumbent position and intermediate when supine.
- *Supine hypotensive syndrome* may develop in some women late in pregnancy in supine position. This is due to compression of the inferior vena cava by the large pregnant uterus resulting in decrease venous return, decrease cardiac output and

low blood pressure that fainting may occur.

(C) Veins:

Varicosities in the lower limbs and vulva may occur due to:

(i) back pressure from the compressed inferior vena cava by the pregnant uterus,

(ii) relaxation of the smooth muscles in the wall of the veins by progesterone.

(VI) RESPIRATORY SYSTEM

Dysponea may occur due to :

(i) increase sensitivity of the respiratory center to CO_2 possibly due to high progesterone level,

(ii) elevation of the diaphragm by the pregnant uterus.

(VII) GASTROINTESTINAL TRACT

1-Gingivitis:

There is increased vascularity and tendency for bleeding as well as hypertrophy of the interdental papilla.

2-Ptyalism:

It is excessive salivation and more common in association with oral sepsis.

3- Nausea and vomiting :

Nausea (morning sickness) and vomiting (emesis gravidarum) occur in early months.

4- Appetite changes (longing or craving):

The pregnant woman dislikes some foods and odours while desires others. Reduced sensitivity of the taste buds during pregnancy creates the desire for markedly sweet, sour or salt foods. Deviation may be so extreme to the extent of eating blackboard chalk, coal or mud (pica).

5- Indigestion and flatulance :

This is probably due to :

(i) decreased gastric acidity caused by regurgitation of alkaline secretion from the intestine to the stomach,

(ii) decreased gastric motility.

6- Hurt burn:

due to reflux of the acidic gastric contents to the oesophagus.

7- Constipation:

due to:-

i- reduced motility of large intestine (progesterone effect),

ii- increased water reabsorption from the large intestine (aldosterone effect),

iii- pressure on the plevic colon by the pregnant uterus,

iv- sedentary life during pregnancy.

8- Gall stones:

More tendency to stone formation due to atony and delayed emptying of the gall bladder.

9- Haemorroids:

due to:

i- mechanical pressure on the pelvic veins,

ii- laxity of the veins walls by progesterone,

iii- constipation.

10- Appendix:

is displaced upwards by the enlarged uterus.

(VIII) URINARY SYSTEM

(A) Kidney:

Renal blood flow and glomerular filtration rate increases by 50%.

(B) Ureters:

Dilatation of the ureters and renal pelvis due to :

i- relaxation of the ureters by the effect of progesterone,

ii- pressure against the pelvic brim by the uterus particularly on the right side.

(C) Bladder:

- Frequency of micturition in early pregnancy due to :

  i- pressure on the bladder by the enlarged uterus,

  ii- congestion of the bladder mucosa.

- Urinary stress incontinence may develop for the first time during pregnancy and spontaneously relieved later on.

(IX) MUSCULO-SKELETAL SYSTEM

1. Progressive lordosis to compensate for the anterior position of the enlarged uterus.
2. Increased mobility of the pelvic joints due to softening of the joints and ligaments caused by progesterone and relaxin.

(X) ENDOCRINE SYSTEM

(A) Pituitary gland:

- The anterior pituitary enlarges due to an increase in prolactin secreting cells (lactotrophs).
- Prolactin level increases up to 150 ng/ml at term to ensure lactation.

(B) Thyroid gland:

- There is diffuse slight enlargement of the gland.
- Gland activity increases as evidenced by the increase in:

  i- basal metabolic rate (BMR) by about 30%,

  ii- thyroxine-binding globulin, total T_3 (tri-iodothyronine) and T_4 (thyroxine),

  ii- protein bound iodine (PBI).

  iv- TS H, free T_3 and T_4.

(C) Parathyroid glands:

increase in size and activity to regulate the increased calcium metabolism.

(D) Adrenal glands:

Hypertrophy particularly the cortex resulting in increased mineralocorticoids (aldosterone) and glucocorticoids (cortisol).

(X) METABOLIC CHANGES

(A) Weight gain:

- The average weight gain in pregnancy is 10-12 kg.
- This increase occurs mainly in the second and third trimesters at a rate of 350-400 gm/week.
- Six kg of the average 11 kg weight gain is composed of maternal tissues (breast, fat, blood and uterine tissue) and 5 kg of foetus, placenta and amniotic fluid.

- Of this 11 kg, 7 kg are water, 3 kg fat and 1 kg protein.

(B) Water metabolism:

There is tendency to water retention secondary to sodium retention.

(C) Protein metabolism:

There is tendency to nitrogen retention for foetal and maternal tissues formation.

(D) Carbohydrate metabolism:

- Pregnancy is potentially diabetogenic.
- Alimentary glucosuria may occur in early pregnancy.
- Renal glucosuria may occur in the middle of pregnancy.

(E) Fat metabolism:

There is increase in plasma lipids with tendency to acidosis.

(F) Mineral metabolism:

There is increased demand for iron, calcium, phosphate and magnesium.

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Obstetrics Simplified

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Diagnosis of Pregnancy

(I) THE FIRST TRIMESTER (0-12 WEEKS)

(A) Symptoms:

1. *Amenorrhoea :* sudden cessation of a previously regular menstruation is the most common symptom denoting pregnancy. However, pregnancy may occur during lactational amenorrhoea. On the other hand, bleeding may occur early in pregnancy as in threatened abortion. Slight bleeding may occur also at the expected time of menstruation in the first 12 weeks of pregnancy but never afterwards due to separation of parts of the decidua vera.
2. *Morning sickness:* nausea with or without vomiting commences in the morning. It usually appears about 6 weeks after onset of the last menstrual period and usually disappears 6-12 weeks later.
3. *Frequency of micturition:* due to congestion and pressure on the bladder and disappear after the first trimester to reappear again near the end of pregnancy when the foetal head descends into the maternal pelvis.
4. *Breast symptoms:* as enlargement, sensation of fullness, tingling and tenderness.
5. *Appetite changes and sleepiness.*

(B) Signs:

(I)Breast signs:

1. Increase in size and vascularity.
2. Increase pigmentation of the nipple and primary areola.
3. Appearance of the secondary areola.
4. Montgomery's follicles.
5. Expression of colostrum.
6. Breast signs are diagnostic only in primigravidae. In multigravidae , it may be due to the previous pregnancies.

(II) Uterine signs:

1. The uterus becomes enlarged, globular and soft.
2. Palmer's sign: uterine contractions felt during bimanual examination.

3. Hegar's sign: during bimanual examination, the two fingers in the anterior fornix can be approximated to fingers of the abdominal hand behind the uterus due to softening of the lower part of the uterus and its emptiness. This sign can be elicited between 6-10weeks but not after as the growing conception will fill the whole uterine cavity.

(III) Cervix : soft, hypertrophied and violet.

(IV) Vagina: violet, moist, warm with increased acidity.

(C) Investigations:

(I) Pregnancy tests:

These depend on presence of human chorionic gonadotrophin (hCG) in maternal serum and urine.

1- Urine pregnancy tests :

i- Agglutination Test: Latex particles, or sheep erythrocyte (tube) coated with anti-hCG.

ii- Agglutination Inhibition Tests

iii- Dip stick

Rapid and simple tests based on enzyme-labelled monoclonal antibodies assay can detect low level of hCG in urine.

Causes of false positive results:

1. Proteinuria.
2. Haematuria.
3. At time of ovulation (cross reaction with LH).
4. HCG injection for infertility treatment within the previous 30 days.
5. Thyrotoxicosis (high TSH).
6. Premature menopause (high LH & FSH).
7. Early days after delivery or abortion.
8. Trophoblastic diseases.
9. hCG secreting tumours.

Causes of false negative results:

1. Missed abortion.
2. Ectopic pregnancy.
3. Too early pregnancy.
4. Urine stored too long in room temperature.
5. Interfering medications.

2- Serum pregnancy tests:

(i) Radioimmunoassay of b -subunit of hCG.

(ii) Radio receptor assay.

3- Enzyme- linked immunosorbent assay (ELISA).

can be used for urine and serum.

Sensitivity of pregnancy tests:

	Lowest hCG detectable(mIU/ml)	Minimum Day post ovulatory
I- Urine		
a- Slide	500-2500	17-26
b- Tube	75-1000	14-22
II- Serum		
a- Radioimmunoassay	300-500	9
b- Radiorecepter	100-200	9
III- ELIZA	50	7-10

The pregnancy test becomes negative about:

- one week after labour,
- 2 weeks after abortion, and
- 4 weeks after evacuation of vesicular mole.

Uses of pregnancy test:

1. Diagnosis of pregnancy.
2. Diagnosis of foetal death.
3. Diagnosis of ectopic pregnancy.
4. Diagnosis and follow up of gestational trophoblastic diseases.

(II) Ultrasonography:

Gestational sac can be detected after 4-5 weeks of amenorrhoea. Foetal heart pulsation can be detected as early as 7 weeks.

(II) THE SECOND TRIMESTER (13-28 WEEKS)

(A) Symptoms:

1. Amenorrhoea.
2. Morning sickness and urinary symptoms decrease.
3. *Quickening :* The first sensation of the foetal movement by the mother, occurs at 18-20 weeks in primigravida and at 16-18 weeks in multiparas.
4. Abdominal enlargement.

(B) Signs:

1. *Breast signs:* become more manifested.
2. *Skin signs :* Cloasma, linea nigra and striae gravidarum appear.
3. *Uterine signs:*

   i-The uterus is felt abdominally.

   ii-*Braxton Hick's contractions:* intermittent painless contractions can be felt by abdominal examination.

4-Foetal signs:

i- *Internal ballottement:* can be elicited at 16 weeks by a push to the foetal parts with the two fingers through the anterior fornix.

ii- *External ballottement:* can be elicited at 20 weeks by a push to the foetal parts with one hand abdominally and the other hand receiving the impulse.

iii- *Palpation of foetal parts and movement:* by the obstetrician at 20 weeks.

iv- Foetal heart sound: can be auscultated at 20-24 weeks by the Pinard's stethoscope.

v- Umbilical (funic) souffle: A murmur with the same rate of FHS due to rush of blood in the umbilical arteries. It is occasionally detected when a loop of the cord lies below the stethoscope.

(C) Investigations in doubtful cases.

1. *Pregnancy tests.*
2. *Ultrasonography.*
3. *X-ray:* It shows the foetal skeleton starting from the 16th week of pregnancy. It has been replaced by ultrasonography due to the following hazards:

i- Teratogenic effects particularly before 10 weeks.

ii- Chromosomal changes in the foetal gonads leading to genetic disorders in the following generations.

iii- Subsequent leukaemia in childhood.

(III) THE THIRD TRIMESTER (29-40 WEEKS)

All signs of pregnancy become more evident. Pregnancy tests are positive, sonar and X-ray are diagnostic.

Sure Signs of Pregnancy:

1. Palpation of foetal parts.
2. Palpation of foetal movements.
3. Auscultation of foetal heart sounds.
4. The occasional auscultation of the umbilical (funic) souffle.
5. Detection of foetal skeleton by X-ray.
6. Ultrasonographic detection of foetal parts, movements and /or heart movements.

Differential Diagnosis of Pregnancy:

(A) Early pregnancy:

(I) Causes of amenorrhoea.

(II) Causes of symmetrically enlarged uterus:

1- Myoma.

2- Adenomyosis.

3- Pyometra.

4- Haematometra.

5-Metropathia haemorrhagica.

(III) Pelvi-abdominal swellings:

1- Ovarian swellings.

2- Tubal swellings.

3- Pelvic haematocele.

4- Full bladder.

(B) Late pregnancy:

1- Myomas.

2- Ovarian neoplasm.

3- Ascitis.

4- Pseudocyesis.

5- Other causes of pelvi-abdominal mass.

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Obstetrics Simplified

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Antenatal Care

Objectives:

1. Prevention, early detection and treatment of pregnancy related complications as pre-eclampsia, eclampsia and haemorrhage.
2. Prevention, early detection and treatment of medical disorders as anaemia and diabetes.
3. Detection of malpresentations, malpositions and disproportion that may influence the decision of labour.
4. Instruct the pregnant woman about hygiene, diet and warning symptoms.
5. Laboratory studies of parameters may affect the foetus as blood group, Rh typing, toxoplasmosis and syphilis.

Frequency of antenatal visits:

- Every month during the first 6 months.

- Every 2 weeks during the 7th and 8th months.

- Every week during the last month.

More frequent visits are indicated in high risk pregnancy.

The first visit:

1. *History.*
2. *Examination :* general, abdominal and local.
3. *Laboratory investigations:*

   - Blood grouping.

   - Rh typing.

   - Haemoglobin.

   - Toxoplasma and / or VDRL if needed.

   - Urine analysis particularly for albumin and sugar.

Return visits:

a-History : ask the patient about any complaint.

b-Examination :

- Blood pressure.
- Weight.
- Oedema.
- Abdominal examination.

c-Investigation: urine for albumin and sugar.

INSTRUCTIONS TO THE PREGNANT WOMAN

(1) Diet: The daily requirements are:

a. Calories **:** 2500 Kcal.

b.Proteins **:** 60 gm.

c.Carbohydrates : 200- 400 gm.

d. Lipids **:** should be restricted.

e.Vitamins:

- Vitamin A : 5000 IU.
- Vitamin B_1 (Thiamine): 1mg.
- Vitamin B_2 (Riboflavin): 1.5 mg.
- Nicotinic acid: 15mg.
- Ascorbic acid (vit. C) : 50mg.
- Vitamin D: 400 IU.
- Folic acid: 0.5 mg.

f. Minerals :

- Iron : 15 mg.
- Calcium: 1000 mg.

So the suggested daily diet should include:

- One litre of milk or its derivatives,
- 1-2 eggs,
- fresh vegetables and fruits.
- 2 pieces of red meat replaced once weekly by sea fish and once by calf ’s liver.

- Cereals and bread are recommended also.

Coffee and tea: should be restricted.

2) Smoking : should be avoided as it may cause intrauterine growth retardation or premature labour.

3) Rest and sleep: 2 hours in the midday and 8 hours at night.

4) Exercises: violent exercises as diving and water sports should be avoided. House work short of fatigue and walking are encouraged.

5) Clothing:

- Lighter and looser clothes of non synthetic materials are more comfortable due to increased BMR and sweating.
- Clothes which hang from the shoulders are more comfortable than that requiring waste bands.
- Breast support is required.
- Avoid tight elastic hosiery or its bands.

6) Shoes: High - heeled shoes should be discouraged as they increase lumbar lordosis, back strain and risk of falling.

7) Bathing: Shower bathing is preferable than tube or sea bathing for fear of ascending infection. Vaginal douching should be avoided.

8) Teeth : Regular cleansing. Consult the dentist when needed.

9) Breasts: to reduce the incidence of retracted and/ or cracked nipples postpartum, the patient is instructed to massage them with a mixture of glycerine and alcohol during the last 6 weeks of pregnancy.

10) Bowels : Constipation is avoided by increasing vegetables, fluids and milk intake and mild exercise. Liquid paraffin should not be used for long period as it interferes with absorption of fat-soluble vitamins (A and D).

11) Coitus: Whenever abortion or preterm labour is a threat, coitus should be avoided. Otherwise, it is allowed with less frequency and violence. Some obstetricians advise abstinence in the last 4 weeks of pregnancy for fear of ascending infection.

12) Travelling: long and tiring journeys should be avoided particularly if the woman is prone to abortion or preterm labour. Flying is not contraindicated but not the long ones and near term.

13) Medications: not to be taken without obstetrician advice due to risk of teratogenicity

14) Exposure to infections: is to be avoided particularly those of documented teratogenicity e.g. rubella, cytomegalovirus, herpes huminis and varicella zoster viruses.

15) Exposure to irradiation: is to be avoided whether diagnostic or therapeutic.

16) The warning symptoms: which indicate immediate contact to the obstetrician are:

(i) vaginal bleeding,

(ii) gush of fluid per vaginum,

(iii) abdominal pain,

(iv) persistent headache,

(v) blurring of vision,

(vi) oedema of lower limbs or face,

(vii) persistent vomiting.

17) Immunisation:

Nature of Vaccine	Name	Allowance
Live virus vaccines	Measles Mumps Rubella Poliomyelitis Yellow fever	Contraindicated. Contraindicated. Contraindicated. In risk of exposure only. Travel to endemic areas.
Inactivated virus vaccines	Influenza Rabies	Serious underlying disease. Same as non-pregnant.
Inactivated bacterial vaccines	Cholera Typhoid fever Plague Meningococcal meningitis	For international travels. Travel to endemic areas. Selective for exposed persons. Same as non-pregnant.
Toxoid	Tetanus Diphtheria	Same as non-pregnant.
Immune globulins	Rabies Tetanus Varicella Measles Hepatitis A Hepatitis B	Post-exposure prophylaxis. Post-exposure prophylaxis: give along with hepatitis B vaccine initially, then vaccine alone at 1 and 6 months.

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Obstetrics Simplified

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Minor Complaints During Pregnancy

Gingivitis

Increased vascularity and hypertrophy of the interdental papillae. It is improved usually after pregnancy termination.

Sequelae:

1. Increased tendency for bleeding.
2. Retention of food debris predisposes to sepsis and dental caris.

Treatment:

1. Proper dental hygiene.
2. Cryosurgery for severe cases.

Ptyalism (Sialorrhoea)

Increased salivation may occur early in pregnancy and subsides later on. It is due to failure of the patient to swallow the saliva rather than increase in its amount.

Treatment:

1. Care of dental hygiene.
2. Discontinue smoking.
3. Anticholinergic drugs as belladonna, which induce dryness of the mouth, may be needed.

Heartburn

A common complaint caused by reflux of gastric contents into the lower oesophagus due to mechanical relaxation of the cardiac sphincter caused by upward displacement and compression of the stomach by the pregnant uterus. Sometimes the cardia actually herniates through the diaphragm.

Treatment:

1. More frequent but smaller meals.

2. Avoidance of bending over or lying flat.
3. Antacids containing aluminium hydroxide are preferable as they buffer the gastric contents, do not cause an acid rebound and not absorbed so that alkalosis is unlikely.

Constipation

Causes:

1. Reduced intestinal motility due to steroid hormones.
2. Increased fluid resorption from the large bowel.
3. Reduced exercise.
4. Mechanical compression by the gravid uterus.

Treatment:

1. Evacuate the bowel at the same time every day.
2. Increase fluid intake.
3. Diet rich in green vegetables, bran and fruits.
4. Mild laxative as senna preparations. Liquid paraffin interferes with absorption of fat soluble vitamins, so better to be avoided.

Haemorrhoids

Causes:

1. Laxity of the rectal veins by progesterone effect.
2. Pressure by the gravid uterus.
3. Tendency to constipation.

Treatment:

1. Avoid constipation.
2. Soothing and astringent agents.
3. Local anaesthetics.

Surgical and local injection treatment have to be avoided.

Varicosities

Varicose veins may occur in the vulva and / or lower limbs.

In addition to the non-cosmetic appearance, they cause oedema, discomfort and even ulcers, dermatitis and superficial thrombophlebitis.

Causes:

1. Congenital weakness which will exaggerated by ,
2. increased venous pressure by compression with the pregnant uterus,
3. prolonged standing,
4. relaxation of veins walls by steroid hormones.

Treatment:

1. Avoid prolonged standing.
2. Encourage active exercise.
3. Elevate the legs in higher level than the body during sitting and sleeping.
4. Avoid elastic bands for the hosiery.
5. Elastic stocking are worn while the patient is lying down and veins are empty.

Surgical or injection treatment should be avoided during pregnancy.

Dyspnea

- It may occur early in pregnancy due to hyperventilation caused by progesterone.
- Late in pregnancy, it occurs due to pressure on the diaphragm by the pregnant uterus.

Urinary symptoms

Frequency and stress incontinence may occur during pregnancy.

Causes :

1. Increased intra-abdominal pressure.
2. Pressure on the bladder by the enlarging uterus reducing its capacity.

Leucorrhoea

Increased vaginal discharge is a common complaint during pregnancy due to excess oestrogen production. No treatment is needed except if there is associated infection. Monilial infection is common.

Leg Cramps

Sustained involuntary painful contractions, usually affecting the calf and peroneal muscles may occur in the second half of pregnancy, particularly at night.

Causes:

1. Depletion of serum calcium as well as sodium and chloride due to excessive vomiting, sweating or salt restriction.
2. Local vascular insufficiency.

Management:

1. Massage of the contracted muscles and passive stretching.
2. Calcium gluconate may be helpful.

Paraethesia

Tingling sensation of the fingers and sometimes weakness of small muscles of the hand.

Causes :

1. Oedema of the carpal tunnel which may be relieved by diuretics.
2. Brachial plexus traction due to droping of the shoulders during pregnancy.

Backache

Causes:

1. Lumbar lordosis.
2. Relaxation of ligaments and intervertebral joints by progesterone effect.

Management:

1. Adequate rest and support the back when sitting in a chair by a pillow.

2. Avoid wearing high heeled shoes.

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Obstetrics Simplified

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Bleeding in Early Pregnancy, Abortion

Causes :

1. Abortion.
2. Ectopic pregnancy.
3. Vesicular mole.
4. Local gynaecological lesions e.g. cervical ectopy, polyp, dysplasia, carcinoma and rupture of varicose vein.

ABORTION

Definition:

Termination of pregnancy before viability of the foetus i.e. before 28 weeks (in Britain) and before 20 weeks or if the foetal weight is less than 500 gm (in USA and Australia).

When the abortion occurs spontaneously, the term " miscarriage" is often used.

Incidence: about 15% of all pregnancies.

Aetiology:

1) Chromosomal abnormalities: cause at least 50% of early abortions e.g. trisomy, monsomy X (XO) and triploidy.

2) Blighted ovum (anembryonic gestational sac): where there is no visible foetal tissues in the sac.

3) Maternal infections : e.g. listeria monocytogenes, mycoplasma hominis, ureaplasma urealyticum, cytomegalovirus and toxoplasma gondii which causes abortion if there is acute infection early in pregnancy. Acute fever for whatever the cause can induce abortion.

4) Trauma: external to the abdomen or during abdominal or pelvic operations.

5) Endocrine causes:

a. Progesterone deficiency (causes abortion between 8-12 weeks).

b. Diabetes mellitus.

c. Hyperthyroidism.

6) Drugs and environmental causes:

e.g. quinine , ergots, severe purgatives, tobacco, alcohol, arsenic, lead, formaldehyde, benzene and radiation.

7) Maternal anoxia and malnutrition.

8) Overdistension of the uterus: e.g. acute hydramnios.

9) Immunological causes:

a. Systemic lupus erythematosus.

b. Antiphospholipid antibodies that are directed against platelets and vascular endothelium leading to thrombosis, placental destruction and abortion.

c. Histocompatibility between the mother and father and in turn the foetus. It is assumed that histoincompatibility particularly in human leucocyte antigen (HLA- DR locus) is essential for stimulation of the immune system to produce blocking factors which prevent rejection of the foetus.

10) Ageing sperm or ovum.

11) Uterine defects

e.g. Septum , Asherman's syndrome (intrauterine adhesions) and submucous myomas.

12) Nervous, psychological conditions and over fatigue.

13) Idiopathic.

Mechanism of Abortion:

*a. Up to 8 weeks:*The gestational sac tends to be expelled complete and the decidua is shed thereafter.

b. From 8-12 weeks: The decidua capsularis ruptures and the embryo is expelled either entire or after rupture of the amnion.

c. After 12 weeks: The placenta is completely formed and the process of abortion is like a miniature labour. It is more common for the foetus to be expelled but for the placenta to be retained due to firmer attachment to the uterine wall.

Clinical Varieties

Differential Diagnosis of Different Types of Abortion

Type of abortion	Bleeding	Colicky pain	Cervical dilatation	Uterine size	Products of conception	Shock	Pregnancy test

Threatened	+	-	-	Corresponding to amenorrhoea	-	-	+
Inevitable	++	+	+	Corresponding to amenorrhoea	-	±	+
Incomplete	++	+	+	Slightly smaller	+	±	+
Complete	+	-	-	Smaller	+	-	+
Missed	±	-	-	Smaller	-	-	-

(A) Threatened Abortion:

Clinical picture:

1. Symptoms and signs of pregnancy coincide with its duration.
2. Vaginal bleeding slight or mild, bright red in colour originating from the choriodecidual interface.
3. Pain is absent or slight.
4. Cervix is closed.
5. Pregnancy test is positive.
6. Ultrasonography shows a living foetus.

Prognosis:

If the blood loss is less than a normal menstrual flow and is not accompanied by pain of uterine contraction there is a reasonable chance for continuing pregnancy. This occurs in 50% of cases while other half will proceed to inevitable or missed abortion.

Treatment:

1. Rest in bed until one week after stoppage of bleeding.
2. No intercourse as it may disturb pregnancy by the mechanical effect and the effect of semen prostaglandins on the uterus.
3. Sedatives: if the patient is anxious.
4. Treatment of controversy:
    - Progestogens: e.g. hydroxy progesterone caproate (Primulot depot) 250 mg IM twice weekly is given by some if there is evidence of progesterone deficiency. However, low plasma progesterone level is an indication of pregnancy failure. Progestogens may cause retention of the dead ovum leads to missed abortion.

- Gonadotrophins may be of benefit in cases of luteal phase deficiency and those get pregnant with ovulatory drugs.
- Sympathomimetics, antiprostaglandins and folic acid were used but of no proven beneficial effect.

(B) Inevitable Abortion:

Clinical picture:

1. Symptoms and signs of pregnancy coincide with its duration.
2. Vaginal bleeding is excessive and may accompanied with clots.
3. Pain is colicky felt in the suprapubic region radiating to the back.
4. The internal os of the cervix is dilated and products of conception may be felt through it.
5. Rupture of membranes between 12-28 weeks is a sign of the inevitability of abortion.

Treatment:

1. Any attempt to maintain pregnancy is useless.
2. Resuscitation and ergometrine 0.5 mg is given by IM or IV route to induce tetanic uterine contraction and stop bleeding.

   (I) If pregnancy is less than 12 weeks: Termination is done by vaginal evacuation and curettage or suction evacuation under general anaesthesia.

   (II) If pregnancy is more than 12 weeks:

   - Oxytocin is given by intravenous drip to expel the uterine contents.

   - If the placenta is retained it is removed under general anaesthesia.

Cervical abortion: is a variety of inevitable abortion in which the products of conception has been separated from the uterine cavity but retained in the cervical canal causing its distension.

Clinical picture:

- The patient complains of considerable bleeding and severe lower abdominal pain referred to the back.

- On examination, the products of conception is felt through the dilated cervix.

Treatment:

Under anaesthesia, the cervix is dilated, contents is removed and cavity is curetted to remove the decidua.

(C) Incomplete Abortion:

Retention of a part of the products of conception inside the uterus. It may be the whole or part of the placenta which is retained.

Clinical picture:

1. The patient usually noticed the passage of a part of the conception products.
2. Bleeding is continuous.
3. On examination, the uterus is less than the period of amenorrhoea but still large in size. The cervix is opened and retained contents may be felt through it.
4. Ultrasonography: shows the retained contents.

Treatment:

As inevitable abortion.

(D) Complete Abortion:

All products of conception have been expelled from the uterus.

Clinical picture:

1. The bleeding is slight and gradually diminishes.
2. The pain ceases.
3. The cervix is closed.
4. The uterus is slightly larger than normal.
5. Ultrasound : shows empty cavity.

(E) Missed Abortion:

Retention of dead products of conception for 4 weeks or more.

Carneous mole is a special variety of missed abortion in which the dead ovum in early pregnancy is surrounded by clotted blood.

Clinical picture:

(A) Symptoms:

1. Symptoms of threatened abortion may or may not be developed.
2. Regression of pregnancy symptoms as nausea, vomiting and breast symptoms.
3. The abdomen does not increase and may even decrease in size.
4. The foetal movements are not felt or ceases if previously present.
5. Milk secretion may start particularly in second trimester abortion because of the decline in oestrogens secretion that were normally

blocking the action of prolactin on the breasts.

6. A dark brown vaginal discharge may occur (prune juice discharge).

(B) Signs:

1. The uterus fails to grow or even decreases in size and becomes firmer.

2. The cervix is closed.

3. The foetal heart sounds cannot be heard by the doptone.

Investigations:

1. Pregnancy test becomes negative within two weeks from the ovum death, but it may remain positive for a longer period due to persistent living chorionic villi.

2. Ultrasound shows either a collapsed gestational sac, absent foetal heart movement or foetal movement.

Complications:

1. Disseminated intravascular coagulation (DIC) may occur if the dead conceptus is retained for more than 4 weeks.

2. Superadded infection.

Treatment:

The dead conceptus is expelled spontaneously in the majority of cases. Evacuation of the uterus is indicated in the following conditions:

1. spontaneous expulsion does not occur within four weeks,

2. there is bleeding,

3. infection or DIC developed or ,

4. patient is anxious. Although some gynaecologists advise evacuation of the uterus once sure diagnosis of missed abortion is made.

Evacuation is carried out as following:

1. *If the uterine size is less than 12 weeks' gestation:* vaginal or suction evacuation is done

2. *If the uterine size is more than 12 weeks' gestation :* evacuation can be done by

a. Prostaglandins: given intravaginally (PGE_2), intravenously, intra-or extra-amniotic ($PGF_{2\ a}$).

b. Oxytocin infusion.

c. Combination: starting with prostaglandin and completed with oxytocin.

d. Hysterotomy: is rarely indicated in 2nd trimester missed abortion if the medical induction fails initially and after repetition few days later.

(F) Septic Abortion:

It is any type of abortion, usually criminal abortion, complicated by infection.

Microbiology:

E.Coli,bacteroids, anaerobic streptococci, clostridia, streptococci and staphylococci are among the most causative organisms.

Clinical picture:

General examination:

- Pyrexia and tachycardia.

- Rigors suggest bacteraemia.

- A subnormal temperature with tachycardia is ominous and mostly seen with gas forming organisms.

- Malaise, sweating , headache, and joint pain.

- Jaundice and /or haematuria is an ominous sign, indicating haemolysis due to chemicals used in criminal abortion or haemolytic infection as clostridium welchii.

Abdominal examination:

- Suprapubic pain and tenderness.

- Abdominal rigidity and distension indicates peritonitis.

Local examination:

- Offensive vaginal discharge. Minimal inoffensive vaginal discharge is often associated with severe cases.

- Uterus is tender.

- Products of conception may be felt.

- Local trauma may be detected.

- Fullness and tenderness of Douglas pouch indicates pelvic abscess which will be associated with diarrhoea.

Complications:

Endotoxic (septic) shock may develop with its serious sequels as acute renal failure and DIC.

Treatment:

1. Isolate the patient . Bed rest in semi-sitting position.
2. An intravenous line is established for therapy. In case of shock a central venous pressure (CVP) line to aid in the control of fluid and blood transfusion is added

3. Observation for vital signs: pulse, temperature and blood pressure as well as fluid intake and urinary output.
4. A cervico-vaginal swab is taken for culture (aerobic and anaerobic) and sensitivity,
5. Antibiotic therapy: Ampicillin or cephalosporin (as a broad spectrum) +gentamycin (for gram -ve organisms) + metronidazole (for anaerobic infection)are given by intravenous route while awaiting the results of the bacteriological culture. Another regimen to cover the different causative organism is clindamycin + gentamycin.
6. Fluid therapy: e.g. glucose 5% normal saline and/or lactated ringer solutions can be given as long as there is no manifestations of acute renal failure particularly the urinary output is more than 30 ml/hour.
7. Blood transfusion : is given if CVP is low (normal: 8-12 cm water). It is of importance also to correct anaemia coagulation defects and infection.
8. Anti-gas gangrene (in Cl.welchii) and antitetanic serum (in Cl. tetani).
9. Oxytocin infusion: to control bleeding and enhances expulsion of the retained products.
10. . Surgical evacuation of the uterus can be done after 6 hours of commencing IV therapy but may be earlier in case of severe bleeding or deteriorating condition in spite of the previous therapy.
11. . Hysterectomy may be needed in endotoxic shock not responding to treatment particularly due to gas gangrene (Cl. welchii).

(G) Therapeutic Abortion:

Abortion induced for a medical indication.

(H) Criminal Abortion:

Illegal abortion induced for a non-medical indication.

(I) Recurrent (Habitual) Abortion:

Definition:

Three (two by some authors) or more consecutive abortions.

Aetiology:

(I) Chromosomal abnormalities:

Can be detected in

1. Foetus : e.g. autosomal trisomy, sex chromosome monosomy (X), and polyploidy.
2. Parents : e.g. balanced translocation.

(II) Uterine abnormalities:

1. *Congenital anomalies:* e.g. hypoplasia, bicornuate, septate and subseptate uterus.
2. *Intrauterine synechiae (Asherman's syndrome).*
3. *Cervical incompetence:* whether congenital or acquired.
4. *Uterine myomas.*
5. *Deficiency of endometrial oestradiol and progesterone receptors:* leads to failure of implantation or early abortion .
6. *Divided uterine artery:* uterus with two ascending uterine arteries may fail to provide adequate blood flow to the developing placenta and the growing foetus.

(III) Infections:

- Toxoplasma.
- Mycoplasma hominis.
- Ureaplasma urealyticum.
- Listeria monocytogenes.
- Brucella.
- Chlamydia.
- Syphilis.

(IV) Hormonal:

- Hypothyrodism,
- Diabetes.
- Luteal phase deficiency.

(V) Immunological:

1. *Human leucocyte antigens (HLA)* **:** the difference in HLA between both parents stimulates the maternal production of the "blocking factors" which prevent rejection of the conception. More sharing in HLA between the parents causes recurrent abortions. So the incidence of recurrent abortions is higher if there is positive consanguinity between the two partners.
2. *Antiphospholipid antibodies*: These antibodies cause placental vessels thrombosis resulting in infarction and placental insufficiency.

3. *Systemic lupus erythematosus.*

(VI) Miscellaneous:

Chronic malnutrition.

Chronic anaemia.

Chronic cardiac and renal diseases.

Cigarette smoking and alcohol abuse.

Diagnosis

(A) History:

Abortion due to cervical incompetence is characterised by:

History of a previous operation as dilatation or amputation of the cervix may be present.

It is a midtrimester abortion; occurs usually between 16-28 weeks of pregnancy,

preceded by spontaneous rupture of membrane,

abortion process takes a short time,

usually associated with slight pain and bleeding,

the expelled foetus shows no abnormalities,

the duration of pregnancy is decreasing each time due to weakness of the isthmus by successive pregnancies.

Recurrent abortion with increasing duration of pregnancy:

Uterine hypoplasia.

Syphilis : abortions occur after th 4th month as the treponema pallidum cannot pass the placental barrier before that.

Recurrent abortion with decreasing duration of pregnancy:

Cervical incompetence.

Ask about:

1. Consanguinity between the couple.
2. History of in utero exposure to diethylstilbestrol (DES) that causes uterine anomalies..
3. Exposure to radiation, infections or environmental pollutants.

(B) General examination:

may reveal:

- malnutrition,

- anaemia,

- thyroid disorder.

(C) Local examination:

may reveal

- fibroid,

- cervical incompetence: which can be diagnosed by:

(a) Between pregnancies:

1. The cervix can admit easily No. 8 Hegar's dilator without resistance or pain.
2. A 2 ml (6 mm diameter) Foley's balloon catheter can be withdrawn through the cervical canal with minimal resistance.
3. Hysterosalpingogram: demonstrates cervical funnelling.
4. Extensive old cervical lacerations may be detected.

(b) During pregnancy:

1. The membranes are bulging through the patulous os.
2. The transverse diameter of the internal os is more than 2 cm measured by abdominal or vaginal ultrasonography.

(D) Special investigations:

1.Urine analysis for chronic renal disease and diabetes.

2. Blood for:

Haemoglobin. - Sugar. - kidney function tests.

Thyroid function tests.

VDRL (venereal disease research laboratory) for syphilis.

Serological tests for toxoplasma and brucellosis.

Mid- luteal serum progesterone level.

Detection of HLA sharing between the couple.

Antiphospholipid antibodies.

3. Microbiological investigations for chlamydia and mycoplasma.

4. Dating of premenstrual endometrial biopsy.

5. Cytogenetic study to detect chromosomal abnormalities in both parents and the resultant abortus.

6. Hysterosalpingography and / or hysteroscopy: may diagnose uterine malformations as septate uterus , submucous myoma or incompetent cervix.

Treatment

(A) Medical treatment:

Treatment of the cause as :

1. anaemia and malnutrition,
2. diabetes,
3. renal diseases,
4. infections as chlamydia and mycoplasma (tetracycline or doxycycline) and toxoplasma (spiramycin) which may need another coarse(s) of treatment during pregnancy.
5. Luteal phase defect treated by progestrone or progestogens in the secretory phase and up to 16 th week of pregnancy.

(B) Surgical treatment:

(1) Cervical cerclage:

- It means encircling the cervix at or as near as possible to the internal os by a non-absorbable suture.
- The best time for the operation is about 12-14 weeks, so that the placenta is formed and there is no possibility of abortion due to congenital anomalies of the early embryo.
- The suture is removed at 38 weeks or if labour started at any time.
- Ultrasonography is done before operation to:

  - confirm foetal viability,

  - exclude congenital anomalies,

  - measure the internal os.

I- Vaginal cerclage:

i) Shirodkar operation:

Two incisions at the reflection of the vaginal wall on the cervix are done anteriorly and posteriorly and bladder is dissected upwards. A nylon or silk suture or a dacron (mersilene) tape is applied around the internal os under the cervical mucosa.

ii) Mc Donald operation:

It is the commonest operation.

The cervix is surrounded from outside by a nylon or silk purse- string suture. The suture takes bites of cervical tissue at 3,6,9 and 12 o'clock then tied anteriorly or posteriorly.

This operation is easier and gives nearly the same results as Shirodkar.

(II) Abdominal cerclage:

- In case of previous high amputation of the cervix extensive cervical laceration or repeated failure of vaginal cerclage.
- The isthmus uteri is encircled by a non-absorbable suture and the patient should be delivered by caesarean section.

(2)Metroplasty :

i) Bicornuate uterus:

Strassman operation is done to unify the two corns.

ii) Septate uterus:

- Jones operation: involves excision of the uterine septum through a wedge - shaped incision.

- Tompkin's operation: involves dissection of the uterine septum.

- Hysteroscopic excision of the septum is the preferred management nowadays as it leaves no scar in the uterus and the patient can be delivered

vaginally later on in addition to absent abdominal incision and early ambulation.

(3) Asherman's syndrome:

Hysteroscopic dissection of the intrauterine adhesions is the preferred management nowadays.

(4) Myomectomy:

In case of submucous myoma which disturb the endometrium and its vasculature affecting implantation and subsequent foetal development. This can be done through hysteroscopy also.

POST-ABORTIVE BLEEDING

Definition:

Persistent or recurrent bleeding within the first 4 weeks after abortion.

Causes:

1. Perforation of the uterus or cervical laceration.
2. Retained products of conception.
3. Infection leading to sloughing of a septic debris.
4. Submucous myoma or a fibroid polyp.
5. Choriocarcinoma.
6. Local gynaecological lesion as cervical polyp or carcinoma.
7. Haemorrhagic blood disease.
8. Dysfunctional uterine bleeding.

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Obstetrics Simplified

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Ectopic Pregnancy

Definition

It is implantation of the fertilised ovum outside the normal uterine cavity.

- *Common site (95%) :* the tubes.
- *Rare sites (5%) :* The ovaries, a rudimentary horn of a bicornuate uterus , broad ligaments, peritoneum and cervix.

TUBAL PREGNANCY

Incidence: about 1:250.

Aetiology

The following risk factors have been implicated:

(A) Mechanical factors:

May prevent or retard the passage of the fertilised ovum into the uterine cavity. These may result from:

1- Previous inflammatory disease:

It is the commonest risk factor. Ectopic pregnancy may occur due to:

- Destruction of tubal ciliated epithelium resulting in reduction or loss of the ciliary current.

- Intratubal adhesions resulting in partial tubal obstruction.

- Peritubal adhesions resulting in restricted tubal motility.

2- Previous pelvic surgery:

Particularly reconstructive tubal surgery.

3- Developmental abnormalities:

as diverticulae, accessory ostia and tubal hypoplasia.

4- Adjacent tumours:

especially in the broad ligament resulting in distortion, stretching or partial obstruction of the tube.

5- Previous ectopic pregnancy:

where conservative treatment was carried out.

6- Intrauterine contraceptive device:

due to its effect on tubal motility or increased incidence of PID.

(B) Premature implantation:

Premature implantation of the fertilised ovum in the tube may occur due to :

1. *Premature shedding of the zona pellucida:* from the fertilised ovum.
2. *Transperitoneal migration of the fertilised ovum to the contralateral tube*: this long journey leads to advanced development of the ovum that it becomes ready for implantation when it reaches the tube. This was proved by presence of the corpus luteum in the contralateral ovary in 50% of ectopic pregnancy.
3. Presence of *ectopic endometrium in the tube.*

Pathogenesis

- The trophoblast develops in the fertilised ovum and invades deeply into the tubal wall.

- Following implantation, the trophoblast produces hCG which maintains the corpus luteum.

- The corpus luteum produces oestrogen and progesterone which change the secretory endometrium into decidua. The uterus enlarges up to 8 weeks size and becomes soft.

- The tubal pregnancy does not usually proceed beyond 8-10 weeks due to :

- lack of decidual reaction in the tube,
- the thin wall of the tube,
- the inadequacy of tubal lumen,
- bleeding in the site of implantation as trophoblast invades.

  - Separation of the gestational sac from the tubal wall leads to its degeneration, and fall of hCG level, regression of the corpus luteum and subsequent drop in the oestrogen and progesterone level.

- This leads to separation of the uterine decidua with uterine bleeding.

Fate of tubal pregnancy:

(I) Tubal mole:

The gestational sac is surrounded by a blood clot and retained in the tube.

(II) Tubal abortion:

- This occurs more if ovum had been implanted in the ampullary portion of the tube.

- Separation of the gestational sac is followed by its expulsion into the peritoneal cavity through the tubal ostium.

- Rarely, reimplantation of the conceptus occurs in another abdominal structure leads to *secondary abdominal pregnancy*.

- If expulsion was complete the bleeding usually ceases but it may continue due to incomplete separation or bleeding from the implantation site.

(III) Tubal rupture:

- More common if implantation occurs in the narrower portion of the tube which is the isthmus.

- Rupture may occur in the anti-mesenteric border of the tube. Usually profuse bleeding occurs ® intraperitoneal haemorrhage.

- If rupture occurs in the mesentric border of the tube a broad ligament haematoma will occur.

Clinical Picture

General symptoms:

1- Short period of amenorrhoea:

usually does not exceed 8-10 weeks. This may be lacking if the ectopic pregnancy is disturbed before the next menstruation. This may occur particularly with ectopic pregnancy in the interstitial portion of the tube.

2- Pain:

is present in almost every case and precedes vaginal bleeding. It may be:

a. Aching due to tubal distension.

b. Colicky in tubal abortion.

c. Stabbing in tubal rupture.

d. Shoulder pain if blood accumulates under the diaphragm.

e. Bladder and rectal irritability in pelvic haematocele.

3- Vaginal bleeding:

Due to shedding of the decidua. It is usually slight and follows the pain.

General signs:

General examination:

Breast signs of pregnancy.

Abdominal examination:

Lower abdominal tenderness and rigidity especially on one side may be present.

Vaginal examination:

- Bluish vagina and bluish soft cervix.
- Uterus is slightly enlarged and soft.
- Marked pain in one iliac fossa on moving the cervix from side to side.
- Ill defined tender mass may be detected in one adnexa in which arterial pulsation may be felt.

The other manifestations depend upon the clinical variety of the ectopic pregnancy:

(A) Undisturbed Tubal Pregnancy

It is the same general symptoms and signs mentioned before. The pain is aching in nature and there is no vaginal bleeding.

(B) Tubal Abortion

The more common so it is called the classical picture of ectopic pregnancy.

Symptoms:

1. The general symptoms and signs are present.
2. Fainting attacks due to pain and intraperitoneal haemorrhage.
3. Nausea and vomiting due to peritoneal irritation.

Signs:

General examination:

1. Anaemia of varying degree depending upon the blood loss.
2. Pulse is usually rapid.
3. Temperature slightly higher (up to 38ºC) due to absorption of blood from the peritoneal cavity.

4. Blood pressure: falls in proportion to the amount of internal haemorrhage.

Abdominal examination:

Cullen's sign: a periumbilical bluish discoloration may be present due to absorption of the blood in the peritoneal cavity by lymphatics. It is a late sign.

Local examination:

Boggy swelling in the cul-de-sac if pelvic haematocele is present.

(C) Tubal Rupture

The most dramatic although not the most common.

Symptoms:

Short period of amenorrhoea (6-8 weeks) or even there is no missed period.

Signs

General examination:

- Rapidly developed shock, with pallor, sweating, air hunger, rapid thready pulse and hypotension.

- Shoulder tip pain and hiccoughs due to irritation of the phrenic nerve of the diaphragm by accumulated blood when the patient lying down

Abdominal examination:

- The abdomen is distended, rigid with generalised tenderness.

- Shifting dullness and periumbilical bluish discolouration due to intraperitoneal haemorrhage.

Local examination:

The same as in general signs of ectopic, although it is undesirable as it may induce more disruption and bleeding.

(D) Pelvic Haematocele

Symptoms:

1. Symptoms suggesting disturbed tubal pregnancy since a period of time.
2. Pressure symptoms due to accumulation of blood in the Douglas pouch as frequency of micturition, tenesmus and dyspareunia.

Signs:

1. A fixed tender swelling is felt in Douglas pouch.
2. The uterus is slightly enlarged, soft and pushed forwards and the external os is directed downwards.

3. Aspiration of Douglas pouch (*culdocentesis*) may reveal blood which does not clot on standing. If blood clots it means that needle has punctured a blood vessel.
4. Infection may be superadded and a pelvic abscess is formed.

Investigations of Ectopic Pregnancy

(1) Serum b -hCG:

Urine pregnancy tests are positive in only 50-60% of ectopic. Detection of b -hCG in the serum by ELISA or radioimmunoassay are more sensitive and can detect very early pregnancy about 10 days after fertilisation i.e. before the missed period.

- If the test is negative, normal and abnormal pregnancy including ectopic are excluded.
- If the test is positive, ultrasonography is indicated.

Doubling time:

- In normal pregnancy, the b -hCG level is doubling every 48 hours during the first 42 days of gestation.
- Ectopic pregnancy usually shows less than 66% increase in b -hCG level within 48 hours.
- Unfortunately, this is not specific to ectopic pregnancy. In 15% of normal pregnancies as well as in abortions there is also slow doubling time.

N.B. *Alpha-hCG subunit level* is higher in ectopic pregnancy than normal gestations.

(2) Ultrasonography:

In general, a positive b -hCG test with empty uterus by sonar indicates ectopic pregnancy. This is true if the ß-hCG is at or above the threshold level in which an intrauterine gestational sac can be detected. This is called discriminatory zone.

Discriminatory hCG zones:

Diagnosis of ectopic pregnancy is made if there is:

1. An empty uterine cavity by abdominal sonography with b -hCG value above 6000 mIU/ml.
2. An empty uterine cavity by vaginal sonography with b -hCG value above 2000 mIU/ml.

(3) Progesterone:

Serum progesterone level is lower in ectopic than normal pregnancy and usually less than 15ng/ml.

(4) Culdocentesis:

If non-clotting blood is aspirated from the Douglas pouch through a wide pored needle, intraperitoneal haemorrhage is diagnosed. But if not, ectopic pregnancy cannot be

excluded.

(5) Curettage:

- If microscopic examination of the products of curettage reveals decidua and chorionic villi, the condition is abortion of intrauterine pregnancy.
- If it reveals decidua only or *Arias Stella reaction* in the endometrium as well (cellular atypism, mitotic activity and glandular proliferation), ectopic pregnancy is diagnosed. The drawback is that in complete abortion also decidua only is curetted.

(6) Laparoscopy:

A good diagnostic aid particularly in disturbed ectopic.

(7) Complete blood picture:

- Haemoglobin and haematocrit ---- to assess anaemia.

- Leucocytic count ---- exclude infections as appendicitis and salpingitis.

Uncommon Sites of Ectopic Pregnancy

(I) Cornual angular pregnancy:

- It is implantation in the interstitial portion of the tube.

- It is uncommon but dangerous because when rupture occurs bleeding is severe and disruption is extensive that it needs hysterectomy.

- In some cases, the pregnancy is expelled into the uterus and rupture does not occur.

(II) Pregnancy in a rudimentary horn:

- Pregnancy occurs in the blind rudimentary horn of a bicornuate uterus.

- As such a horn is capable of some hypertrophy and distension, rupture usually does not occur before 16-20 weeks.

- *Treatment:* Excision of the horn. During operation, pregnancy in a rudimentary horn can be differentiated from interstitial cornual tubal pregnancy by finding the attachment of the round ligament lateral to the first and medial to the later.

(III) Cervical pregnancy:

- Implantation in the substance of the cervix below the level of uterine vessels.

- May cause severe vaginal bleeding.

Treatment :

1. Evacuation and cervical packing with haemostatic agent as fibrin glue and gauze.
2. If bleeding continues or extensive rupture occurs hysterectomy is needed.

(IV) Ovarian pregnancy:

Aetiology:

1. Pelvic adhesions.
2. Favourable ovarian surface for implantation as in ovarian endometriosis.

Pathogenesis:

- Fertilisation of the ovum inside the ovary or ,
- implantation of the fertilised ovum in the ovary.

Spiegelberg criteria for diagnosis of ovarian pregnancy:

1. The gestational sac is located in the region of the ovary,
2. the ectopic pregnancy is attached to the uterus by the ovarian ligament,
3. ovarian tissue in the wall of the gestational sac is proved histollogically,
4. the tube on the involved side is intact.

Treatment:

Laparotomy and inoculation of the ectopic pregnancy and reconstruction of the ovary if possible. Otherwise, removal of the affected ovary is indicated.

(V) Abdominal (peritoneal) pregnancy:

Types:

1. *Primary:* implantation occurs in the peritoneal cavity from the start.
2. *Secondary:* usually after tubal rupture or abortion. Intraligamentous pregnancy: is a type of abdominal but extraperitoneal pregnancy. It develops between the anterior and posterior leaves of the broad ligament after rupture of tubal pregnancy in the mesosalpingeal border or lateral rupture of intramural (in the myometrium) pregnancy.

Diagnosis:

(A) History:

of amenorrhoea followed by an attack of lower abdominal pain and slight vaginal bleeding which subsided spontaneously.

(B) Abdominal examination:

- Unusual transverse or oblique lie.
- Foetal parts are felt very superficial with no uterine muscle wall around.

(C) Vaginal examination:

- The uterus is soft, about 8 weeks and separate from the foetus.
- No presenting part in the pelvis.

(D) Special investigations:

1. Plain X-ray : shows abnormal lie. In lateral view, the foetus overshadows the maternal spines .
2. Ultrasound : shows no uterine wall around the foetus.
3. Magnetic resonance imaging (MRI): has a particular importance in preoperative detection of placental anatomic relationships.

Differential Diagnosis:

Rupture uterus.

Treatment:

The condition should be terminated surgically through laparotomy once diagnosed as the foetus is malformed in the majority of cases. In addition, there is risk of massive internal haemorrhage if separation of the placenta occurs.

At least 2000 ml of cross-matched blood should be on hand before proceeding to laparatomy. The foetus is removed and if the placenta is attached to an excisable structure as omentum, it is removed with it. If the placenta is attached to an important structure leave it for autolysis which may extend to few months or years. Any attempt to separate placenta will evoke uncontrollable bleeding. In this case, methotrexate 12.5 mg IM daily for 5 days will destroy trophoblastic tissue and accelerates the involution of the placenta.

In rare cases, the foetus may reach full term where spurious (false) labour occurs and the foetus dies if not recognised.

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Obstetrics Simplified

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Hydatidiform (Vesicular) Mole

It is a benign neoplasm of the chorionic villi.

Incidence:

1:2000 pregnancies in United States and Europe, but 10 times more in Asia. The incidence is higher toward the beginning and more toward the end of the childbearing period. It is 10 times more in women over 45 years old.

Pathology:

1. The uterus is distended by thin walled, translucent, grape-like vesicles of different sizes. These are degenerated chorionic villi filled with fluid.
2. There is no vasculature in the chorionic villi leads to early death and absorption of the embryo.
3. There is trophoblastic proliferation, with mitotic activity affecting both syncytial and cytotrophoblastic layers. This causes excessive secretion of hCG,chorionic thyrotrophin and progesterone. On the other hand, oestrogen production is low due to absence of the foetal supply of precursors.
4. High hCG causes multiple theca lutein cysts in the ovaries in about 50% of cases. It also results in exaggeration of the normal early pregnancy symptoms and signs.

Types:

(i) Complete mole:

- The whole conceptus is transformed into a mass of vesicles.

- No embryo is present.

- It is the result of fertilisation of anucleated ovum (has no chromosomes) with a sperm which will duplicate giving rise to 46 chromosomes of paternal origin only.

(ii) Partial mole:

- A part of trophoblastic tissue only shows molar changes.

- There is a foetus or at least an amniotic sac.

- It is the result of fertilisation of an ovum by 2 sperms so the chromosomal number is 69 chromosomes.

DIFFERENTIATION BETWEEN COMPLETE AND PARTIAL MOLE

Feature	Complete Mole	Partial Mole
Embryonic or foetal tissue	Absent	Present
Swelling of the villi	Diffuse	Focal
Trophoblastic hyperplasia	Diffuse	Focal
Karyotype	Paternal 46 XX (96%) or 46 XY (4%)	Paternal and maternal 69 XXY or 69 XYY
Malignant Changes	5-10%	Rare

DIAGNOSIS:

(A) Symptoms:

1. Amenorrhoea: usually of short period (2-3 months).
2. Exaggerated symptoms of pregnancy especially vomiting.
3. Vaginal bleeding which is usually dark brown and may be associated with passage of vesicles.
4. Abdominal pain : may be ,

   - dull-aching due to rapid distension of the uterus,

   - colicky due to starting expulsion,

   - sudden and severe due to perforating mole.

(B) Signs:

General examination:

1. Pre-eclampsia develops in 20% of cases, usually before 20 weeks' gestation.
2. Hyperthyroidism develops in 10% of cases manifested by enlarged thyroid gland, tachycardia and elevated plasma thyroxin level.
3. Breast signs of pregnancy.

Abdominal examination:

1. The uterus is larger than the period of amenorrhoea in 50% of cases, corresponds to it in 25% and smaller in 25% with inactive or dead mole.
2. The uterus is doughy in consistency
3. Foetal parts and heart sound cannot be detected except in partial mole.

Local examination :

1. Passage of vesicles (sure sign).
2. Bilateral ovarian cysts (5-20 cm) in 50% of cases.

(C) Investigations:

1. Urine pregnancy test: is positive in high dilution. 1/200 is highly suggestive, 1/500 is surely diagnostic. In normal pregnancy it is positive in dilutions up to 1/100.

2. Serum b -hCG level: is highly elevated (> 100.000 mIU/m1).

3. Ultrasonography reveals*:*

The characteristic intrauterine " *snow storm*" appearance,

no identifiable foetus,

bilateral ovarian cysts may be detected.

4. X-ray : shows no foetal skeleton.

Complications:

1. Haemorrhage.
2. Infection due to absence of the amniotic sac.
3. Perforation of the uterus.
4. Pregnancy induced hypertension
5. Hyperthyroidism.
6. Subsequent development of choriocarcinoma

Treatment:

- As soon as the diagnosis of vesicular mole is established the uterus should be evacuated.

- The selected method depends on the size of the uterus, whether partial expulsion has already occur or not, the patient's age and fertility desire.

- Cross - matched blood should be available before starting.

(I) Suction evacuation:

- It is carried out under general anaesthesia, but not that which relax the uterus as halothane as it may induce severe bleeding.

- An infusion of 20 units oxytocin in 500 m1 of 5% glucose should be maintained throughout the procedure.

- Dilatation of the cervix is done up to a Hegar's number equal to the period of amenorrhoea in weeks e.g. No. 10 Hegar for 10 weeks’ amenorrhoea. The suction canula used will be of the same size also.

- A suction canula which may be metal or a disposable plastic (preferred) is introduced into the uterine cavity.

- The canula is connected to a suction pump adjusted at negative pressure of 300-500 mmHg according to the duration of pregnancy.

- Although some recommended a gentle sharp curettage to the uterus after evacuation, it is preferable to wait one week for fear of uterine perforation.

(II)Hysterotomy:

It may be needed for evacuation of a large mole to minimise and facilitate control of bleeding.

(III) Hysterectomy:

It should be cosidered in women over 40 years who have completed their family for fear of developing choriocarcinoma.

(IV) Medical induction:

Oxytocins and / or prostaglandins may be used to encourage expulsion of the mole but must always be followed by surgical evacuation.

Follow up :

- As choriocarcinoma may complicate the vesicular mole after its evacuation, detection of serum ß-hCG by radioimmunoassay for 2 years is essential.

- Detection is done every;

  - 2 weeks after evacuation to ensure regression of b -hCG level then,
  - every month for one year then,
  - every 3 months for another year.

- Persistent high level indicates remnants of molar tissues which necessitate chemotherapy (methotrexate) with or without curettage. Hysterectomy is indicated if women had enough children.

- Rising hCG, level after disappearance means developing of choriocarcinoma or a new pregnancy. So combined contraceptive pills should be used for prevention of pregnancy which can be misleading .

- It is expected that urine pregnancy test is negative 4 weeks after evacuation and serum b -hCG is undetectable 4 months after evacuation.

- Early features suggesting residual molar tissue include;

  - recurrent or persistent vaginal bleeding,
  - amenorrhoea,
  - failure of uterine involution,

- persistence of ovarian enlargement.

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Obstetrics Simplified

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Bleeding in Late Pregnancy (Antepartum Haemorrhage)

Definition

It is bleeding from the genital tract after the 28th week of pregnancy and before the end of the second stage of labour.

Classification

(A) Placental site bleeding : (62%)

Placenta praevia (22%) : Bleeding from separation of a placenta wholly or partially implanted in the lower uterine segment.

Abruptio placentae (30%) : Premature separation of a normally implanted placenta.

*Marginal separation(10%)*ý: Bleeding from the edge of a normally implanted placenta.

(B) Non-placental site bleeding : (28%)

1-Vasa praevia : Bleeding from ruptured foetal vessels.

2-Rupture uterus. 3-Bloody show.

4-Cervical ectopy , polyp or cancer.

5- Vaginal varicosity.

PLACENTA PRAEVIA

Definition

The placenta is partialy or totally attached to the lower uterine segment.

Incidence:

0.5% of pregnancies . It is more common in multiparas and in twin pregnancy due to the large size of the placenta.

Aetiology

Not well known but may be due to:

Low implantation of the blastocyst.

Development of the chorionic villi in the decidua capsularis leading to attachement to the lower uterine segment.

Large placenta as in twin pregnancy.

Degrees (types)

(1) First degree (Type I = P.P. lateralis = low-lying placenta):-

The lower edge of the placenta reaches the lower uterine segment but not the internal os.

(2) Second degree (Type II= P.P. marginalis):

The lower edge of the placenta reaches the margin of the internal os but does not cover it.

(3) Third - degree (Type III= P.P. incomplete centralis):

The placenta covers the internal os when it is closed or partially dilated but not when it is fully dilated.

(4) Fourth - degree (Type IV = P.P. complete centralis):

The placenta covers the interanl os completely whether the cervix is partially or fully dilated.

N.B. Placenta praevia marginalis posterior is of bad prognosis than marginalis anterior because:

It encroaches on the true conjugate diameter delaying engagement of the head.

Engagement of the head will compress the placenta against the sacrum, causing foetal asphyxia.

Mechanism of bleeding

Progressive stretching of the lower uterine segment normally occurs during the 3rd trimester and labour, but the inelastic placenta cannot stretch with it. This leads to inevitable separation of a part of the placenta with unavoidable bleeding. The closer to term, the greater is the amount of bleeding.

Diagnosis

Symptoms:

Causeless, painless and recurrent bright-red vaginal bleeding;

It is causeless, but may follow sexual intercourse or vaginal examination.

It is painless, but may be associated with labour pains .

It is recurrent, but may occur once in slight placenta praevia lateralis. Fortunately, the first attack usually not severe.

Signs:

General examination:

The general condition of the patient depends upon the amount of blood loss. Shock develops if there is acute severe blood loss and anaemia develops if there is recurrent slight blood loss.

Abdominal examination:

The uterus is corresponding to the period of amenorrhoea, relaxed and not tender.

The foetal parts and heart sound (FHS) can be easily detected.

Malpresentations, particularly transverse and oblique lie and breech presentation are more common as well as non-engagement of the head. This is because the lower uterine segment is occupied by the placenta.

Vaginal examination

Speculum examination to exclude local lesions is only permissible when placenta praevia has been excluded by ultrasound.

P/V is indicated only if active treatment is initiated. This may provoke a severe attack of bleeding so it should be done with the following precautions:

In the operating room,

under general anaesthesia,

cross- matched blood is in hand,

operating theatre is ready for immediate caesarean section.

If the index finger is introduced gently through the dilated cervix, the placenta can be felt as a tough fibrous mass.

Differential diagnosis :

Other causes of antepartum haemorrhage.

Investigations:

(1) Ultrasound:

It is the most simple, precise and safe method for placental localization. A partially full bladder is necessary to identify the lower edge of the placenta. If it is less than 3 cm from the margin of the internal os , it is diagnosed as placenta praevia.

The posterior placenta praevia is difficult to be identified due to shadowing from the presenting part of the foetus. This can be overcome by head-down tilt of the patient or displacing, the presenting part manually. If difficulty still present, the distance between the presenting part and the promontory of the sacrum is measured. If this exceeds 1.5 cm it means that placenta lies inbetween.

In mid - pregnancy the placenta reaches the internal os in up to 20% of pregnancies. With increasing gestational age and the formation of the lower uterine segment, a gap develops between the placental edge and the internal os " *placental migration*". So it is recommended to repeat scan when placenta praevia is diagnosed in mid - pregnancy.

(2) Soft tissue placentography, isotopes and thermography:

are old methods for placental localization that are obsolete nowadays.

Treatment

At home:

Arrange for immediate trasfer to the hospital.

No vaginal examination and no vaginal pack, only a sterile vulval pad is applied.

No oral intake as anaesthesia may be required.

Antishock measures as pethidine IM, fluids and blood transfusion may be given in the way to the hospital if bleeding is severe.

At Hospital:

Assessment of the patient's condition, general and abdominal examination and resuscitation if needed.

At least 2 unites of cross matched blood should be available.

Ultrasonography for:

differentiation between abruptio placentae (retroplacental haematoma in a normally implanted placenta), marginal bleeding (separation of the margine of a normally implanted placenta) and placenta praevia (in the lower uterine segment),

assessment of foetal viability age, position and presentation.

Then management is carried out as following:

(I) If the patient is not in labour:

Look to the amount of bleeding;

If the bleeding is severe, continue antishock measures and do immediate caesarean section .

If the bleeding is slight , look to the gestational age;

If completed 37 weeks (36 weeks by some authors) or more, pregnancy is terminated by induction of labour or caesarean section (see later). At this time, the foetus is mature and the mother will be in a risk of severe haemorrhage as term

approaches.

If less than 37 weeks (36 weeks by others), conservative treatment is indicated till the end of 37 (or 36) weeks but not more.

Conservative treatment:

The patient is kept hospitalized with bed rest and observation till delivery.

Anaemia should be corrected if present.

Observation of foetal wellbeing.

Anti-D immunoglobulin is given for the Rh-negative mother.

(II) If the patient is in labour:

Vaginal examination is done under the previously mentioned precautions. According to the findings, the patient will be delivered either vaginally by amniotomy + oxytocin or by caesarean section.

Vaginal delivery is allowed if the following findings are fulfilled:

Placenta praevia is lateralis or marginalis anterior,

bleeding is slight,

vertex presentation,

adequate pelvis with no soft tissue obstruction.

partialy dilated cervix to allow amniotomy. Amniotomy has 2 benefits:

Allows descent of head so it compresses the placental site preventing further bleeding.

It abolishes the shearing movement of the placenta during uterine contractions. As the bulging of fore bag of water during contractions with intact membranes will drag the edge of the placenta evoking more bleeding.

Caesarean section is indicated in :

Placenta praevia centralis whether complete or incomplete even if the foetus is dead.

Placenta praevia marginalis posterior.

Severe bleeding.

Presentation other than vertex.

Other obstetric indications as contracted pelvis, cord prolapse and elderly primigravida.

Vasa praevia.

N.B. Although upper segment C.S. is sometimes advocated to be away from the placenta, lower segment C.S. is preferable because:

It allows better control of bleeding from the placental site.

It leaves a stronger scar can withstand subsequent vaginal delivery.

If placenta praevia was anteriorly implanted it is gently displaced laterally to reach the foetal head otherwise cut through it (not preferred).

Complications of Placenta Praevia:

(A) Maternal:

Maternal mortality rate is 0.2%.

(I) During pregnancy:

(1) Abortion. (2) Preterm labour.

(3)Antepartum haemorrhage.

(4) Malpresentation and non-engagement.

(II) During labour:

(1) Premature rupture of membranes.

(2) Cord prolapse.

(3) Inertia.

(4) Obstructed labour.

(5) Postpartum haemorrhage.

(6) Retained placenta.

(7) Placenta accreta due to deficient decidual reaction in the lower segment allows deep penetration of chorionic villi. This may necessitate hysterectomy.

(8) Lacerations of lower uterine segment due to increased vascularity and friability.

(9) Air embolism due to low placental site.

(B) Foetal:

Foetal mortality rate is 20 %.

(1) Prematurity.

(2) Asphyxia.

(3) Malformations (2%).

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Obstetrics Simplified

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Abruptio Placentae (Accidental Haemorrhage)

Definition

Premature separation of a normally situated placenta after the 28th week of pregnancy and before delivery of the foetus.

Incidence

0.5-1%.

Aetiology

Unknown , but the following factors may be associated with :

1. Hypertensive disorders of pregnancy (30%) due to spasm and degenerative changes in the decidual arterioles.
2. Trauma as during external version.
3. Sudden drop of intrauterine pressure as rupture of membranes in polyhydramnios.
4. Folate deficiency and may be vitamin C,K, or E deficiency.
5. Passive congestion of the uterus due to pressure of the gravid uterus on the inferior vena cava.
6. Torsion of the uterus.
7. Smoking.

Pathogenesis

- Separation of the placenta results in formation of a retroplacental haematoma and its extension leads to more separation of the adjacent placental tissue (*concealed haemorrhage*).
- Ultimately the blood reaches the placental margin and tracks between the membranes and uterine wall to escape from the cervix *(revealed haemorrhage).*
- The presence of concealed and revealed haemorrhage together called *mixed variety.* Thus the three varieties are actually different presentations to one process.
- If separation of the membranes does not occur, there is progressive disruption of the placental tissue and intravasation of blood through the myometrium even up to

the peritoneal coat resulting in *Couvelaire's uterus.*

- Thromboplastin-like substances are released from the damaged placental site and passed to the maternal circulation initiating the process of disseminated intravascular coagulopathy (DIC).
- *Acute renal failure* may result from renal ischaemia caused by :

  a. hypovolaemia,

  b. reflex spasm of the renal vessels due to sudden distension of the uterus,

  c. occlusion of the glomerular capillaries by microthrombi from DIC, and /or

  d. kidney pathology caused by hypertensive states of pregnancy.

Early stage of renal ischaemia causes renal tubular necrosis which is reversible. Later on , irreversible cortical necrosis occurs.

- *Postpartum haemorrhage* is common as the result of:

  - uterine damage,

  - uterine atony,

  - coagulation failure (DIC),

  - anaemia,

  - inhibition of myometrial activity by fibrinogen degradation products (FDP) present in DIC, and
- *Sheehan's syndrome*: severe antepartum and / or postpartum haemorrhage leads to necrosis of the anterior pituitary.

Diagnosis

Symptoms:

1. Acute constant severe abdominal pain which may be localised or diffuse.
2. Dark vaginal bleeding results from escape of blood from the retroplacental haematoma.
3. Cessation of foetal movement is common.

Signs:

(A) General examination:

1- Shock is usually present and may be marked and not proportionate to the amount of visible bleeding due to :

- concealed and/ or revealed haemorrhage,

- overdistension of the uterus and damage of the myometrium causing neurogenic shock.

2- Blood pressure is;

- subnormal due to haemorrhage,

- normal due to falling from previous hypertension or

- high due to slight bleeding in hypertensive patient.

3- Tachycardia.

(B) Abdominal examination:

1. Uterus is large for date and increasing gradually in size due to retained blood.
2. Uterus is very tender and hard (board-like).
3. Foetal parts are difficult to be felt.
4. FHS may be absent due to foetal death in severe cases or distressed in mild cases.

(C) Vaginal examination:

Done under the same precautions in placenta praevia may reveal:

1. Vaginal bleeding which is dark as it is retained for some time before escape.
2. If the cervix is dilated the placenta is not felt.

Differential diagnosis:

1. Other causes of antepartum haemorrhage.

2. Other causes of acute abdomen.

Investigations:

1. *Ultrasound :* detects normally sited placenta with retroplacental haematoma that may dissect the placental margin.

2. *Tests for DIC* (see later).

Treatment

At home:

The same as in placenta praevia.

At hospital

As placenta praevia regarding:

1. Assessment of the patient’s condition, general and abdominal

examination and resuscitation.

2. Blood volume preservation.
3. Ultrasonography.

Delivery:

Patient with abruptio placenta has to be delivered and usually there is no place for conservative treatment.

(I) Amniotomy + oxytocin if :

- bleeding is not severe,

- vertex presentation,

- the cervix is partially dilated.

- adequate pelvis with no soft tissue obstruction,

Advantages of amniotomy:

- It reduces the intrauterine tension, intravasation of blood between myometrial muscles and its damage.

- Reduces the pain and shock.

- Reduces the incidence of renal failure.

- Stimulates the onset of labour and improves uterine contractions pattern.

(II) Caesarean section is indicated in :

- Severe haemorrhage whether the foetus is dead or alive.

- Living foetus and labour is expected to be longer than 6 hours e.g. closed cervix.

- Foetal distress.

- Failure of progress after amniotomy + oxytocin.

- Other indications for C.S. as contracted pelvis, malpresentations and elderly primigravida.

Postpartum:

The patient is more liable for postpartum haemorrhage so oxytocin is continued after delivery of the foetus, methergin is given with delivery of the shoulders if there is no hypertension with continuous massage of the uterus.

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Obstetrics Simplified

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Marginal Haemorrhage

Definition

Bleeding from the edge of a normally situated placenta after 28th weeks' gestation.

Clinical Picture

Similar to that of placenta praevia.

Symptoms:

Vaginal bleeding.

Signs:

(A) General examination:

The general condition proportionates to the amount of bleeding as all the blood loss is revealed

(B) Abdominal examination:

No characteristic signs.

(C) Vaginal examination:

- Done under the same precautions in placenta praevia.
- There is vaginal bleeding and if the cervix is dilated the placenta is not felt.

Investigations

Ultrasound reveals a normally situated placenta in the upper uterine segment with no retroplacental haematoma.

Treatment

At home:

As in placenta praevia.

At hospital:

Assessment, resuscitation and ultrasound.

(I) If the patient is not in labour:

a) If the bleeding is severe ® caesarean section.

b) If the bleeding is slight,

- Gestantional age is completed 37 weeks or more® termination of pregnancy by induction of labour or C.S.
- If not completed 37 weeks conservative treatment is carried out as placenta praevia till completed 37 weeks.

(II) If the patient is in labour:

Delivery is carried out by amniotomy + oxytocin or C.S if indicated.

Ruptured Vasa Praevia

In velamentous insertion of the cord, some of the foetal vessels in the membranes cross the region of the internal os. When the membranes ruptures, the foetal vessels are torn and bleeding occurs which is usually slight. Foetal heart rate abnormalities are detected .

Investigations:

The foetal blood can be detected by :

1. *Apt's test:* 4-6 drops of the antepartum haemorrhage blood is added to 10 ml of water then 2 ml of sodium hydroxide is added. The foetal blood remains red/ pink for at least 2 minutes and turns green/brown after 10-20 minutes due to resistance to alkali in formation of alkaline haematin. If the blood is maternal in origin it turns green/ brown within 10 seconds.
2. *Spectrophotometer*: Foetal haemoglobin shows different ultraviolet absorption than adult haemoglobin.
3. *Blood film* : Foetal RBCs can be detected by a special cytochemical stain and it may be nucleated.

Treatment:

Immediate caesarean section.

Differential Diagnosis of Antepartum Haemorrhage

	Placenta Praevia	Marginal Haemorrhage	Abruptio Placentae
(I) History: *Bleeding*	- Painless, causeless, recurrent. - Usually starts slight in amount.		- Associated with abdominal pain. - A cause may be detected. - Usually starts severe in amount.

(II) Examination: *(1) General*	- The degree of shock is proportionate to the amount of blood loss. - Hypertension usually not present.		- The degree of shock may be out of proportion to amount of blood loss. - Hypertension usually present.
(2) Abdominal - Uterus - Foetus - FHS	- No tenderness or hardness. - Easily felt. - Usually normal.		- Tender, hard. - Not easily felt. - Absent or distressed.
(3) Vaginal (with the precautions) - Bleeding - Placenta	- Bright red. - Can be felt	- Dark red. - Not felt.	
(III) Investigations - Urine - Blood - Ultrasound for placenta	- Normal. - Normal. - In lower segment.	- Normal. - Normal. - In upper segment.	- Proteinuria. - DIC may present. - In upper segment + retroplacental haematoma may present.

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Obstetrics Simplified

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Hyperemesis Gravidarum

Definitions

Morning sickness: is the nausea felt by about 50% of pregnant women on getting up in the morning.

Emesis gravidarum : Actual vomiting in the morning.

These two conditions usually start between the 4th and 6th weeks of pregnancy and improves or disappears about the 12 th week.

Hyperemesis gravidarum: The vomiting is not confined to the morning but it is repeated throughout the day until it affects the general condition of the patient.

Incidence

1:500 pregnancies.

Aetiology

The following theories were postulated:

(1) *Hormonal* : high human chorionic ganadotrophin (hCG) stimulates the chemoreceptor trigger zone in the brain stem including the vomiting center. This is the most accepted theory and proved by the higher frequency in the conditions where the hCG is high as in :-

- early in pregnancy,
- vesicular mole and
- multiple pregnancy.

(2) *Allergy:* to the corpus luteum or the released hormones.

(3) *Deficiency* of:

a- adrenocortical hormone and /or,

b- vitamin B_6 and B_1

(4) *Nervous and psychological :* due to

- psychological rejection of an unwanted pregnancy,

- fear of pregnancy or labour so it is more common in primigravidae.

Pathological Changes:

These are the same as in prolonged starvation:

1. *Liver*: small fatty infiltration.
2. *Kidney*: fatty degeneration of the convoluted tubules.
3. *Heart*: small subendocardial and subpericardial haemorrhages.
4. *Brain*: congestion and petechial haemorrhages in the brain stem resembling that of Werniche's encephalopathy.
5. *Eye*: optic neuritis and retinal haemorrhage.
6. *Peripheral nerves:* degeneration.
7. *Blood*:

   (i) Hypovolaemia and haemoconcentration.

   (ii) Hyponatraemia, hypokalaemia and hypochloraemia.

   (iii) Increased blood urea .

   (iv) Hyperbilirubinaemia (due to liver damage).

   (v) Acidosis.

8- *Urine*:

   (i) Oliguria.

   (ii) Increased specific gravity.

   (iii) Decreased chloride.

   (iv) Albuminuria.

   (v) Ketonuria.

Diagnosis

Symptoms:

1. The patient cannot retain anything in her stomach. vomiting occurs through the day and night even without eating.
2. Thirst, constipation and oliguria.
3. In severe cases, vomitus is bile and/ or blood stained.
4. Finally , there is manifestations of Werniche's encephalopathy as drowsiness, nystagmus and loss of vision then coma.

Signs:

Manifestations of starvation and dehydration:

1- Loss of weight.

2- Sunken eyes.

3- Dry tongue and inelastic skin.

4- Pulse: rapid and weak.

5- Blood pressure: low.

6- Temperature: slight rise.

Differential diagnosis:

Other causes of vomiting as:

- cholecystitis,

- appendicitis,

- pyelonephritis,

- gastroenteritis,

- gall bladder diseases,

- complicated ovarian tumours.

Management

(A) Hospitalisation:

For observation, fluid therapy and competition of neurosis.

(B) Intravenous fluids:

- Oral feeding is prevented for 24-48 hours.
- Three litres of glucose 5% is given by rapid infusion over 2-3 hours.
- Maintain intravenous glucose 5% and saline therapy.
- When vomiting is controlled frequent gradual small carbohydrate diets are started.

(C) Drugs:

1. Adrenocortical preparations.
2. Vit. B_6 and Vit. B_1.
3. Antihistaminics that have antiemetic effect as meclozine hydrochloride 25-50 mg twice daily. A preparation contains both meclozine hydrochloride + pyridoxine hydrochloride (vit. B_6) is of

good benefit.

4. Phenothiazine (chlorpromazine=largactil) 5-10 mg three times daily has a tranquilliser and antiemetic effect.

(D) Observation for:

1. *Vomiting:* frequency, amount, colour and contents.

2. *Vital signs :* pulse, temperature and blood pressure.

3. *Fluid:* intake and output.

4. *Urine analysis :* specific gravity , albumin, ketone bodies, chloride and bile pigments.

5. *Blood* : urea, electrolyte and liver function tests.

6. *Eye:* examination of the fundus.

(E) Termination of pregnancy:

Indications:

1. Persistent severe vomiting after one week of treatment.
2. Pulse is persistently above 100/min, temperature persistently above 38ºC or the systolic blood pressure is persistently below 100 mmHg.
3. Jaundice or bile in urine.
4. Anuria, absence of chloride in urine, persistent albuminuria or high blood urea.
5. Retinal haemorrhage or Werniche's encephalopathy .

Methods of termination:

1. Vaginal evacuation: if pregnancy is less than 12 weeks.
2. Abdominal hysterotomy: if pregnancy is more than 12 weeks. Use nitrous oxide + oxygen for anaesthesia but not agents that affect liver as halothane. Prostaglandins cannot be used as it will aggravate the vomiting.

N.B. mild case of hyperemesis gravidarum:

i.e. without dehydration can be treated as an outpatient with the same drugs. If not responding admit to the hospital.

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Obstetrics Simplified

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Polyhydramios and Oligohydramnios

POLYHYDRAMNIOS

Definition

An amount of amniotic fluid more than 2000 ml.

Incidence

About 1:200.

Aetiology

Increased production or decreased consumption of amniotic fluid will result in polyhydramnios.

(A) Foetal causes:

(I) Congenital anomalies:

1- Anencephaly: accounts for 30-50% of the cases. This is due to:

i. transudation of the cerebro-spinal fluid from the exposed meninges.

ii. absence of swallowing of the liquor.

iii. foetal polyuria resulting from lack of antidiuretic hormone or irritation of the exposed centres.

2- Atresia of the oesophagus or duodenum enable the foetus to swallow the liquor.

(II) Uniovular twins:

Due to interconnecting vascularity in the placenta, one foetus obtains more circulation so that its heart and kidneys hypertrophy leading to increased urine production. So one amniotic sac only is affected.

(III) Increased placental mass:

i) Oedema of the placenta due to :

- hydrops foetalis resulting from Rh-incompatibility, severe anaemia,haemoglobinopathies particularly

a-thalassaemia major and cytomegalovirus infection.

- true knot of the cord causes obstruction of venous return with placental congestion.

- foetal liver cirrhosis as in syphilis.

ii) Chorio-angioma and large placenta.

(B) Maternal causes:

(I) Diabetes mellitus due to:

i. increased osmotic pressure of the liquor amnii due to its high sugar content,

ii. foetal polyuria resulting from hyperglycaemia.

(II) Pregnancy induced hypertension:

Due to oedema of the placenta.

(III) Severe generalised oedema:

Cardiac, hepatic or renal.

Clinical Varieties

(I) Acute hydramnios:

- Very rare,
- rapid accumulation of liquor,
- occurs before 20 weeks,
- the commonest cause is uniovular twins but foetal anomalies are also common.

(II) Chronic hydraminos:

- More common,
- accumulation of liquor is gradual,
- it occurs in late pregnancy,
- the condition may end by preterm labour.

Clinical Picture

(A) Symptoms:

1. Abdominal discomfort and pain in acute hydramnios.
2. Pressure symptoms: dysponea, palpitation, indigestion, haemorrhoids, oedema and varicosities of the lower limbs.

(B) Signs:

1-General examination:

may reveal pregnancy-induced hypertension.

2- Abdominal examination:

a- Inspection: overdistended abdomen.

b- Palpation :

- The fundal level is higher than gestational age.
- The uterus is tense cystic.
- The foetal parts are felt with difficulty by dipping.
- Fluid thrill can be elicited.
- Malpresentation and nonegagement are common.

c- Auscultation: faint FHS.

Investigation

Ultrasonography can reveal:

- Excessive amount of liquor.
- Malpresentations.
- Multiple pregnancy.
- Congenital anomalies.
- Intrauterine foetal death.

Differential Diagnosis

1. Causes of over sized pregnant uterus.
2. Ovarian cyst with pregnancy.
3. Ascites.

Management

(A) Acute hydramnios:

Termination of pregnancy by high artificial rupture of membranes. This allows gradual escape of liquor thus shock and separation of the placenta are avoided.

Shock results from rapid accumulation of blood in the splanchnic area after sudden drop of intrauterine pressure.

Separation of the placenta occurs due to sudden drop of intrauterine pressure and shrinkage of the placental site following this. Drew Smythe catheter is used for rupture of hind water in such conditions.

(B) Chronic hydramnios:

(I) During pregnancy:

1. Termination of pregnancy by high artificial rupture of membranes if the foetus is dead or malformed.
2. Expectant treatment if the foetus is healthy.

    - rest,

    - sedative,

    - salt restriction,

    - treatment of the underlying cause as diabetes and toxoplasmosis.

    - Termination of pregnancy if the condition is not improved or get worse.

3- Repeated amniocentesis may be indicated in premature foetus with marked pressure symptoms. 1.5-2 litres can be aspirated in a rate not exceeding 500 ml/hour under sonographic control. However, the amniotic fluid is rapidly reaccumulating and there is risk of premature labour, injury to the foetus or umbilical cord vessels.

(II) During labour:

1. Malpresentation, cord presentation and / or cord prolapse should be detected and the labour is managed according to the condition.
2. When the cervix is half dilated Drew Smythe catheter is passed to rupture the hind water. This will initiate uterine contractions which can be enhanced by oxytocins.
3. Active management of third stage is carried out to guard against postpartum haemorrhage.

(III) Care of the newborn:

- Congenital anomalies should be excluded. Oesophageal atresia can be excluded by passing a soft rubber catheter down to the stomach of the new born.

- Care of newborns to diabetic mothers (see diabetes).

- Care of newborns to Rh-incompatibility mothers (see Rh-isoimmunization).

- Care of preterm babies (see prematurity).

Complications

(I) Maternal :

(a) During pregnancy:

(1) Abortion.

(2) Preterm labour.

(3) Pregnancy-induced hypertension.

(4) Pressure symptoms.

(5) Malpresentation.

(b) During labour:

(1) Premature rupture of membranes.

(2) Cord prolapse.

(3) Abruptio placentae.

(4) Shock.

(5) Postpartum haemorrhage.

(II) Foetal:

(1) Prematurity.

(2) Asphyxia due to cord prolapse or placental separation.

OLIGOHYDRAMNIOS

Definition

Reduction of amniotic fluid volume below 500 ml. Anhydramnios is complete absence of amniotic fluid which is very rare.

Incidence

1:750.

Aetiology

1. Placental insufficiency: as in severe pre-eclampsia and post-term pregnancy.
2. Urinary tract malformations: as renal agenesis (detected by empty foetal bladder on serial ultrasonic scanning) and obstruction of the urinary tract.

Clinical Picture

1. Uterus is small for date.
2. The foetus is in hyperflexed attitude and breech presentation is common.

Investigations

1. *Ultrasound:* shows small (<1x1cm) amniotic fluid locules. It is important to exclude congenital anomalies, growth retardation and identifies foetal presentation.
2. *X-ray:* shows hyperflexion of the foetal spines.

Complications

1. *Pulmonary hypoplasia:* as the amniotic fluid is essential for lung distension.
2. *Abnormal foetal development:* due to compression of uterine wall and adherent foetal parts.
3. *Abnormal attitude and presentations*.

Management

- *In post-term:* Termination of pregnancy is indicated.

- *During labour:* Observe for foetal distress as it is more common, if occurs do immediate vaginal or abdominal delivery according to the circumstances.

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Obstetrics Simplified

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Hypertensive Disorders in Pregnancy

Classification

(I) Pre-existing (chronic) hypertension:

Hypertension is present before pregnancy, detected in early pregnancy (before 20 weeks in absence of vesicular mole) and postpartum.

Examples:

- essential hypertension ,
- secondary to chronic renal disorders e.g. pyelonephritis and renal artery stenosis,
- coarctation of the aorta, systemic lupus erythematosus and pheochromocytoma.

(II) Pregnancy-induced hypertension (PIH):

(1) Transient hypertension:

Late onset hypertension, without proteinuria or pathologic oedema

(2) Pre-eclampsia:

Hypertension with proteinuria and / or oedema after 20 weeks of pregnancy, but may be earlier in vesicular mole.

(3) Eclampsia:

Pre-eclampsia + convulsions.

(III) Superimposed pre-eclampsia or eclampsia:

Development of pre-eclampsia or eclampsia in pre-existing hypertension detected by a further increase of 30 mmHg or more in systolic blood pressure or 15 mmHg or more in diastolic blood pressure.

PRE-ECLAMPSIA

Incidence

5-10%.

Aetiology

Although eclampsia had been described since 200 years, no definite aetiology is found for PIH and it is still a disease of theories.

Predisposing factors:

1. Primigravidae more than multigravidae.
2. Pre-existing hypertension.
3. Previous pre-eclampsia.
4. Family history of pre-eclampsia.
5. Hyperplacentosis i.e. excessive chorionic tissue as in hydatidiform mole ,multiple pregnancy, uncontrolled diabetes mellitus and foetal haemolytic diseases.
6. Obesity.
7. Climatic variations.

Theories:

(I) The uteroplacental bed:

In early pregnancy, the cytotrophoblasts invade the decidual arteries making their musculature more flaccid and dilated. During the second trimester of normal pregnancy, a second wave of invasion occurs into the myometrial segments of the spiral arteries. If the second invasion does not occur pre-eclampsia develops.

(II) Immunological factor:

- Stimulation of the maternal immune system by the early conceptus is essential for production of the blocking factors that prevent rejection of the foetus and placenta. Hypoimmune response results in damage of the placenta and subsequent pre-eclampsia.
- **The evidences is that:** Pre eclampsia is less common in previously stimulated immunity conditions as in:

  - Previous pregnancy.

  - Previous blood transfusion.

  - Consanguineous marriages.

- Increased maternal anti-HLA (human leucocyte antigen) antibodies.

(III) Genetic factor:

A maternal autosomal recessive gene or a foetal genetic component could be responsible. An increase in HLA-DR_4 (subtype of human leucocyte antigen) has been noted in pre-eclamptic women, their babies and their sisters who developed PIH.

(IV) Renin- angiotensin system:

It was found that the vascular sensitivity to angiotensin II is reduced in normal pregnancy while it increases in PIH.

Angiotensin II -binding sites on platelets increase in women with PIH in comparison with normal pregnancy.This can identify the women in risk of developing PIH and hence prophylaxis against it can be achieved by anti-platelets as aspirin.

(V) Atrial natriuretic peptide (ANP):

It's release is stimulated by volume expansion and increase in atrial pressure. It is increased in normal pregnancy to ameliorate the effect of the increased angiotensin II. Actually, there is no evidence that there is decrease in ANP in PIH, but in contrast, it may be increased as a response to increased blood pressure.

(VI) Prostaglandins:

Prostacyclin is a vasodilator and an inhibitor for platelets aggregation while thromboxane is a vasoconstrictor and platelets aggregator. In PIH, there is imbalance towards an increase in thromboxane production.

(VII) Neutrophils:

Neutrophils activation causes damage and dysfunction of the vascular endothelium leading to platelets aggregation, coagulation activation, hypertension and proteinuria.

Pathological Changes

(I) Vasospasm :

Is the basis to the pathophysiology of PIH accounts for the development of hypertension. The vascular changes and local hypoxia of the surrounding tissues lead to haemorrhage, necrosis and other pathological changes.

1. *Central nervous system :* ischaemia, haemorrhages and oedema.
2. *Liver:* subcapsular haemorrhage, periportal necrosis and infarctions.
3. *Endocrine glands:* necrosis and haemorrhage in pituitary, pancreas and adrenal glands.

4. *Heart and lungs:* myocardial and endocardial haemorrhage and necrosis. Lungs shows haemorrhage and secondary bronchopneumonia.

5. *Kidney:*decrease in renal blood flow ® glomerular damage (glomerular endotheliosis) leading to:

   - decrease glomerular filtration rate by about 50%,

   - loss of protein in urine (albuminuria),

   - elevated serum levels of uric acid, urea and creatinine. Serum uric acid level is diagnostic and prognostic for severe pre-eclampsia.

6- *Placenta :*

   Reduced utero-placental blood flow leading to intrauterine growth retardation (IUGR) and even death.

   Placental thrombosis, infarction and abruptio placentae.

7- *Retina:* Vascular spasm, haemorrhage, exudate and rarely retinal detachment in severe cases.

(II) Coagulation status:

1. Fibrin production is increased.
2. Fibrinolytic activity is decreased.
3. Factor VII, factor VIII- related antigen and fibrin/ fibrinogen degradation products (FDP) concentrations in the plasma are all increased.
4. Fibrin and platelet deposition is increased particularly in the placental arteries.
5. Thrombocytopenia.
6. Platelets are activated in the microcirculation of the placenta, kidney and liver, release their products as 5-hydroxytryptamine and re-enter the circulation in an exhausted state, unable to respond normally to aggregating agents and having lower level of 5-hydroxytryptamine.

The end result of these changes is hypercoagulability and *disseminated intravascular coagulation* in severe pre-eclampsia and eclampsia.

(III) Sodium and water retention:

There is *haemoconcentration* with fluid shift from the intravascular to the extravascular compartment.

N.B. HELLP syndrome is described in PIH which consists of:

H = Haemolysis, EL= Elevated Liver enzymes, LP= Low Platelet count.

Diagnosis

(A) Signs:

(I) Hypertension:

Blood pressure of 140/90 mmHg or more or an increase of 30 mmHg in systolic and/or 15 mmHg in diastolic blood pressure over the pre-or early pregnancy level.

How to measure the blood pressure in pregnancy?

1. The patient should rest for at least 30 min. after arriving to the clinic.
2. Remove any tight clothing from the right arm.
3. The patient lies comfortably on the left side that her back makes an angle of about 30º with the bed. The right arm is supported to be with the sphygmomanometer at the same level with the patient's sternum i.e. her heart. Each cm above or below the level of the heart induces a difference of 0.7mmHg in blood pressure reading. She should lie undisturbed in this position for 2-3 min. before blood pressure is measured.
4. The cuff should be applied to the right upper arm with the connecting tubes pointing downwards, the centre of the rubber bag in the cuff is directly over the brachial artery leaving ante-cubital fossa free.
5. Apply cuff firmly but not tightly around the arm.
6. Feel the brachial artery and apply the stethoscope directly over it without undue pressure.
7. Pump up cuff rapidly to 20-30 mmHg above the point at which the pulse sound disappears,and take blood pressure reading without delay.
8. Let air out slowly so that mercury falls steadily by 2-3 mm/sec.

Blood pressure measurement phases (Korotkoff):

Korotkoff I¾ Appearance of the sound¾ systolic reading.

Korotkoff II¾ Accentuation of the sound.

Korotkoff III ¾ Sound becomes harsh.

Korotkoff IV¾ Sound becomes muffled¾ diastolic reading.

Korotkoff V¾ Disappearance of the sound.

9- Korotkoff I and IV is the reading for systolic and diastolic blood pressure respectively. If you wait the disappearance of the sound to take the diastolic reading (as in non-pregnant state) you may reach down to zero because of the hyperdynamic circulation during pregnancy.

10- Use the right arm for measuring because it is more covenient to the physician, but if the reading is 10 mmHg or more higher in the left arm use it in the future readings.

11- The blood pressure should be measured in two occasions at least 6 hours apart.

(II) Proteinuria (albuminuria):

- It is urinary protein greater than 0.3gm/L in 24 hours collection or greater than 1gm/L in two random samples obtained at least 6 hours apart.
- It indicates glomerular damage and almost always occurs after hypertension.
- Proteinuria is usually in the range of 1-3 gm daily, of which 50-60% is albumin but in severe cases it may exceed 15gm.

(III) Oedema:

- It is weight gain of more than 1 kg in any one week or 2.25 kg in any one month.
- Clinical oedema is present in about two-thirds of patients with PIH.However, two-thirds of pregnant women with clinical oedema do not develop hypertension.

(B) Symptoms:

These are usually manifestations of severe pre-eclampsia.

1. Headache: usually frontal but may be occipital. It is due to cerebral oedema and hypertension.
2. Visual disturbances: blurring of vision, flashes of light or blindness.
3. Epigastric or right upper quadrant pain: due to enlargement and subcapsular haemorrhage of the liver.
4. Nausea and vomiting : due to congestion of gastric mucosa and/ or cerebral oedema.
5. Oliguria or anuria: due to kidney pathology.

(C) Investigations:

1. *Complete urine examination*: for proteinuria, pus cells, RBCs, casts, specific gravity, culture and sensitivity .
2. *Kidney function tests* : serum uric acid > 6 mg % is abnormal during pregnancy. It is more specific for pre-eclampsia than creatinine.
3. *Coagulation status:* Platelet count, fibrinogen and FDP as DIC may develop.

4. *Eye fundus examination.*
5. *Tests for foetal well being*: as

    - ultrasound,

    - daily foetal movement count,

    - non-stress test,

    - oxytocin challenge test (if needed).

Screening for PIH

These are tests to predict the development of pre-eclampsia.

(I) Tests depend on blood pressure measurement:

(1) Roll -over test:

After resting in the left lateral position turning to a supine position induces a rise in diastolic pressure of 20 mmHg or more is indicative of tendency to develop pre-eclampsia. Subsequent reports have indicated that the test is less satisfactory.

(2) Mid-trimester mean blood pressure:

If the mean arterial blood pressure (the diastolic pressure +1/3 the pulse pressure) is more than 90 mmHg, the risk of developing PIH increases by over four folds.

(3) Hand -grip test:

Isometric (sustained) contraction of striated muscles is known to cause general sympathetic activation and hence increase systemic arterial pressure in healthy adults. The patient compresses an inflated sphygmomanometer cuff for a 3-minutes period at maximal and then at 50% of maximal voluntary contraction. An increase in diastolic pressure >20 mmHg at 28-32 weeks' gestation is associated with an increased incidence of PIH.

(II) Forearm venous tone:

There is an increase in forearm venous tone (veno-constriction) at least 6 weeks before the diagnosis of PIH.It requires a sophisticated equipment.

(III) Urinary assays:

1. *Micro-albuminuria:* detected by radioimmunoassay before albuminuria can be detected by the ordinary methods. The drawback is that not all proteinuric pre-eclampsia are preceded by this phase.
2. *24 hours urinary calcium excretion:* is lower in women with pre-eclampsia than normotensive pregnant women.
3. *Kallikrein/creatinine ratio:* is reduced in patient who develop PIH later on if compared to the increased ratio in normal pregnancy. Kallikrein is a blood pressure reducing agent.
4. *Prostaglandins metabolites*: The end metabolite of prostacyclin is decreased while

thromboxane B_2 (the metabolite of thromboxane A_2) is increased in urine of pre-eclamptic women.

(IV) Blood tests:

1. *Plasma urate:* serial increase is a warning of PIH before appearance of other clinical features.
2. *Platelet count :* a reduction occurs early in pre-eclampsia.
3. *Anti-thrombin - III activity:* begin to decline as much as 13 weeks prior to the development of clinical manifestations of pre-eclampsia.

(V) Angiotensin II sensitivity:

1. *Sensitivity to infused angiotensin II:* is increased may be due to alteration in vascular smooth muscle A II receptors.
2. *Platelet AII binding :* is increased before development of PIH.

Types

1. Mild pre-eclampsia: blood pressure $\geq$ 140/90 mmHg ± oedema.
2. Severe pre-eclampsia:

   - blood pressure >140/90 mmHg + proteinuria ± oedema or

   - diastolic blood pressure>110 mmHg or

   - cerebral or visual disturbances.

N.B.

- *Imminent eclampsia : It is a state in which the patient is about to develop eclampsia. Usually there are :*

  - blood pressure much higher than 160 /110 mmHg ,

  - heavy proteinuria (+++or ++++),

  - hyperreflexia,

  - severe continuous headache,

  - blurring of vision,

  - epigastric pain.

- Fulminating pre-eclampsia: a rapidly deteriorating pre-eclampsia to be imminent eclampsia.

Differential Diagnosis

(I) Other causes of hypertension:

	Pre-eclampsia	Pre-existing (chronic) Hypertension
Parity	usually primigravida.	usually multigravida.
Past History	of pre-eclampsia may be present.	of hypertension in between pregnancies.
Hypertension	after the 20th week of pregnancy (except in vesicular mole) and disappears within 6 weeks postpartum.	before pregnancy, during the first 20 weeks and persists after 6 weeks postpartum.
Proteinuria	If present, it develops after hypertension.	If present, it develops before hypertension due to underlying renal disease.
Hyperreflexia	may be present.	absent.
Fundus Examination	Normal or retinal vessels spasm, oedema, exudate and papilloedema (oedema of the optic disc).	Sclerotic changes.
Serum Uric Acid	Its increase is not proportionate to serum creatinine	Its increase is propotionate to serum creatinine.

(II) Other Causes of proteinuria

1. *Contamination* of urine by vaginal discharge this is excluded by examination of a midstream sample after cleansing the introitus with sterile water or saline or by using a catheter.
2. *Urinary infection* : excluded by microscopic examination and culture of urine.
3. *Congestive heart failure and severe anaemia* due to hypoxia of the kidney.
4. *Orthostatic proteinuria*: Proteinuria is detected at the end of the day while it is absent in the morning. This is due to pressure of the lumbar spines on the left renal vein during standing.

Bed side test for proteinuria:

Add few drops of acetic or citric acid to 10 ml of clear urine in a test tube to prevent precipitation of phosphates and boil. If there is proteinuria, a white cloud will appear. Its amount and density indicate roughly the amount of proteins (+,++,+++or ++++).

(III) Other causes of oedema:

1. *General causes:* cardiac, hepatic , renal or nutritional oedema.
2. *Local causes:* as inflammatory or deep vein thrombosis (usually unilateral).

3. *Pressure of the gravid uterus :* on the pelvic veins may produce ankle oedema.

Complications

(A) Maternal :

1. Convulsions and coma (eclampsia).
2. Cerebral haemorrhage.
3. Renal failure.
4. Heart failure.
5. Liver failure.
6. Disseminated intravascular coagulation.
7. Abruptio placentae.
8. Residual chronic hypertension in about 1/3 of cases.
9. Recurrent pre-eclampsia in next pregnancies.

(B) Foetal :

1. Intrauterine growth retardation (IUGR).
2. Intrauterine foetal death.
3. Prematurity and its complications.

Treatment:

(A) Prophylactic:

(1) Proper antenatal care:

- To detect the high risk patients who may develop PIH through the screening tests.

- Early detection of cases who are already developed PIH and examine them more frequently.

(2) Low dose aspirin:

- It inhibits thromboxane production from the platelets and the AII binding sites on platelets.

- A low dose (60 mg daily) selectively inhibits thromboxane due to higher concentration of such a low dose in the portal circulation than systemic affecting the platelets when pass through the portal circulation. The prostacyclin production form the systemic vessels will not be affected.

(B) Curative:

Delivery of the foetus and placenta is the only real treatment of pre-eclampsia. As the conditions are

not always suitable for this, the treatment aims to prevent or minimise the maternal and foetal complications (see before) till reasonable maturation of the foetus.

(I) General measures:

1. Hospitalisation : with complete bed rest more in left lateral position to prevent compression of the inferior vena cava. This lowers the blood pressure, induces diuresis, reduces oedema and increases renal and placental blood flow.
2. High protein, low sodium diet.
3. Observation:

   i- Maternal:

   - blood pressure twice daily.
   - urine volume and proteinuria daily,
   - oedema daily,
   - body weight twice weekly,
   - fundus oculi once weekly,
   - blood picture including platelet count, liver and renal functions particularly serum uric acid on admission.

   ii- Foetal :

   - daily foetal movement count,
   - serial sonography,
   - non-stress and stress test if needed.

(II) Medical treatment:

1. **Sedatives :** as diazepam 2-5 mg every 8-12 hours.
2. **Antihypertensives:**

   decrease the maternal cerebral and cardiovascular complications but do not affect the foetal outcome.

   i) Alpha-methyl-dopa (Aldomet):

   - It reduces the central sympathetic drive.
   - Dose : 250-500 mg every 6-8 hours up to a maximum dose of 4 gm/day. Its effect appears after 48 hours.
   - A loading single dose of 2 gm may act within 1-2 hours.
   - Side effects : headache, athenia and nightmares.

   ii) Hydralazine (Apresoline):

- It is a vasodilator , increases renal and uteroplacental blood flow.

- Dose : 20 mg slowly IV initially followed by 5mg every 20 min. until diastolic blood pressure is 100-110 mmHg. This regimen is used for severe and acute hypertension. Oral hydralazine can be used in the chronic situation as a second line treatment in a dose of 25-75 mg/ 6 hours.

- Side effects : tachycardia, headache, flushing, nausea and vomiting.

iii) Calcium channel blockers (Nifedipine):

- It is a vasodilator acting by blocking the Ca influx into smooth muscle cells.

- It can be given sublingually (acts within 10 minutes) or orally (acts within 30 minutes) in a dose of 10-20 mg 2-3 times daily.

- The higher the starting blood pressure the greater is the hypotensive effect.

- Side effects : headache and flushing.

iv) Adreno - receptor blockers:

- Examples:Labetalol, atenolol, oxprenolol and propranolol.

- Side effects : may cause growth retardation, neonatal respiratory depression and hypoglycaemia.

- Labetalol is an a and b blocker, causes vasodilatation and given in a dose of 100-200 mg three times daily (t.d.s).

v) Angiotensin converting enzyme inhibitors:

- Example : Captopril.

- Inhibit the formation of angiotensin II from the angiotensin I.

- Side effects: Foetal renal failure and neonatal hypotension.

- It is used in treatment of postpartum hypertension.

vi) Diazoxide (Hyperstat):

- It is a potent vasodilater.

- Dose: 15-30 mg IV every minute and titrated against the blood pressure.

- Side effects : hypotension and hyperglycaemia.

(3) Diuretics:

Examples:

i) " Loop" diuretics:

- Frusemide (Lasix): 20-40 mg IV repeated at intervals of 2-4 hours.

- Thiazides: better to be avoided in pregnancy.

ii) Osmotic diuretics: as mannitol or glucose 25% IV / 8 hours which also decrease brain oedema, supply energy and support the liver.

Indications: Heart failure and pulmonary oedema.

Side effects: aggravate the haemoconcentration due to loss of salt and water so it is better to be avoided.

(4) Other drugs:

i. Dexamethasone: is effective in reducing cerebral oedema but its routine use is not recommended.

ii. Heparin: may be used in treatment of DIC if there is no current bleeding.

iii. Salt-free albumin or plasma protein fraction (PPF): indicated in an oedematous patient with low plasma osmolality and reduced central venous pressure (CVP).

iv. Antibiotics: for prophylaxis or treatment of infection particularly bronchopneumonia.

v. Anticonvulsant therapy: e.g. magnesium sulphate (see below) may be started in case of imminent eclampsia till hyperreflexia, but not reflexes,disappears.

vi. Digitalisation: to guard against or treat heart failure and pulmonary oedema if pulse is persistent >120/min. Digoxin 0.5 mg IV, followed by 0.25-0.5 mg daily.

(III) Obstetric measures:

(1) Timing of delivery:

Severe pre-eclampsia is usually treated conservatively till the end of the 36th week to ensure reasonable maturation of the foetus. *Indications of termination before 36th week include*:

a) Foetal : deteriorating placental function as judged by:

- intrauterine growth retardation,

- oligohydramnios,

- reduced foetal movements,

- abnormal foetal heart patterns, or

- failing biochemical results.

b) Maternal : deteriorating maternal condition as judged by:

- blood pressure is sustained or exceeds 180/110 mmHg,

- urine proteinuria > 5 gm/24 hours,

- oliguria ,

- evidence of DIC , or

- imminent or already developed eclampsia.

(2) Method of delivery:

i) *Vaginal delivery* may be commenced in vertex presentation by:

- amniotomy + oxytocin if the cervix is favourable.
- prostaglandin vaginal tablet (PGE_2) if the cervix is not favourable.

ii) *Caesarean section is indicated in :*

- Foetal distress.
- Late deceleration occurs with oxytocin challenge test.
- Failure of induction of labour.
- Other indications as contracted pelvis, and malpresentations.

(3) Intrapartum care:

- Close monitoring of the foetus is indicated.

- Proper sedation and analgesia to the mother. Hypotensives may be given if needed.

- 2nd stage of labour may be shortened by forceps.

(4) Postpartum care:

- Methergin is better avoided as it may increase the blood pressure.

- Continue observation of the mother for 48 hours.

- Sedatives and hypotensive drugs are continued in a decreasing dose for 48 hours.

N.B. Mild pre-eclampsia: can be treated as an outpatient with sedatives ± hypotensive drugs with frequent follow up. Pregnancy can be allowed to pass to full term but not after. Delivery is usually vaginal unless there is other indication for caesarean section.

ECLAMPSIA

Definition

It is the development of convulsions in a pre-existing pre-eclampsia.

Incidence

About 1/1000 pregnancies.

Aetiology

The exact cause is unknown but cerebral ischaemia and oedema were suggested.

Clinical Picture

1. *Premonitory stage:* the eyes are rolled up with twitches of the face and hands. It lasts for about ½ min.
2. *Tonic stage:* generalised tonic contraction of the whole body muscles with opisthotonus and cyanosis. It lasts for about ½ min.
3. *Clonic stage:* convulsions occur where there is alternative contraction and relaxation of the body muscles. The face is congested, tongue may be bitten, blood-stained frothy saliva appears on the mouth, breathing is stertorous, urine and stool may pass involuntarily, temperature rises due to increased muscular activity patient is unconcious. This lasts for about 1 min.
4. *Coma:* which may last for few hours. Other fits may occur during coma, after recovery or may not recur again.

Types

1. Antepartum eclampsia 50%.
2. Intrapartum eclampsia 25%.
3. Postpartum eclampsia 25% occurs within 48 hours of delivery. It is usually the most dangerous one.

Severity of Eclampsia

Eclampsia is considered severe if one or more of the following is present *(Eden's criteria):*

1. Coma of 6 or more hours.

2. Temperature 39ºC or more.
3. Pulse over 120/min.
4. Systolic blood pressure over 200 mmHg.
5. Respiratory rate over 40/min.
6. More than 10 convulsions.

Differential Diagnosis:

(1) Epilepsy.

(2) Intracranial haemorrhage.

(3) Hysteria.

(4) Meningitis.

(5) Brain tumours.

(6) Strychnine poisoning.

Management

(A) General measures:

1. Hospitalisation is mandatory.

2. Efficient nursing in a single quiet semi-dark room to prevent any auditory or visual stimuli.
3. After sedation, a self-retained Foley's catheter is applied. The hourly output of urine is charted. Proteinuria, haematuria and specific gravity is noticed.
4. Care for respiratory system by :
    - head - down tilt to help drainage of bronchial secretion,
    - frequent change of patient position,
    - keep upper respiratory tract clear by aspiration of mucous through a plastic airway,
    - prophylactic antibiotic and
    - oxygen is administered during and after fits.

5- The tongue is protected from biting by a plastic mouth gauge.

6- Observation for:

a- Maternal:

- pulse,

- temperature,

- blood pressure,

- respiratory rate,

- tendon reflexes,

- urine (see before),

- number of fits and duration of coma,

- uterine contraction,

b- Foetal :

FHS.

(B) Medical measures:

(1) Sedation:

- Morphine 10-20 mg IM or,
- Diazepam one ampule (10mg) IV over 4 min.then maintain by IV infusion 40 mg in 500 ml glucose 5% over 12-24 hours. Diazepam is used as an anticonvulsant as well.

(2) Antihypertensives:

Potent and rapidly acting drugs are used when needed.

Examples are:

- Hydralazine IV.

- Diazoxide IV.

(3) Anticonvulsant therapy:

a) Magnesium sulphate:

- *Action:*

  - inhibits neuromuscular transmission,

  - sedation,

  - peripheral vasodilatation,

  - diuresis.

- Dose: A loading dose 4 gm of 20% solution is given IV over not less than 3 minutes, followed by 1gm/ hour. A total dose of 24 gm/ 24 hours should not be exceeded and therapy continues during the 24 hours postpartum. The aim is to keep the plasma level at 6-8 mEq/L. At this level tendon reflexes are still present. They disappear at

>10 mEq/L and toxic effect including respiratory failure appears at 15 mEq/L.

- Before each maintenance dose the following criteria should be checked:

  i- knee jerk should be present,

  ii- respiratory rate not less than 16 / min.and

  iii-urine output not less than 30 ml/ hour.

- Magnesium sulphate can be given by IM injection of 50% solution. Loading dose is 6-10 gm divided on both buttocks then 4-5 gm/ 6 hours. This regimen is not preferred due to ill control of the blood level of $MgSo_4$ in addition to pain and inflammation of the injection site.

- The antidote: is 10 ml of 10% calcium gluconate given slowly IV.

b) Phenytoin:

- An anti-epileptic drug which can be used to prevent recurrence of fits not for its termination as it acts after about 20 min.

- Dose : 18 gm/kg body weight slowly IV.

c) Sodium thiopentone (Intraval):

- It is a short acting general anaesthetic.

- Used in emergency as frequent convulsions.

- Dose: 25 mg increments IV until convulsions are controlled.

d) Muscle relaxants:

usually used prior to procedures that might trigger off a convulsion as endotracheal intubation.

(4) Diuretics

(5) Other drugs

(C) Obstetric measures:

- The policy is that there is no conservative treatment in eclampsia and the patient should be delivered *but convulsions should be controlled first.*

- Spontaneous labour usually commences within 6 hours. If not induce labour by oxytocin as long as there is no other indication for caesarean section and vaginal delivery is anticipated within 8-12 hours. Otherwise, caesarean section is indicated *but never give general anaesthesia before control of convulsions or if the patient is in coma.*
- Intra-and postpartum care : as in pre-eclampsia.

PRE- EXISTING (CHRONIC) HYPERTENSION

Causes

(i) Essential hypertension: of unknown aetiology.

(ii) Secondary to chronic renal disorder:

e.g.

- Glomerulonephritis.

- Hydronephrosis.

- Pyelonephritis.

- Renal artery stenosis.

(iii) Secondary to cardiovascular disease:

e.g.

- Coarctation of the aorta.

- Polyartheritis nodosa.

- Systemic lupus erythematosus.

(iv) Secondary to endocrine disorders:

e.g.

- Primary aldosteronism.

- Phaeochromocytoma.

- Adrenocortical tumours.

- Diabetes mellitus.

Effect Of Pregnancy On Chronic Hypertension

1. Blood pressure falls by the second trimester in most of cases, but rises during the third trimester to a level some what above that in early pregnancy.

2. Deterioration of the underlying disease.

Effect Of Chronic Hypertension On Pregnancy

A- Maternal:

superimposed pre-eclampsia/ eclampsia in 15-20% of cases.

B- Foetal :

(1) Intrauterine growth retardation.

(2) Intrauterine foetal death.

Treatment

(1) General and medical treatment:

As pre-eclampsia regarding the following:

- Rest,
- Sedatives,
- Antihypertensives,
- Diuretics,
- Observation.

(2) Obstetric measures:

a.Therapeutic abortion : in severe cases not responding to treatment.

b. Preterm delivery if there is:

marked deterioration of the underlying disease.

indication for termination as in pre-eclampsia if it is superimposed.

intrauterine growth retardation.

c. Delivery at 37 completed weeks as intrauterine foetal death may result from deteriorating placental functions.

18.11.02

Obstetrics Simplified

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Heart Disease in Pregnancy

Incidence

1% of pregnancies.

Causes

1. **Rheumatic heart (75%)** : mitral valve affection is the commonest followed by aortic valve then both or others.
2. **Congenital heart diseases (10%):**

   a- Acyanotic (left to right shunt): more common, includes septal defects and patent ductus arteriosus.

   b- Cyanotic (right to left shunt): e.g. Fallot's tetralogy and Eisenmenger's syndrome which is more dangerous carries a maternal mortality rate exceeding 25%.

3. **Others (5%) :** e.g. ischaemic heart disease, arrhythmias and cardiomyopathy.

Diagnosis

(A) History of :

- rheumatic fever,
- heart lesion,
- dysponea,
- paroxysmal nocturnal dyspnoea,
- orthopnoea,
- haemoptysis,
- prophylaxis with long acting penicillin.

(B) Examination may reveal**:**

- murmur,
- accentuated heart sound,
- arrhythmia,

- central cyanosis,

- displaced apex beat,

- manifestations of left side heart failure e.g. gallop rhythm, crepitations over lung bases and pleural effusion.

- manifestations of right side heart failure e.g.congested neck veins, enlarged tender liver , ascitis and oedema lower limbs.

(C) Investigations:

1. *Chest X-ray* : may show cardiac enlargement, pulmonary congestion or pleural effusion.
2. *Electrocardiography (ECG).*
3. *Echo cardiography:* shows cardiac structure and function.

Misleading in Diagnosis During Pregnancy

1. *Dyspnoea and tachycardia*: are common physiological changes during normal pregnancy.
2. *Increased neck (jugular) venous pressure:* during normal pregnancy up to +5 cm is not uncommon due to high cardiac output. This level is indicative of right side heart failure in non-pregnant state.
3. *Displacement of apex beat:* 2-3 cm lateral to its normal position due to rotation of the cardiac axis caused by elevation of the diaphragm.
4. *Auscultation changes* due to hyperkinetic circulation include:

   - Presence of third heart sound (50% of women).

   - Splitting of the first heart sound.

   - Systolic ejection murmur.

   - Early diastolic murmur due to increased velocity of the blood passing through the aortic and pulmonary valves.

   - Mammary souffle or internal mammary murmur is a systolic murmur maximal in the 2nd and 3rd intercostal spaces, especially on the left side due to flow in the dilated internal mammary arteries.

   - Venous hum over the base of the neck leads to an erroneous diagnosis of patent ductus arteriosus.

Functional classification

According to New York Heart Association (1964);

Class I : No discomfort (i.e. dyspnoea, palpitation or anginal

pain) on ordinary activity.

Class II: Discomfort on ordinary activity.

Class III: Discomfort on less than ordinary activity.

Class IV: Dyspnoea at rest. Patient is decompensated.

Effect Of Pregnancy On Heart Disease

1- Heart failure:

- *During pregnancy,* heart failure can occur at any time but the maximum incidence is between 32 and 34 weeks when the blood volume and cardiac output are in their peaks. After that they have a plateau level up to full term.
- *During the 2nd stage,* heart failure may occur due to stress on the heart.
- *After delivery,* failure may occur due to loading of the circulation by the blood from the placental sinuses after retraction of the uterus.

2- Subacute bacterial endocarditis: may develop in the puerperium.

Effect Of Heart Disease On Pregnancy

(1) Abortion.

(2) Intrauterine growth retardation.

(3) Still birth.

(4) Premature labour.

These complications are encountered especially in cyanotic heart diseases.

Management

(A) General management:

1. More frequent *antenatal visits.*
2. More *rest.*
3. *Diet* is directed to restrict weight gain and prevent anaemia as it increases cardiac strain.
4. *Infection* should be avoided and properly treated.
5. *Hospitalisation:* if signs of decompensation occur, the earliest evidence is tachycardia exceeding 100 beats/ minute and crepitations at the lung bases. Rest in a hospital is desirable in the last 2 weeks of pregnancy.

(B) Specific management:

(I) Medical treatment:

1. *Digoxin:* is indicated in atrial fibrillation to slow the ventricular response and in acute heart failure to increase myocardial contractility.
2. *Diuretics* are used in acute and chronic heart failure with potassium supplements in prolonged therapy.
3. *Beta - adrenergic blockers:* as propranolol may be indicated for arrhythmia associated with ischaemic heart disease.
4. *Aminophylline :* relieves bronchospasm.
5. *Heparin :* is indicated in patients with artificial valves or atrial fibrillation.

N.B. Acute pulmonary oedema is urgently treated by:

1. Morphine 15 mg IV, to allay anxiety and reduce venous return.
2. Oxygen.
3. Digoxin 1 mg IV, except in severe mitral stenosis as the increase in right heart output cannot be handled by the mitral valve.
4. Aminophylline 250 mg IV.
5. Venesection, removing 500 ml blood rapidly may be indicated in severe cases.

(II) Surgical treatment:

1. *Therapeutic abortion:* should be considered in class III and IV if the patient is seen early in pregnancy.
2. *Cardiac surgery:* It may be an alternative to therapeutic abortion. The principal indication is recurrent pulmonary oedema with mitral stenosis and heart failure not responding to medical treatment. There is no increased risk to the mother or the foetus in closed cardiac surgery e.g. mitral valvotomy but there is higher incidence of foetal loss with open surgery.

(C) Management of labour:

- There is *no* indication to induce labour because of cardiac disease.
- If induction of labour is indicated for an obstetric cause e.g. antepartum haemorrhage *a low amniotomy + oxytocin* in a concentrated glucose solution is the best method. This minimises the incidence of infection and pulmonary oedema.
- Induction of labour never to be undertaken in patient with acute heart failure.
- *Vaginal delivery* is preferable to caesarean section but should be an easy and not a prolonged one .
- There is no place for " *trial of labour*" in cardiac patients.

- *Bed rest* in semi-sitting position.
- *Oxygen* mask or ventilation if heart failure or cyanosis develop.
- *Adequate* analgesia pethidine or morphine can be used. Epidural anaesthesia is preferable as it abolishes the bearing down desire so decreases the effort load.
- *Shorten the second stage* by forceps or ventouse.
- *Ergometrine* is better avoided as it causes sudden load of the circulation with blood from the uterus leading to acute heart failure. Oxytocin can be used instead.
- *Prophylactic antibiotic* is essential to guard against subacute bacterial endocarditis.
- *Postpartum observation* for 48 hours is essential as the risk of heart failure is high in this period. Although bed rest is essential, early ambulation is desirable to avoid thromboembolism.
- *Breast feeding* is allowed unless there is heart failure. Oestrogens should not be used to suppress lactation and bromocriptine or lisuride can be used.
- *Sterilisation* may be advised if decompansation occurred in this pregnancy.

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Obstetrics Simplified

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Diabetes Mellitus in Pregnancy

Incidence

1:350 pregnancies.

Classification

White classification (1965) is approved by *The American College of Obstetricians and Gynaecologists* (1986) as follow:

Pregestational Diabetes					
Class	*Age at Onset*		*Duration (Yr)*	*Vascular Disease*	*Therapy*
A	Any		Any	None	A-1, diet only
B	Over 20		<10	None	Insulin
C	10-19	or	10-19	None	Insulin
D	<10	or	>20	Benign retinopathy	Insulin
F	Any		Any	Nephropathy	Insulin
R	Any		Any	Proliferative retinopathy	Insulin
H	Any		Any	Heart disease	Insulin
T	Any		Any	After renal transplantation	Insulin

Gestational Diabetes			
Class	*Fasting Plasma Glucose*		*Postprandial Plasma Glucose*
A-1	*<105 mg/dl*	*and*	*<120mg/dl*
A-2	*>105 mg/dl*	*and/or*	*>120mg/dl*

N.B. Gestational diabetes is appearance of diabetes for the first time during pregnancy and disappears postpartum.

In the original white classification, class A diabetes is asymptomatic diabetes with abnormal glucose tolerance test i.e. chemical diabetes.

Phases of Diabetes Mellitus

1. *Potential diabetes:* There is high risk of developing diabetes e.g. if one or both parents is diabetic.
2. *Prediabetes:* The period preceding the development of diabetes. It is a retrospective diagnosis.
3. *Latent diabetes:* Diabetes appears only under stress conditions as pregnancy (gestational diabetes) or with cortisone administration.
4. *Chemical diabetes:* An abnormal glucose tolerance test without symptoms.
5. *Clinical diabetes:* An abnormal glucose tolerance test with symptoms of diabetes.

Effect of Pregnancy on Diabetes

1. Pregnancy is diabetogenic due to increased production of insulin antagonists as human placental lactogen, placental insulinase, cortisol, oestrogens and progesterone.
2. Insulin requirements: increases during pregnancy due to increased production of insulin antagonists while it decreases postpartum.
3. Reliance on urine for control of diabetes may lead to insulin overdosage due to lowered renal threshold for glucose.

Effect of Diabetes on Pregnancy

(A) Maternal:

1. *Pregnancy induced hypertension (30%).*
2. *Infections:* as monilial vulvo-vaginitis, urinary tract infections, puerperal sepsis and breast infection.
3. *Obstructed labour* due to large sized baby.
4. *Deficient lactation:* is more common.

(B) Foetal:

1. *Abortions.*
2. *Polyhydramnios (30%)* : due to large placenta and foetal size.
3. *Congenital anomalies (6%):* This is about 4 times the normal incidence (1.5%). Sacral dysgenesis is a specific anomaly related to diabetes.
4. *Macrosomia:* i.e. foetal weight > 4 kg at term may cause obstructed or traumatic delivery.
5. *Preterm labour:* with its complications mainly due to polyhydramnios.
6. *Intrauterine foetal death (5%):* especially in the last 4 weeks due to;

- ketosis,

- hypoglycaemia,

- pre-eclampsia,

- congenital anomalies,

- placental insufficiency.

7. *Neonatal mortality and morbidity* (5%): due to ;

- hypoglycaemia,

- respiratory distress syndrome,

- congenital anomalies,

- birth trauma,

- hyperbilirubinaemia due to immaturity of the foetal liver,

- hyperviscosity,

- hypocalcaemia and hypomagnesaemia which may result from decreased parathyroid hormone.

Diagnosis

(A) History:

- History of diabetes or symptoms suggesting it as loss of weight, polydepsia (thirst), polyuria and polyphagia.

- History of frequent severe pruritis (recurrent monilial infection).

- History of repeated abortions, intrauterine foetal deaths or delivery of oversized babies.

(B) Investigations:

1. *Positive urine test*: during routine antenatal care.
2. *Fasting and 2 hours postprandial venous plasma sugar*.

Fasting	***2h postprandial***	***Result***
<100 mg/dl	< 145mg/ dl.	Not diabetic
>145 mg/ dl	>200 mg/ dl.	Diabetic
100-145 mg/dl	145-200 mg/dl.	Border line indicates glucose tolerance test.
N.B. The whole blood glucose values are 15% lower.		

3. *Glucose tolerance test (GTT):*

Prerequisites:

- Normal diet for 3 days before the test.
- No diuretics 10 days before.
- At least 10 hours fast.
- Test is done in the morning at rest.

(I) Oral glucose tolerance test:

Giving 75 gm (100 gm by other authors) glucose in 250 ml water orally.

(II) Intravenous glucose tolerance test:

Giving 25 gm rapid IV, has little practical value due to bypassing the gut so there is no stimulus to gut hormone production particularly glucagon.

Criteria for glucose tolerance test:

The maximum blood glucose values during pregnancy:

- fasting 90 mg/ dl,
- one hour 165 mg/dl,
- 2 hours 145 mg/dl,
- 3 hours 125 mg/dl.

If any 2 or more of these values are elevated, the patient is considered to have an impaired glucose tolerance test.

Indications of performing glucose tolerance test:

1. Positive urine test.
2. First degree family history of diabetes.
3. Gross obesity.
4. Previous macrosomic babies.
5. Previous unexplained intrauterine or neonatal deaths.
6. Previous 2 or more unexplained abortions.
7. Current or previous congenital anomalies.
8. Current or previous polyhydramnios.

4. Glycosylated haemoglobin (Hb A_1):

It is normally accounts for 5-6% of the total haemoglobin mass. A value over 10% indicates poor diabetes control in the previous 4-8 weeks. If this is detected early in pregnancy, there is a high risk of congenital anomalies and in late pregnancy it indicates increased incidence of macrosomia and neonatal morbidity and mortality.

Differential Diagnosis of Glycosuria:

*(1)Lactosuria:*may be present during pregnancy, labour or puerperium. Lactose is differentiated by:

- Osazone test,

- it does not ferment yeast, and

- glucose oxidase test is negative.

(2) Alimentary glycosuria:

- Usually occurs early in pregnancy due to rapid absorption of glucose from the gut.

- No symptoms of diabetes.

- GTT is normal.

(3) Renal glycosuria:

- usually occurs in midpregnancy due to lowered renal threshold.

- No symptoms of diabetes.

- GTT is normal.

(4) Reducing agents: as vitamin C, salicylates and morphine.

(5) Diabetes mellitus.

Management

(A) Antenatal care:

1. Frequent antenatal visits : for maternal and foetal follow up.

2. Control of diabetes:

i) Diet: is arranged to supply 1800 calories/ day with restriction of carbohydrates to 200 gm/ day, less fat and more proteins and vitamines.

ii) Insulin therapy:

- Oral hypoglycaemics are contraindicated during pregnancy, labour and early puerperium as they are not adequate for controlling diabetes, have teratogenic effects and may result in neonatal hypoglycaemia.

- Doses of insulin tend to increase in the first half of pregnancy, then stabilise and finally rise in the last quarter, to be decreased again postpartum.

- Twice daily (before breakfast and before dinner)

injections of a combination of short and intermediate acting insulins are usually sufficient to control most patients otherwise a subcutaneous insulin pump is used.

- Monocomponent insulins which do not provoke production of antibodies are preferable e.g. " Actrapid" (short acting) and " Monotard" (intermediate acting).

- The total first dose of insulin is calculated by;

- Starting with a low dose of 20 units combined insulin then increase it according to the blood sugar level or,
- according to the patient's weight as follow:

In the first trimester .....patient's weight x 0.7

In the second trimester.....patient's weight x 0.8

In the third trimester.....patient's weight x 0.9

- If the total dose of insulin is less than 50 units/ day, it is given in a single morning dose with the ratio:

Short acting (regular or Actrapid)/Intermediate (NPH or Monotard) = 0.5

In higher doses, 2/3 the dose is given in the morning with the same ratio and 1/3 the dose is given in the evening in a ratio 1:1.

Blood sugar analysis is carried out 4 times daily to regulate the doses as follow:

Time of analysis	The dose to be regulated
Postprandial - breakfast	Evening - intermediate
Postprandial - lunch	Morning - short
Postprandial- dinner	Morning - intermediate
Fasting - midnight	Evening - short

The aim is to achieve normoglycaemic values as in GTT.

3- Hospitalisation : if diabetics are not controlled as outpatients or complications develop.

4- *Evaluation of foetal well - being* by:-

- ultrasound .....weekly,

- cardiotocography..... weekly,

- serial oestriol estimation . ..... 3 times/ weekly,

- amniocentesis before delivery for detection of phosphatidyl glycerol that indicates lung maturity. L/S ratio is less reliable in diabetics.

(B) Delivery:

1. Timing: pregnancy is terminated at 37 completed weeks to avoid intrauterine foetal death.

2. Mode of delivery: vaginal delivery is induced in normal presentation, favourable cervix, average sized baby and no foetal distress. Otherwise, caesarean section is indicated.

3. Insulin therapy:

- Day prior to delivery:

  Normal diet, - normal morning insulin,

  reduce evening insulin by 25% or omit intermediate acting insulin.

- Day of delivery:

5% glucose infusion in a rate of 125 ml/hour + short acting insulin 1-2 units/hour.

- Postpartum:

Continue 5% glucose + insulin till oral feeding is established. When oral feeding is allowed the pre-pregnancy dose of insulin is given.

4. Neonatal care:

- The neonate is managed as a premature baby as it is more liable for RDS.
- 5% glucose may given IV at a rate of 0.24 gm / kg/ hour to guard against possible neonatal hypoglycaemia. Pulsed IM glucose is not preferred as they may sustain the output of insulin from the foetal pancreas.

(C) Contraception:

Mechanical and chemical methods or sterilization are allowed but hormonal

methods are diabetogenic and IUDS may cause PID. Progestogen only contraception may be used if the patient will accept the high possibility of menstrual irregularity.

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Obstetrics Simplified

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Anaemia in Pregnancy

Normal Blood Standards

(A) Red blood corpuscles (RBCs):

1- Number:

In females : 4.5-5 millions/mm^3.

2- Haemoglobin (Hb%):

In females : 12-14 gm/100 cc (dl) blood. During pregnancy: 10-12 gm/dl i.e. physiological anaemia due to the increase in plasma volume more than RBCs volume.

3- Haematocrit value:

It is the volume of packed RBCs in 100 cc of blood.

In females: 42%.

4- Reticulocytes:

0-2%. They are cells with remnants of the nucleus. Reticulocytosis indicates over active bone marrow as in haemolytic anaemia.

(B) Leucocytes

1- Total leucocytic count:

4.000-10.000/mm^3. It increases during pregnancy to 9.500-10.500/mm^3 and up to 16.000/mm^3 during labour and the first week of puerperium.

2- Differential leucocytic count:

- Basophils 0-1%.
- Eosinophils 3-5%.
- Monocytes 3-8%.
- Lymphocytes 20-30%.
- Neutrophils 60-70%.

(C) Platelets:

200.000-400.000/mm^3.

(D) Bleeding time:

2-4 minutes.

(E) Coagulation time:

4-8 minutes.

Definition:

Anaemia is a reduction in the number of RBCs and haemoglobin content with a corresponding reduction in the oxygen carrying capacity of the blood.

(I) Iron Deficiency Anaemia

It is the most common type of anaemias (95%).

Daily Requirements:

Normal iron requirement is 10 mg/day of which 1mg is absorbed. Requirement increases during pregnancy to 15mg/ day.

Aetiology.

1- Inadequate intake of iron.

2- Defective absorption of iron e.g. achlorhydria.

3- Increased demand e.g. menstruation and pregnancy.

4- Chronic blood loss e.g. abnormal uterine bleeding and piles.

Clinical Picture:

(A) Symptoms: general symptoms of anaemia as;

- easy fatigability,

- headache,

- dysponea,

- palpitation.

(B) Signs:

- Pallor which can be detected in the face, palm of the hand, nail bed and mucus membranes of the mouth and conjuctiva.

- Angular stomatitis and red glazed tongue.

- Nails are brittle, striated with loss of their lustre. Spooning of the nails may occur in severe cases.

Investigations:

1. *RBCs , haemoglobin and haematocrit:* below normal.
2. *Serum iron concentration:* below normal (n=125 m g/dl).
3. *Iron binding capacity :* below normal (n=400 m g/dl).
4. *Transferrin saturation:* below normal (n= 30%).
5. *Blood film:* microcytic hypochromic anaemia.

Treatment:

1. *Diet:* liver, meat, kidney, eggs and green vegetables are rich in iron.
2. *Oral iron therapy:* ferrous sulphate or ferrous gluconate 300 mg t.d.s after meals.

Side effects: nausea, vomiting and constipation.

3. Parentral iron therapy:

Indications:

a- Malabsorption syndrome.

b- Intolerance to oral iron.

c- Need to rapid response.

Preparations:

a- Iron-dextran complex: IV or IM injection.

b- Iron-sorbitol-citrate complex: IM injection only.

Side effects:

i- IM injection is irritant, painful, stains the skin and less absorbed so IV injection whether by repeated small doses or infusion in saline solution is preferable.

ii- IV therapy may be complicated by flushing, urticaria, arthralgia, fever, lymphadenopathy, phlebitis and anaphylaxis.

4- Packed RBCs : is used if more rapid response is needed e.g. pre-operative.

Prophylactic iron therapy is particularly indicated in high risk group as high parity, multiple pregnancy, and low socio-economic class. In absence of actual anaemia, prophylactic therapy is better deferred till the end of the first trimester as nausea and vomiting are common in this period.

(II) Megaloblastic Anaemia

It is caused by deficiency of folic acid and / or vitamin B_{12}.

(A) Folic Acid Deficiency Anaemia:

It is uncommon.

Daily Requirement:

Normal folate requirement is 500 mg /day and a similar amount is needed during pregnancy so that the daily requirement during pregnancy is 1mg.

Aetiology.

1. Inadequate intake.
2. Defective absorption.
3. Increased demand e.g. pregnancy.
4. Drugs: folic acid antagonists as epanutin (anti-epileptic).

Clinical Picture:

- General symptoms of anaemia (see before).
- GIT manifestations in the form of:

  - dyspepsia,
  - anorexia,
  - nausea,
  - vomiting,
  - diarrhoea,
  - beefy (red, glassed) tongue,
  - hepatosplenomegaly.

Investigations:

1. Blood film:
   - Macrocytic hyperchromic RBCs.
   - Hypersegmented neutrophilic nuclei (>5 lobes).
2. Serum folate level: is low measured by radioimmunoassay.
3. Bone marrow: abnormal red cell precursors (megaloblasts).

Treatment:

- Diet rich in folic acid as liver, kidney and meat.

- Folic acid 5-15 mg /day orally.

(B) Vit. B_{12} Deficiency Anaemia (Addisonian Pernicious Anaemia):

It is rare.

Daily Requirement: less than 1mg.

Aetiology:

1. Inadequate intake (rare).
2. Deficient intrinsic factor as in atrophic gastritis or gastrectomy.
3. Malabsorption syndrome.
4. Increased demand e.g. pregnancy.

Clinical Picture:

- General symptoms of anaemia.
- GIT manifestations: as folic acid deficiency.
- Nervous manifestations:
  - Subacute combined degeneration.
  - Peripheral neuritis.

Investigations:

As folic acid deficiency + decreased serum vit. B_{12}.

Treatment:

Vit. B_{12} IM injection.

N.B. Folic acid is never given alone for B_{12} deficiency anaemia as it will increase the nervous manifestations.

(III) Haemolytic Anaemias

Aetiology:

(I) Congenital (Intracorpuscular):

1. Spherocytosis.
2. Haemoglobinopathies;
   a.Thalassaemia:

α - thalassaemia Major.

α - thalassaemia Minor.

ß - thalassaemia Major.

ß - thalassaemia Minor.

b. Sickle cell anaemia.

3. Glucose -6- phosphate dehydrogenase deficiency (G-6-PD).

(II) Acquired (Extracorpuscular):

1. Chemicals: e.g. drugs, lead and snake venum.
2. Infections: e.g. malaria and clostridium welchii.
3. Hypersplenism.

Congenital Spherocytosis

An autosomal dominant disorder in which there is deficiency in the lipoprotein of cell membrane leading to increased rigidity of the RBCs and hence its destruction especially in the spleen.

Clinical picture:

1. Features of anaemia (see before).
2. Features of haemolytic jaundice:

   - Lemon yellow skin,

   - ting of jaundice in the sclera,

   - dark stool and normal urine which darkens on standing.

3. Hepatosplenomegaly: are common.

The condition is inherited by 50% of the mother offspring. In the infant, jaundice develops within 48 hours of birth and exchange transfusion may be required.

Thalassaemia

An autosomal inherited disorder resulted from failure of production of either a chain (a -thalassaemia) or b chain (b -thalassaemia) of the haemoglobin molecule and their replacement with other polypeptide chains.

(I) α - thalassaemia:

a) α - thalassaemia major (homozygotes):

- The foetus with this disorder is affected in utero showing polyhydramnios, erythroblastosis, anaemia and hydrops resembling Rh-incompatibility.

- This foetus does not survive due to inability of oxygen transfer as the a -chain is responsible for O_2 carrying capacity.

b) α - thalassaemia minor (heterozygotes):

Patient develops mild progressive anaemia during pregnancy.

(II) ß -Thalassaemia:

a) ß -thalassaemia major (homozygotes):

The disorder starts in childhood leading to death of the patient mostly in the 2 nd or 3rd decade.

b) ß -thalassaemia minor (heterozygotes):

As α - thalassaemia minor.

Effect on pregnancy:

- ß -Thalassaemia major is rarely encountered in pregnant women, but if this happened the prognosis is poor.
- Anaemia becomes severe in mid-pregnancy and may result in heart failure.

Sickle Cell Anaemia

- An autosomal inherited disorder in which glutamic acid in position 6 of the b -chain of the haemoglobin molecule is replaced by valine. This leads to production of HbS.
  Hb S on exposure to hypoxia forms insoluble aggregations and RBCs become sickle-shaped and are subsequently fragmented.
- In addition, these sickle-shaped cells increase the blood viscosity and occlude blood vessels of various organs.
- The manifestations appear usually in homozygous not in heterozygous.

Clinical picture:

1. Feature of anaemia and haemolytic jaundice.
2. Multiple infarcts due to obstruction of microcirculation in the spleen, kidney, CNS, retina, bone, lungs and heart.
3. Increased susceptibility to infections especially urinary.
4. Attacks of severe abdominal pain and fever are common due to ischaemia and infarctions.
5. Pre-eclampsia like- syndrome with hypertension, oedema and proteinuria may develop.
6. Increased foetal wastage from abortion, preterm labour and growth retardation associated with placental insufficiency due to maternal placental bed thrombosis.

Management of sickle cell disease during labour:

1. Avoid : hypoxia, dehydration and acidosis.
2. Treat crises by: rehydration, bicarbonate, analgesic, heparin or low molecular weight dextran.
3. Prophylactic antibiotic.

Investigations of Haemolytic Anaemia:

1. Serum bilirubin: raised.

2. Urine: increased urobilinogen.

3. Stool : increased stercobilinogen.

4. Blood film: shows normocytic normochromic anaemia and;

- Small spherical RBCs in case of spherocytosis.
- Target cells in case of Thalassaemia major.
- Sickling after inducing hypoxia by addition of Na bisulphite in case of sickle cell anaemia.

5. Electrophoresis: detect type of haemoglobin in haemoglobinopathies.

6. Estimation of glucose-6-phosphate dehydrogenase activity.

Treatment of Haemolytic Anaemia:

1. *Blood transfusion* : in acute attacks.
2. *Folic acid and iron therapy:* may be indicated.
3. *Splenectomy:* may be beneficial in spherocytosis and some cases of thalassaemia major, but not to be done during pregnancy.
4. *Avoid precipitating factors:* as hypoxia in spherocytosis and oxidative agents in G-6-PD deficiency.

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Obstetrics Simplified

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Urinary Tract Infection in Pregnancy

ASYMPTOMATIC BACTERIURIA

Definition

It is the presence of 100.000 organisms/ml of the same species in two cultured fresh, mid-stream specimens of urine.

Incidence

2-5% of pregnant women. If not treated 30% of them will develop symptomatic infections.

Complications:

1- Symptomatic infections as cystitis and pyelonephritis.

2- Anaemia.

3- Hypertension.

4- Intrauterine growth retardation.

5- Pre-term delivery.

Treatment

- Ampicillin or cephalosporin 500 mg/ 6 hours for 10 days or

- Nitrofurantoin 100 mg/6 hours.

Pyelonephritis

Definition

It is inflammation of the renal pelvis and parenchyma.

Incidence

30% in cases with asymptomatic bacteriuria and 1% in cases without.

Predisposing Factors During Pregnancy

(A) Urine stasis during pregnancy due to:

1. Compression of the ureter by the gravid uterus against the pelvic brim particularly on the right side. So infection is more common on the right side.
2. Relaxation of the ureter by progesterone effect.

(B) Increased urinary excretion of glucose and amino acids favours the growth of bacteria.

Causative Organisms

- Escherichia coli (E.coli)(90%).

- Klebsiella, streptococcus, staphylococcus, proteus, pseudomonas and others.

Diagnosis

Symptoms: started usually after 16 weeks in the form of;

- malaise,

- anorexia,

- nausea and vomiting,

- rigors,

- dysuria,

- urgency and frequency of micturition,

- renal pain commonly on the right side.

Signs:

- Fever reaching 40^{o}C ,

- rapid pulse,

- tenderness in one or both renal angles (costovertebral angle).

Investigations:

1.Urine analysis: pus cells, organisms and proteins. Casts and RBCs may be present.

N.B. Presence of organisms without pus cells suggests contamination, while pus cells without organisms creates suspicion of tuberculosis.

2. Culture and sensitivity : for urine.

3. Blood picture : leucocytosis.

Differential diagnosis:

1. Causes of acute abdomen as appendicitis, abruptio placentae and complications of pelvic tumours.
2. Causes of vomiting.

Complications:

1. Chronicity : with recurrent infections. In these cases, plain X-ray and intravenous pyelography (IVP) should be done after delivery to exclude urinary stones. Chronic pyelonephritis may result in hypertension and renal failure later on .

2. Abortion, intrauterine foetal death, IUGR or premature labour may result.

Treatment

1. Bed rest: light diet and plenty of fluids. Intravenous fluid may be needed if there is vomiting

2. Analgesics and antipyretics.

3. Alkalies: as potassium citrate to inhibit the growth of E.coli.

4. Antibiotics and chemotherapy: The following therapy is started until the result of culture and sensitivity is obtained.

-Ampicillin 500 mg/ 6 hours, or

- Nitrofurantoin 100 mg/ 6hours, or

- Cephalosporins 500 mg/ 6 hours.

- Treatment is continued for 7-10 days.

18.11.02

Obstetrics Simplified

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Infectious Diseases in Pregnancy

SYPHILIS

Effect of Syphilis on Pregnancy

The more is the duration between infection and conception, the less is the foetal affection.

1. Abortion: of a dead foetus after the 4th month of pregnancy when the spirochetes can cross the placenta as the cytotrophoblast starts to disappear.
2. Repeated late abortions then premature or mature macerated still born then live born with congenital syphilis or developing it later on.

Effect of Pregnancy on Syphilis

Primary lesion which is the sign of early syphilis may be masked if infection occurs during pregnancy.

Diagnosis

(A) History: of infection, repeated late abortions or macerated still birth.

(B) Examination: Signs of primary, secondary or tertiary syphilis.

(C) Investigations: by serological tests;

(I) Non- specific (non-treponemal) tests:

1. Venereal disease research laboratory (VDRL).
2. Rapid plasma reagin (RPR).

(B) Specific (treponemal) tests:

1. Fluorescent treponemal antibody absorption test (FTA - ABS).
2. Treponema pallidum immobilisation test (TPI).

Non-treponemal test can be positive in other conditions as collagen diseases , lymphomas, mononucleosis, and febrile illnesses. So these tests can be performed as screening tests, if positive a specific (treponemal) test is done to confirm or refute

syphilis.

Evidence of syphilis in products of conception:

1. *Placenta:* is bulky with hypertrophied villi and endartritis of their vessels. Spirochetes may be detected in the villous stroma. These changes are detected in still born only.
2. *Umbilical cord:* shows endarteritis, chronic cellular infiltration and sometimes spirochetes. These changes are detected in all cases.
3. *Foetus:*

   - *Stillborn:* is macerated with syphilitic epiphysitis and hepatosplenomegaly in which spirochetes may be detected

   - *Live birth* : small - for -date with saddle nose, skin rash, hepatosplenomegaly, jaundice, osteochondritis and positive serological tests for syphilis.

Treatment

(A) Mother:

Treatment should be started before 16 weeks i.e. before spirochetes cross the placenta.

(I) Penicillin:

Procaine penicillin 600.000 units IM daily for 17 days or - benzathine penicilin (long acting) 2.4 million units IM, half the dose in each buttock. This is repeated for 3 courses at 2 weeks interval.

(II) Erythromycin:

500 mg/ 6 hours orally for 21 days is given to patients who are allergic to penicillin.

(B) New born:

Procaine penicillin 150.000 units IM for 10 days.

PULMONARY TUBERCULOSIS WITH PREGNANCY

Effect of T.B. on Pregnancy

- Abortion or premature labour rarely occur in acute febrile cases.

- The infant is usually not affected as it is extremely rare for tubercle bacilli to cross the placenta.

Effect of Pregnancy on T.B.

No effect on the course of the disease.

Diagnosis

1. Suggesting symptoms.
2. X-ray chest after shielding the uterus from irradiation.
3. Bacteriological examination for the sputum.

Management

(I) Antenatal care:

- *Chemotherapy*: isoniazid 300 mg orally and ethambutol 15mg/ kg orally for 9 months.

- *Induction of abortion*: active disease itself is not an indication for termination of pregnancy, but if there is gross respiratory impairment or the patient cannot tolerate the drugs because of excessive vomiting it may be indicated.

(II) Labour:

- Isolate the patient with active disease,

- give oxygen,

- avoid inhalation anaesthesia,

- shorten the second stage,

- avoid excessive blood loss.

(III) Neonate:

- Breast feeding is contraindicated only for the infants of patients with active disease who should be isolated.

- Neonate should be given isoniazid and vaccinated with isoniazid-resistant BCG and returned to his mother when he/she is tuberculin positive (2-10 weeks).

RUBELLA

Causative Organism: Rubella virus.

Route of Infection : via respiration as the virus is concentrated in the nasopharyngeal secretions.

Incubation Period: 14-21 days.

Clinical Manifestations

- Mild pyrexia,

- arthralgia,

- rash which persists for a week and always affecting the face,

- lymphadenopathy in the postauricular, deep cervical and suboccipital L.N. precedes the appearance of the rash and persists for 3 weeks.

Diagnosis

A pregnant woman who had been in contact with a case of rubella should have repeated estimations of rubella antibody titre. If antibodies are detected after being absent or rising, this indicates recent infection even in absence of clinical manifestations.

Complications

1. Abortion, still birth and low birth weight may occur.
2. Congenital anomalies include:

   - cataract,

   - deafness,

   - cardiac anomalies,

   - hepatosplenomegaly,

   - lymphadenopathy.

Management

(I) Prophylactic:

Vaccination to all young females. Pregnancy should be avoided for 3 months after vaccination.

(II) Induction of abortion:

is indicated if infection is caught in the first 12 weeks of pregnancy.

Viral Infections During Pregnancy

Virus	*Complications*			
	Abortion	*Stillbirth*	*Low birth weight*	*Main congenital anomalies*

Rubella	+	+	+	Cataract, deafness, cardiac, hepatosplenomegaly, psychomotor retardation.
Cytomegalovirus	?	+	+	Microcephaly, deafness, hepatosplenomegaly, psychomotor retardation.
Herpes hominis	-	-	+	Microcephaly, psychomotor retardation, chorioretinitis.
Varicella zoster	?	?	+	Hypoplasia of limb, rudimentary digits.
Mumps	+	+	-	Endocardial fibro-elastosis.
Influenza	+	+	-	? following 1st trimester illness.
Smallpox	+	+	?	Foetal smallpox.
Hepatitis B	-	-	-	Hepatosplenomegaly, chronic cirrhosis.
Measles	+	+	-	Nil Proven.
Polio virus	+	+	+	Paralysis.

TOXOPLASMOSIS

Causative Parasite: Toxoplasma gondii.

Method of Transmission: It is believed to be cats faeces and uncooked meat or by transfer across the placenta.

Clinical Features: usually asymptomatic although fever, muscle pain and lympadenopathy may occur.

Complications: occur only if there is acute exacerbation during pregnancy. This may lead to abortion or a live birth with the following manifestations which may develop weeks or months after birth:

- Convulsions,
- intracranial calcification,
- chorioretinitis,
- hydrocephalus or microcephaly,
- hepatosplenomegaly,
- jaundice and
- anaemia.

Diagnosis

Detection of specific IgM.

Treatment

Spiramycin 3 gm/day for 3-4 weeks.

MALARIA

Causative Parasite:

Plasmodium : falciparum, vivax, ovale or malariae.

Complications

- Maternal haemolytic anaemia,
- abortion,
- preterm labour,
- intrauterine growth retardation,
- intrauterine foetal death.

Treatment

- Chloroquine is the drug of choice.
- Pyrimethamine + extra folic acid may be used in resistant P. falciparum.

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Obstetrics Simplified

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Coagulation Defects in Pregnancy

Physiological Bases

Factors involved in the arrest of haemorrhage:

(I) Haemostasis:

After injury to any blood vessel haemostasis is achieved by:

(1)Vascular responses: obliteration of the injured vessel by;

- vasoconstrictors released from platelets,
- external pressure by either haematoma formation, contraction of the surrounding muscles (as in uterine and placental blood vessels) or by artificially applied pressure.

(2) Platelets aggregation.

(II) Coagulation:

Stage I : (few minutes)

- Intrinsic mechanism: Activation of factors XII, XI and IX respectively by vessel wall damage + Ca^{++} and factor VIII $\longrightarrow$ activation of factor X.
- Extrinsic mechanism: Tissue damage leads to release of factor III and VII $\longrightarrow$ activation of factor X.

Stage II : (10-15 seconds)

In which activated factor X (Xa) + factor V+ Ca^{++} lead to conversion of prothrombin (factor II) $\longrightarrow$ thrombin.

StageIII: (1-2 seconds)

Thrombin converts fibrinogen (factor I) $\longrightarrow$ fibrin monomer $\longrightarrow$ fibrin polymers $\longrightarrow$ fibrin.

Changes in pregnancy and labour:

(I) Coagulation system:

- Fibrinogen (FI) : increases from 2-4 gm/L (normal level) to 4-6 gm/L.

- Factors VII, VIII and X : increase by 20-100%.

(II) Fibrinolytic system:

Although plasminogen increases by about 100%, fibrinolytic activity decreases due to;

- increase inhibitory activity,

- high oestrogen and progesterone level reduces fibrinolysis, and

- placenta contains inhibitors.

(III) Platelets:

No change.

(IV) Uterine vasculature:

The elastic lamina and smooth muscles of the terminal spiral arteries are replaced by fibrin matrix . This facilitates increase blood flow during pregnancy and closure of the sinuses postpartum by myometrial contraction.

Coagulation Disorders in Pregnancy

(I) Disseminated intravascular coagulation:

(II) Others:

a- Inherited:

1. Von Willebrand's disease: Inability to synthesise factor VIII related antigen.
2. Haemophilia :
   - Haemophilia A = inability to synthesise factor VIII.
   - Haemophilia B = inability to synthesise factor IX.

b- Non-inherited:

1. Thrombocytopenia: due to decreased production or increased utilisation.
2. Immunologic (idiopathic) thrombocytopenic purpura.

Disseminated Intravascular Coagulation (DIC)

Pathogenesis:

Extensive vessels and tissues damage ..... release of *thromboplastins* ..... utilisation of the fibrinogen and other clotting factors in an aimless coagulation process ..... fibrin ..... stimulates fibrinolytic system ..... breaks fibrin and fibrinogen into *FDP* which have an anticoagulant effect ..... aggravates

haemorrhage and shock ..... ischaemia ..... more tissue damage..... viscious circle.

N.B. The anticoagulant effect of FDP is due to :

1. Inhibition of platelet function.
2. Interference with thrombin/ fibrinogen reaction.
3. Interference with fibrin polymerisation.
4. Interference with myometrial contraction.

Predisposing factors:

1. Abruptio placentae.
2. Amniotic fluid embolism.
3. Endotoxic shock.
4. Eclampsia and pre-eclampsia.
5. Hydatidiform mole.
6. IUFD and missed abortion.
7. Intra amniotic hypertonic saline or urea for induction of abortion.
8. Incompatible blood transfusion or transfusion of massive banked blood which is deficient in factor V and VIII.
9. Prolonged shock of whatever the cause.
10. . Placenta accreta.
11. . Rupture uterus.

Clinical features:

Unexplained spontaneous bleeding from any site e.g.

- oozing of blood,
- bruising,
- epistaxis,
- haematuria,
- haematoma formation especially at wound and venepuncture site,
- postpartum haemorrhage.

Investigations:

(I) Bed -side tests:

1- Clot observation test:

5-10 C.C. of blood in a test tube will be clotted normally within 10 minutes. In case of

DIC no clot will be formed or a clot is formed but it undergoes dissolution within one hour in 37ºC.

2- Fibrindex test:

0.5 C.C. of fibrindex which contains thrombin is added to 0.5 C.C. of plasma in a test tube. Normally, a visible clot will be formed within 5-10 seconds. In DIC, clot formation is delayed up to 30 seconds (hypofibrinogenaemia) or it will not form at all (afibrinogenaemia).

3- Shnieder test:

Thrombin is added to serial dilutions of the patient's plasma 1:2 , 1: 4, 1:8,.....1:128.

- Clot formation in all tubes: Normal.
- No clot in all tubes: Afibrinogenaemia.
- No clot in dilutions 1: 16 onwards: Hypofibrinoginaemia.

(II) Laboratory tests:

1- Plasma fibrinogen level:

During pregnancy the normal level is 4-6 gm/L. Failure of coagulation occurs when its level drops to 1 gm/L.

2- Fibrinogen degradation products FDP : increased.

3- Platelet count: decreased.

Management:

1. *Elimination of the underlying cause.*
2. *Fresh blood transfusion:* contains clotting factors particularly F II, V and VIII.
3. *Fresh frozen plasma:* contains 3 gm fibrinogen/L in addition to FV and VIII.
4. *Fibrinogen:* 4-6 gm IV may be given if there is no fresh frozen plasma. However, it is not recommended as it may aggravate the coagulation process (fuel on fire) and cause hepatitis B.
5. *Heparin:* to inhibit fibrin production and consumption of the clotting factors but it is contraindicated if there is current bleeding.
6. *Antifibrinolytic agents:* as EACA, trasylol or tranexamic acid may be given to suppress the fibrinolytic process. However, this may enhance thrombosis formation.

DEEP VEIN THROMBOSIS (DVT)

Predisposing Factors

1. Venous stasis,
2. increased blood coagulability,
3. venous intimal damage.

These three factors meet with pregnancy and labour due to:

1. increased clotting factors I, VII, VIII and X.
2. reduced fibrinolytic activity.
3. pressure of the gravid uterus on pelvic veins.
4. antenatal rest, prolonged labour, dehydration, excessive blood loss, pressure on calf muscles during delivery, delay in mobilisation, trauma and pelvic infection.
5. oestrogen for postpartum suppression of lactation.

Clinical Picture

(A) Superficial Thrombophlebitis:

1. Common in varicose veins of the calf, thigh, inguinal region and vulva.
2. There is discomfort, localised superficial tenderness, and pain.
3. A palpable lump.
4. A low grade fever.

(B) Deep Vein Thrombosis:

1. Pain and tenderness in calf muscles due to involvement of the posterior tibial vein which may extend to popliteal, femoral and pelvic veins.
2. Oedema of the affected leg diagnosed by difference in girth of the limbs of more than 1cm.
3. Hotness and cyanosis of the leg.
4. Positive Homan’s sign: calf pain on dorsiflexion of the foot but neither its presence nor absence is reliable.
5. Fever.

Investigations

(1) Doppler ultrasound:

The flow of blood as detected by reflection of the waves on RBCs is absent in DVT.

(2) Ascending phlebography:

30-40 ml of contrast medium is injected into a vein of the dorsum of the foot after obstructing superficial venous return with a sphygmomanometer cuff at the ankle and thigh. Flow is monitored on a television screen.

(3) Isotope venography:

using technetium - 99m albumin followed with a gamma camera.

(4) Thermography:

The rise of temperature of the affected limb is detected by a thermovision infrared camera.

Management

1. **Elastic bandage and elevation of the affected leg** to improve the venous return and reduce oedema. This is continued until acute swelling subsides and gradual ambulation is allowed as soon as pain is improved.
2. **Heparin:**
    - Start with 10.000-15.000 units IV, followed by continuous IV infusion of 10.000 units/ 4-6 hours.
    - The aim is to make the blood clotting time or partial thromboplastin time 1.5-2 times their normal values.
    - Subcutaneous heparin: can be given instead of IV infusion in a dose of 10.000 units/ 12 hours.
    - *During labour:* Dosage is reduced to 5000 units/ 12 hours.
    - *Postpartum:* 5000 units/ 8 hours is recommended.
    - *Antidote:* Protamine sulphate 1% solution; 10 mg (1ml) for every 1000 units heparin is given by slow IV injection.
    - Heparin cannot cross the placenta because of its high molecular weight (16.000-40.000 dalton).
    - *Oral anticoagulants* as coumarin are teratogenic and excreted in breast milk causing foetal haemorrhage and chondrodysplasia punctata (nasal hypoplasia, saddle nose, frontal bossing, short stature, mental retardation, cataract and optic atrophy).

      - Warfarin can be given orally to the postpartum non-lactating woman in an initial dose of 0.75mg/ kg body weight to a maximum of 50 mg. Maintenance dose is 5-13 mg daily

controlled by prothrombin time which should be 2-4 times the normal value.

- Antidote: Vit. K_1 10-20 mg slowly IV which can be repeated every 3 hours to a maximum of 40 mg in 24 hours.

PULMONARY EMBOLISM

- It may occur with or without preceding deep vein thrombosis.

- DVT occurs either during delivery, surgery or in the first 24 hours following them.

- Clinical signs of pulmonary embolism appear within 4-14 days after DVT formation.

Diagnosis

(A) Symptoms:

Range from minimal disturbance to sudden collapse and death depending on the size, number and site of the emboli;

1- Dysponea,

2- chest pain,

3- cough,

4- frothy blood stained sputum,

5- haemoptysis,

6- nausea, vomiting and sudden desire to defaecate.

(B) Signs:

1- Mild pyrexia,

2- tachycardia,

3- tachypnoea,

4- cyanosis,

5- raised jugular venous pressure,

6- pleural friction rub,

7- pleural effusion,

8- right ventricular failure.

(C) Investigations:

1- ECG: inverted T waves and atrial arrythmia.

2- X-ray :

- triangular radio
- opaque shadow (infarction),
- pleural effusion,
- raised copula of the diaphragm.

Treatment

(I) Prophylaxis:

1. *Subcutaneous heparin:* 5000-7500 units/12 hours in puerperium for women with past history of thrombo-embolism.
2. *Dextran 70:* 500-1000 ml during surgery increases fibrinolysis.

(II) Curative.

1. *Heparin:* start immediate IV therapy as discussed before.
2. *Defibrinating drugs:* as streptokinase 600.000 IU over 30 minutes, followed by 100.000 IU/hour by infusion for 72 hours. They are contraindicated during pregnancy, labour and early puerperium for fear of haemorrhage.
3. *Oxygen..*
4. *Analgesic:* e.g. morphine sulphate 10 mg.
5. *Digoxin :* as an inotropic.
6. *Aminophylline:* 250-500 mg IV to relieve dyspnoea.
7. *Pulmonary embolectomy; partial or total occlusion of* the *inferior vena cava* by an umbrella filter or *iliofemoral thrombectomy* are surgical procedures that may be used.

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Jaundice in Pregnancy

Disease	Time of Onset	Cause	Main Symptoms	Prognosis
Recurrent cholestatic jaundice of pregnancy	usually last quarter	- Oestrogen. - Familial.	- Pruritis. - Mild jaundice.	Spontaneous resolution but recurs with pregnancy and hormonal therapy.
Acute fatty liver	Last quarter	- ? Protein malnutrition. -?Eclampsia & pre- eclampsia.	- Severe vomiting. - Abdominal pain. - Haematemesis.	poor, maternal mortality 80%.
Viral hepatitis	Any	Viral	- Malaise. - Anorexia. - Vomiting. - Pyrexia. - Upper abdominal pain. - Hepatomegaly.	Good, but poor in malnutrition.
Cholecystitis	Any	Biliary obstruction.	- Pain, - Vomiting, - Malaise, - Jaundice.	Good, surgical treatment rarely required.

Acute pancreatitis	Common in late pregnancy		- Severe pain. -Vomiting. - Hypotension. - Rapid pulse.	High mortality 20%.
Haemolytic anaemia	Any	- Drugs. - Anaesthesia. -Incompatible blood transfusion.	- Anaemia. - Jaundice.	Good if proper diagnosis and treatment is taken.

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Obstetrics Simplified

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Thyrotoxicosis in Pregnancy

Hazards

-Abortion , and -preterm labour.

Clinical Picture

1. Weight loss inspite of good appetite.
2. Intolerance to heat.
3. Tremors.
4. Resting pulse over 100 beats/min.
5. Exophthalmos.

Investigations

- Free T_4 (raised)
- T_3 resin uptake (raised)

Treatment

Propylthiouracil : 100-200 mg t.d.s. or

Carbimazole: 10-15 mg t.d.s.

- Thyroxine is combined with antithyroid drugs in the last trimester to protect the neonate from hypothyroidism.
- Breast feeding is contraindicated because the drugs are excreted in milk.

Epilepsy in pregnancy

- Grand mal epilepsy is the commonest type.
- *Treatment:* phenobarbitone or phenytoin. Folic acid should be given with phenytoin as it is antifolic .
- There is risk of foetal malformations.

ISO-IMMUNIZATION IN PREGNANCY

RHESUS ISO-IMMUNIZATION

- Rhesus (Rh) factor is present on the surface of erythrocytes. It consists of 3 pairs of genes C/c, D/d, E/e.
- The usual, but inaccurate, term " Rh positive" or " Rh negative" refers to the presence or absence of the D gene.
- The D gene is dominant to "d" and therefore an " Rh positive" individual may be homozygous (DD) or heterozygous (Dd). An " Rh negative" individual has a (dd) genotype.
- *Incidence:* 85% of population are " Rh positive" while 15% are " Rh negative".

Development of Rh-isoimmunization:

An " Rh negative" female may develop antibodies if " Rh positive" blood is passing to her circulation via:

1. *Blood transfusion from " Rh positive" donor.*
2. *Pregnancy with " Rh positive" foetus:*

When an " Rh positive" father is married from an " Rh negative" mother there is a chance that the baby will be " Rh positive". Foetal RBCs can be transmitted to the mother during;

- delivery, abortion, disturbed ectopic pregnancy, antepartum haemorrhage, amniocentesis, or external cephalic version.
- This initial stimulus produces IgM which cannot cross the placenta again to harm the foetus due to its large molecular weight (900.000) so the first baby is escaped from the haemolysis.
- When the mother is exposed for a second time she will develop IgG which can cross the placenta due to its low molecular weight (150.000) to affect the foetus.

N.B. Sensibilization: The initial sensitization is so low that it is not detectable by normal laboratory testing but such patients will develop a strong response to further stimuli.

Although 15% of the population are Rh negative the incidence of Rhesus isoimmunization is 0.5-1.5% only. This is because:

1. The foetus must have inherited a "D" gene from the father. This is inevitable if the father is homozygous (DD), but if he is heterozygous (Dd) 50% of offsprings will be (dd) i.e. Rh negative.
2. ABO incompatibility between the mother and her foetus results in the destruction of transfused foetal cells before they can induce Rh antibody formation.
3. Individual variability of response to the stimulus.

Clinical Varieties:

- The primary pathology in the foetus is haemolysis leading to anaemia.
- In response to the haemolytic anaemia erythropoiesis is enhanced with an increase in blast cells. So the condition was called *erythroblastosis foetalis*.
- The haemolysis results in excessive production of bile pigments which excreted mainly through

the placenta to the mother. Thus, the threat during intra-uterine life is anaemia but after birth is the accumulation of bile pigments.

(I) Hydrops foetalis:

The less common but most severe form in which there are:

- Severe haemolytic anaemia in utero,
- Cardiac failure,
- Gross oedema of the whole foetus and placenta,
- Hepatosplenomegaly,
- Pleural effusion and ascitis,
- Polyhydramnios.
- Radiological and ultrasound features:
  - "*Buddha" attitude*: due to abdominal distension,
  - *" halo" sign:* due to oedema of the scalp.
- Occasionally, in severe cases a maternal syndrome develops with features resembling pre-eclampsia plus jaundice and pruritus.

(II) Icterus gravis neonatorum:

It is the commonest form in which :

- The baby is anaemic at birth,
- Oedema, ascitis, pleural and pericardial effusion,
- Hepatosplenomegaly.
- Jaundice not present at birth but usually develops within few hours, and is progressive.
- Death may result during this period from heart failure, aggravated by respiratory difficulties due to pulmonary oedema, pleural effusion and distended abdomen.
- *Kernicterus*: is damage of the basal nuclei of the brain occurs if the blood bilirubin exceeds 20 mg%. It is characterised by neck rigidity, nystagmus, twitching and death of the neonate may occur. If survives, there is residual spasticity and mental retardation.

(III) Congenital haemolytic anaemia:

It is the mildest form in which there is anaemia which may be evident at birth or reveals itself up to a weak or more postnatally.

Antenatal Assessment:

(I) Maternal antibody level:

It is *indirect Coombs' test* that measures specific anti-D Ig G. A concentrations above 0.5 m g/ml or titer more than 1/8 is an indication for amniocentesis.

(2) Amniocentesis:

- The first sample from the amniotic fluid is taken at not later than 22-24 weeks' gestation if there is :
  - a history of a previous severely affected or stillborn infant, or

- rising antibody levels.

- Otherwise amniocentesis is performed at 30-32 weeks.
- Repeat tests at intervals of 2-3 weeks.
- Amniotic fluid sample is examined as soon as possible by the spectrophotometer at a wave length of 450 m m.
- The interpretation of the result is based on Liley's chart (1961) as shown in the figure.

(3) Ultrasound or X-ray:

to diagnose hydrops foetalis - see before.

Management:

(A) Prophylaxis:

1. Rh-negative women should not receive Rh-positive blood transfusion.
2. *Anti - D gammaglobulin should be given to:*

- All Rh-negative women having Rh-positive baby in any delivery. They should receive 500 units IM within 72 hours from delivery.
- Rh-negative women with abortion before 20 weeks should receive 250 units.
- After ectopic pregnancy, amniocentesis and abruptio placentae in Rh-negative women.
- Women received Rh-positive blood inadvertently can receive a large dose of anti-D globulin.
- Trials were made for prophylaxis with 1500 units given at 28 weeks or 500 units at 28 weeks and another one at 34 weeks' gestation.

(B) Antenatal treatment:

1- Plasmapheresis:

- It is indicated if the foetus is severely affected (Liley zone3) before 24 weeks' gestation.
- It aims to decrease the maternal antibody concentration by removal of 1 litre of maternal blood in each session.
- The blood is centrifuged under complete aseptic condition and the supernatant plasma containing the antibodies is removed.
- The cells are resuspended in saline, plasma protein fraction or fresh frozen plasma and returned to the mother.
- This is repeated five times weekly initially to be reduced to twice weekly later on.

2- Intrauterine transfusion:

- It is indicated if the foetus is severely affected between 24 and 34 weeks' gestation.
- 80 ml of Rh-negative group O blood is injected into the peritoneal cavity of the foetus from which the cells are rapidly absorbed.
- This is repeated every 2-3 weeks and increased to 120 ml at 33 weeks.
- The procedure is done under sonographic control and local anaesthesia.
- The rate of injection is 1.0-1.5 ml / minute.

- Cordocentesis: is intravascular transfusion into the umbilical vein under direct vision using the fetoscope. It can be used instead of intraperitoneal injection.

(C) Delivery:

- In severe cases, induction of labour or caesarean section is indicated as soon as lung maturity is demonstrated by L/S ratio.
- In milder cases, pregnancy can be allowed to continue to 37 weeks when termination is done
- The cord is not milked and immediatly clamped to avoid further passage of antibodies from the placenta. The cord is divided 3 inches from the umbilicus to facilitate exchange transfusion if needed

(D) Neonatal Management:

(I) Blood is obtained from the umbilical cord for the following investigations:

1. ABO and Rh group,
2. haemoglobin concentration,
3. serum bilirubin,
4. direct Coombs' test: detects the antibodies absorbed to the RBCs.

Haemoglobin and bilirubin estimation is repeated every 6 hours for 36 hours.

(II) Exchange transfusion:

Indications:

1. Cord blood haemoglobin less than 15 gm/dl.
2. Cord serum bilirubin more than 3mg% .
3. Positive Coombs'test.

- 20 ml of blood is withdrawn from the umbilical vein to be replaced by the same amount of Rh-negative group O blood. This process is continued till 80-90% of the foetal blood is exchanged.
- The aims are:
  1. Removal of bilirubin.
  2. Removal of some antibodies.
  3. Correction of anaemia.
  4. Replacement of Rh- positive by Rh-negative RBCs.

(III) Simple transfusion:

may be needed later on to correct anaemia.

(IV) Phototherapy:

Exposing the baby to fluorescent light, with protection of the eyes, reduces bilirubinaemia.

ABO ISO-IMMUNIZATION

Sometimes, when the mother is group O and the foetus is group A, B or AB like his father , some anti A or anti B antibodies pass from the mother to the foetus causing haemolysis which can affect the first infant and usually requires no treatment.

Very rarely, the ABO incompatibility is severe causing marked neonatal jaundice in the first 48 hours. This will indicate exchange transfusion for the newly born by group O blood.

ABO incompatibility differs from Rh incompatibility in that:

1. The first baby is affected.
2. It is usually mild due to the presence of soluble A and B antigens in the foetal tissues and fluids in addition to the foetal RBCs.

N.B. The natural anti-A and anti-B antibodies of group O are IgG so it can cross the placenta to affect the baby, whereas the natural anti-A and anti-B antibodies of group B and A are IgM thus if the mother is of group A or B her antibodies cannot cross the placenta.

DIFFERENTIAL DIAGNOSIS OF JAUNDICE IN THE NEW BORN

(1) Physiological jaundice:

- It appears after 48 hours due to destruction of RBCs and immaturity of the liver.
- It is slight and disappears after one week but it tends to be severe and prolonged in premature infants.
- Coombs' test is negative.

(2) Icterus gravis neonatorum:

- Jaundice develops within few hours of birth and is progressive
- Coombs' test is positive.

(3) ABO incompatibility:

- Jaundice may develop in the first 48 hours after birth.
- The first baby is affected.

(4) Congenital spherocytosis:

Due to increased fragility of the RBCs.

(5) Glucose-6- phosphate dehydrogenase deficiency.

(6)Drugs:

as salicylates, diazepam, sulphonamides and vitamin K.

(7) Infections:

As hepatitis, toxoplasmosis, rubella, congenital syphilis and cytomegalvirus.

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Obstetrics Simplified

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Abdominal Pain with Pregnancy

(A) Pregnancy Related Pain:

(I) First trimester:

1. *Abortion:* Inevitable, incomplete or septic abortions.
2. *Vesicular mole:* when expulsion starts.
3. *Ectopic pregnancy:* pain precedes bleeding.

(II) Second trimester:

1. *Mid-trimester abortion:* although abortion due to cervical incompetence is relatively painless it may be preceded by mild lower abdominal pain.
2. *Angular pregnancy ;* or rupture of a rudimentary horn.
3. *Red degeneration* of fibroids.
4. *Stretch of the nerve fibres in the round ligaments*: pain in one or both iliac fossae between 16th and 20th week of pregnancy.

(III) Third trimester:

1. *Abruptio placentae.*
2. *Rupture uterus*.
3. *Severe pre-eclampsia*: associated with upper abdominal pain.
4. *Pressure symptoms:*as engagement of the head , distension of the abdominal wall and pain due to flaring of the ribs particularly in breech presentation.
5. *Braxton Hicks contractions*: Although it is usually painless, many women find it painful.
6. *False labour pain*: irregular, not progressively increasing and not associated with bulging of forebag of water or dilatation of the cervix.
7. *Labour pain*.

(B) Incidental Abdominal Pain:

(I) Genital causes:

1. *Acute salpingitis:* It is rarely seen because the presence of a pregnancy in the uterus prevents ascending infection and if the disease is chronic infertility is more

likely.

2. *Complicated ovarian cyst*: as torsion, rupture, or haemorrhage.

(II)Gastro-intestinal causes:

1-Hurt burn and hiatus hernia. 2-Peptic ulcer. 3-Biliary diseases. 4-Pancreatitis.

5-Acute appendicitis. 6-Constipation. 7-Acute intestinal obstruction.

8-Inflammatory bowel disease : as Crohn's disease and ulcerative colitis.

(III) Renal causes:

1-Pyelonephritis. 2-Renal calculi.

3-Acute retention of urine.

(IV) Miscellaneous:

1. Vascular accidents : e.g.

- rectus sheath haematoma,

- mesenteric thrombosis, and

- rupture spleen or splenic aneurysm.

2-Malignant lesions.

3-Porphyria.

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Retroverted Gravid Uterus

During pregnancy the following may occur:

(1) Spontaneous correction:

occurs in the majority of cases about the 12th week.

(2) Incarceration:

occurs usually around 14-16 weeks where the uterus continue to grow posteriorly in the pelvis and its fundus is below the promontory of the sacrum. This may be due to :

a-jutting promontory,

b- pelvic adhesions,

c- posterior wall fibroid.

(3) Abortion:

may occur around 14-16 weeks due to :

- congestion of the uterus, and

- stretching of the internal os as the body of the uterus is unable to expand to accommodate the pregnancy.

(4) Anterior sacculation:

If the incarceration is not relieved the anterior part of the lower uterine segment distends to accommodate the growing pregnancy. This may lead to rupture of the uterus.

Clinical Picture of Incarceration

(A) Symptoms:

(1) Urinary symptoms: Frequency then difficulty which may progress to acute retention of urine due to elongation and compression of the urethra.

(2)Pain : may be due to;

- bladder distension, - pressure on pelvic organs, or - abortion.

(B) Signs:

1. Abdominally: The distended bladder may be flet.
2. Vaginally :

- The cervix is high and directed anteriorly,
- The body of the uterus is felt in Douglas pouch as a soft mass.

Differential Diagnosis

1. Ovarian cyst with pregnancy.
2. Posterior wall fibroid with pregnancy.
3. Pelvic haematocele.

Management

(A) Prophylactic:

1. Avoid overdistention of the bladder.
2. Frequent prone position.
3. Examine the patient during 14-18 weeks if spontaneous correction was not occur, manual correction is advised.

(B) Curative.

1. Slow evacuation of the bladder and leave Foley's catheter to keep it empty.
2. Place the patient in prone or Sims' position.

These usually succeed to correct the retroversion, if fail do:

1. Manual correction with or without anaesthesia.
2. In extremely rare cases, laparotomy may be needed to free the adhesions.

Management of anterior sacculations:

1. In early pregnancy: manual correction is attempted and if fails, do laparotomy to free the uterus.
2. In late pregnancy: deliver the foetus by caesarean section.

Pendulous Abdomen

It is marked weakness of the anterior abdominal wall leading to forward falling of the pregnant uterus to overhang the symphysis pubis.

Predisposing Factors:

1. Grand multiparity which causes laxity of the abdominal wall.
2. Contracted pelvis.
3. Increased lumbar lordosis.

Complications:

1. Discomfort to the patient.
2. Malpresentations and nonegagement.
3. Premature rupture of membranes and prolapse of the cord.

4. Prolonged labour.
5. Obstructed labour and rupture uterus.

Management:

1. Abdominal binder.
2. Exclude disproportion and maintain the dorsal position during labour.
3. Ventouse, forceps or breech extraction may be used in prolonged labour to direct the presenting part in the pelvis.

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Gynaecologic Tumours with Pregnancy

Fibroids with pregnancy

Incidence: 1%.

Effect of Fibroid on Pregnancy and Labour:

(1) *Abortion :* particularly in submucous myomas due to:

i) distortion of the uterine cavity,

ii) affection of the decidual development,

iii) affection of the vascular supply to the implanted ovum.

(2)*Ectopic pregnancy:* if it interferes with the passage of the ovum.

(3)*Incarceration:* of retroverted gravid uterus in case of posterior wall fibroid.

(4)*Placenta praevia:* due to interference with implantation of the ovum in the upper uterine segment.

(5)*Malpresentations.*

(6)*Abdominal discomfort*: if the tumour is large.

(7)*Torsion of the uterus* : very rare in subserous fundal myoma.

(8) *Premature labour.*

(9) *Nonengagement.*

(10) *Prolonged labour:* Inertia may be present due to interference with normal uterine contractions.

(11) *Obstructed labour*: in cervical myoma or pedunculated subserous myoma impacted in the pelvis.

(12) *Postpartum haemorrhage:* due to

i) interference with uterine retraction,

ii) increased vascularity.

(13) *Puerperal sepsis.*

(14) *Inversion of the uterus* : rare.

(15) *Subinvolution of the uterus.*

Effect of Pregnancy and Labour on Fibroid:

(1) *Increase in size:* due to

i) oedema and increased vascularity,

ii) hypertrophy of the uterine muscles.

(2) *Softening:* due to oedema and increased vascularity.

(3) *Red degeneration.*

(4) *Torsion of a pedunculated myoma.*

(5) *Internal haemorrhage:* from rupture of a surface vein.

(6) *Infection :* supervenes bruising during labour.

(7)*Extrusion:* of submucous myoma may rarely occur in puerperium.

Management:

(A) During pregnancy:

(I) No treatment is indicated in the majority of cases.

(II) Myomectomy carries the risk of abortion and severe haemorrhage so it is indicated in the following conditions only:

1. Red degenration which is not responding to the conservative treatment in the form of

- rest, - analgesics, - antibiotics to guard against secondary infection.

* Give progesterone before and after the operation and remove the affected tumour only.

2- Torsion of a pedunculated myoma.

3- Internal haemorrhage from rupture of a surface vein.

(B) During labour:

(I) *If the myoma lies above the pelvic brim* not causing obstruction: vaginal delivery is allowed and myomectomy is done after 3-6 months if indicated.

(II) *If the myoma lies in the pelvis* causing obstruction: caesarean section is indicated, but myomectomy is contraindicated.

(C) Postpartum:

1. Give prophylactic antibiotic.

2. Observe for postpartum haemorrhage.

Ovarian tumours with pregnancy

Incidence:

1:1500. The commonest is simple serous cyst followed by dermoid cyst.

Effect Of Ovarian Tumours On Pregnancy and Labour:

1. *Abortion and preterm labour* in large and complicated tumours.
2. *Pressure symptoms.*
3. *Malpresentations and nonengagement.*
4. *Obstructed labour*: if a pedunculated tumour is impacted in the pelvis.

Effect of Pregnancy and Labour on Ovarian Tumours:

1. Torsion: is the commonest complication particularly in pedunculated tumours that lie above the pelvic brim. It is more common during puerperium than pregnancy due to;

   - lax abdominal wall,

   - large intra-abdominal space after birth allows free mobility of the tumour.

   2- Haemorrhage. 3- Rupture. 4- Infection. 5- Rapid growth.

Management:

(A) During pregnancy:

(*I)Cyst less than 6 cm in diameter :* is left and followed up by periodic examination and ultrasound as it is usually a functional corpus luteum cyst.

(II) Cyst of 6 cm or more in diameter:

1. *Discovered in the first half of pregnancy: is removed after the 12th week when the placenta is formed so there is less liability for abortion.*
2. *Discovered in the second half of pregnancy: is left to be removed in the first week of puerperium.*

(III) Complicated or malignant tumours:

are removed immediately irrespective of the duration of pregnancy.

(B) During Labour:

(I) If the tumour lies above the pelvic brim- causing no obstruction: vaginal delivery is allowed and tumour is removed in the first week in puerperium.

(II) If the tumour is impacted in the pelvis - causing obstruction : caesarean section with immediate removal of the tumour is done.

(C) During puerperium:

Tumours discovered for the first time should be removed immediately for fear of torsion.

Cancer cervix with pregnancy

Pre-invasive Cancer (CIN)

- *Cytological examination:* can be done during pregnancy taking in cosideration that some features of dysplasia as increased cells showing mitosis are normally present during pregnancy.
- *Colposcopy:* is easier to be done during pregnancy due to physiological eversion of the cervix.
- *If CIN I or CIN II is detected :* follow up only as many cases will regress.
- *If CIN III is detected :* follow up is indicated till one month after delivery where conization can be done or hysterectomy if the patient had taken the decision that she had completed her family.

Invasive Cancer Cervix:

Incidence : very rare 1:10.000 because;

1. The mean age of cancer cervix is 45-50 years.
2. The associated infection prevents conception.

Effect of invasive carcinoma on pregnancy and labour:

1. *Abortion and preterm labour:* due to haemorrhage, infection and general health affection.
2. *Cervical dystocia, obstructed labour, cervical laceration and/or uterine rupture* may occur.
3. *Puerperal sepsis.*

Effect of pregnancy and labour on invasive carcinoma:

1. *Rapid growth:* as young patients tend to have a rapidly growing tumours.
2. *Rapid spread* : if vaginal delivery is allowed.

Management:

(I) Early pregnancy:

1. Wertheim’s operation or
2. Hysterotomy followed by radiotherapy.

(II) Late pregnancy:

Upper segment caesarean section followed by either Wertheim’s operation (caesarean hysterectomy) or radiotherapy.

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High Risk Pregnancy

Definition

It is the pregnancy in which the mother foetus and / or newborn are at risk of morbidity or mortality during pregnancy, labour and/ or postpartum.

Incidence

About 20% of all pregnancies.

Causes

(A) Maternal factors:

Age : below 16 years or above 35 years particularly if the patient is primigravida.

Grand multiparity: 5 or more previous deliveries.

Habits: as heavy smoking, alcoholism or drug addiction.

Bad obstetric history:

- Repeated abortion.
- Repeated preterm labour.
- Prolonged or difficult labour particularly if was ended by stillbirth or neonatal death.
- Operative delivery as caesarean section or forceps.

History or current medical disorders:

- Hypertension.
- Diabetes.
- Cardiac.
- Renal.
- Pulmonary.
- Hepatic.
- Anaemia.
- Coagulation defects.
- Haemoglobinopathies.
- Serious infections as AIDS.

History of surgery or trauma:

- Myomectomy.
- Metroplasty.
- Pelvic trauma.

(B) Foetal factors:

- Malpresentations and malpositions.
- Multiple pregnancy.
- Antepartum haemorrhage.
- Congenital anomalies.
- Premature rupture of membranes.
- Rh-isoimmunization.
- Intrauterine growth retardation.
- Macrosomia.
- Poly - or oligohydramnios.
- Post-term pregnancy.

Management

- Frequent antenatal visits.
- Management of the cause.
- Monitoring of foetal well-being (see later).
- Delivery in well - equipped hospital under senior staff supervision.

Elderly primigravida

Definition:

Primigravida whose age is above 35 years.

Dangers:

This woman is more liable to:

1. Hypertension with pregnancy.
2. Abruptio placentae.
3. Higher incidence of fibroid with pregnancy.
4. Post-term pregnancy.
5. Uterine inertia and prolonged labour.
6. Rigid perineum so instrumental delivery are more needed.
7. More caesarean section delivery as the foetus is precious.

The grand multipara

Definition:

Woman who had 5 or more previous deliveries.

Dangers:

This woman is more liable to:

1- Anaemia.

2- Hypertension with pregnancy.

3- Diabetes.

4- Placenta praevia.

5- Pendulous abdomen.

6- Malpresentation and malposition.

7- Uterine inertia and prolonged labour.

8- Instrumental delivery and caesarean section are more needed.

9- Obstructed labour which may lead to rupture uterus due to :

a) higher incidence of malpresentations and malpositions,

b) pendulous abdomen, c) weak uterine muscles,

d) some osteomalacic changes in the pelvis,

e) larger sized baby, f) false sense of security due to previous normal deliveries.

10- Postpartum haemorrhage.

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Post-term Pregnancy

Definition

A pregnancy that persists for 42 weeks or more from the onset of the last menstrual period. Sometimes called postmaturity or postdate.

Incidence

5-10%. It is more common in primigravidae.

Aetiology

Unknown, but hereditary, hormonal and non-engagement of the presenting part are suspected factors.

Risk of Post-term

1. *Placental insufficiency* : which may lead to foetal hypoxia or even death.
2. *Oligohydramnios:* with its sequelae particularly cord compression during labour.
3. *Obstructed labour:* due to;

    - oversized baby,

    - no moulding of the skull due to more calcification.

4- *Increased incidence of operative delivery*.

Diagnosis

(A) Antenatal:

- *History* : calculation of gestational age (see later).
- *Examination* : larger baby size.
- *X-ray :* large ossification center in the upper end of the tibia.
- *Ultrasonography:* can detect,
    - Biparietal diameter more than 9.6 cm.
    - Increased foetal weight.
    - Oligohydramnios.
    - Increased placental calcification.
- *Tests for placental function* (see later).

(B) Postnatal:

- *Baby length:* more than 54 cm.
- *Baby weight:* more than 4.5 kg.
- *Skull :* well ossified with smaller fontanelles.
- *Finger nails:* project beyond finger tips.

Management

Termination of labour is indicated which may be by:

- *Induction of labour* if the condition is favourable for vaginal delivery using:
    - 1- amniotomy ± oxytocin, or
    - 2- prostaglandins ± oxytocin.
- *Caesarean section:* if conditions are not favourable for vaginal delivery, or if induction of labour failed.

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Preterm Labour

Definition

It is onset of labour before completed 37 weeks of pregnancy.

Incidence

5-10%.

Aetiology

(I) Maternal causes:

(1) Medical disorders:

- Preeclampsia. - Chronic nephritis. - Anaemia and malnutrition.

(2) Antepartum haemorrhage:

- Placenta praevia, - Abruptio placentae.

(3) Uterine anomalies:

- Septate uterus. - Incompetent cervix. - Fibroid uterus.

(4) Psychological or hormonal.

(II) Foetal causes:

1- Congenital anomalies. 2- Intrauterine foetal death. 3- Polyhydramnios.

4- Multiple pregnancy. 5- Rh- isoimmunization. 6- Premature rupture of membranes.

(III) Idiopathic.

Risk of Prematurity:

(1) Birth trauma: particularly intracranial haemorrhage which is aggrevated by hypoprothrombinaemia and capillary fragility present in prematures.

(2) Respiratory distress syndrome (RDS):

- occurs due to deficient pulmonary surfactant which helps distension of the alveoli. A structureless hyaline membrane will develop within the alveolar ducts and atelectasis of the alveoli occurs.

- Dyspnoea and cyanosis develops 1-2 hours after delivery and death occurs after about 30 hours.
- RDS is seen also in infants;

  - to diabetic mothers,

  - delivered by caesarean sections ,or

  - had intrapartum asphyxia.
- Treatment: oxygen and 8.4 % sodium bicarbonate infusion to combat acidosis.

(3) **Hypothermia** as a result of:

i) *Decreased heat production due to*;

- reduced muscle activity and - hypoglycaemia.

ii) *Increased heat loss due to;*

- large surface area relative to body weight,

- lack of insulating fat,

- immaturity of the heat regulating center.

(4) **Infection** especially respiratory due to:

i) immaturity of the immune mechanism,

ii) susceptibility of the delicate tissues to trauma.

(5) **Haematological disorders:**

i) *Anaemia due to* :

- impaired haemopoiesis,

- increased RBCs destruction,

- poor iron stores in the liver which are filled in the last weeks of pregnancy.

ii) *Hypoprothrombinaemia:* due to liver immaturity this is in addition to capillary fragility increase the liability for haemorrhage.

iii) *Hyperbilirubinaemia due to:*

- *liver immaturity and* - *increased RBCs destruction.*

(6) **Malnourishment due to**:

- weak suckling, - weak digestion and - liver immaturity.

Rickets and impaired mental development occurs more frequently in children who were prematures.

Prediction

Recently, it has been reported that detection of foetal fibronectin , which is a glycoprotein synthesized in the chorio-decidual interface, in the cervico-vaginal sample is a predictor of imminent preterm labour.

Diagnosis

(1) Uterine contractions of :

a- frequency every 10 minutes or less,

b- duration at least 30 seconds and

c- continue for at least one hour.

(2) Uterine contractions of whatever the frequency and duration but with:

a- rupture membranes,

b- effacement 75% or more, or

c- cervical dilatation ³ 3 cm in primigravida and ³ 4 cm in multigravida.

Management

(A) Prophylactic management:

1. Adequate rest for high risk patients.
2. Improve health and nutrition.
3. Discourage cigarette smoking.
4. Treatment of cervical incompetence by circulage in the second quarter of pregnancy.

(B) Preventive management:

The aim is to inhibit labour till completed 37 weeks' gestation or at least till the foetal lung maturity is ensured . This may be achieved by acting on one or more of the following theories of labour.

(I) Neuromuscular:

1. Sedation: as diazepam.
2. Ethyl alcohol (Ethanol).
3. b - Sympathomimetic drugs: as ritodrine and isoxuprine.
4. a - receptor blockers: as phenoxybenzamine.

(II) Hormonal :

1- Betamethazone:

4 mg betamethazone IM every 8 hours for 48 hours can cause:

- decrease oestrogen synthesis by depressing the production of its precursor from the foetal adrenal gland.

- inhibition of prostaglandin synthesis.

- acceleration of foetal lung maturity.

2-Prostaglandin inhibition: e.g. endomethacin.

3-Oxytocin inhibition by :

a- Hydration with a rapid IV infusion of 0.9% Nacl (normal saline) in a rate of 120 ml/hour. This will decrease the release of oxytocins as well as antidiuretic hormone from the posterior pituitary.

b- Ethyl alcohol.

(III) Mechanical:

1. Rest in bed: to reduce the mechanical stimuli from the pressure of the presenting part on the lower uterine segment.
2. Cervical circulage: it is of value in prevention of abortion and preterm labour if done at 14-16 weeks' gestation but not so later on.
3. Amniocentesis: was advocated by some authors to reduce the mechanical distension of the uterus in polyhydramnios. The drainage should be slowly aspirating 1 litre of amniotic fluid over 3-4 hours as sudden drop of uterine volume may initiate uterine contractions and causes abruptio placentae.

(C) Management of inevitable preterm labour:

- Inevitable labour occurs when there is frequent labour pain (> 10 contractions/hour) and
- The cervix is > 3 cm in primigravidae or > 4 cm in multigravidae.

i) Intranatal care:

1. *Hospital delivery: is indicated with an available incubator.*
2. *Anaesthesia and analgesia: It is better to avoid the systemic ones that can depress the foetal respiratory center. Epidural or local infilteration anaesthesia or analgesia is the best.*
3. *Vitamin K_1: 10 mg IM to the mother during labour to guard against foetal haemorrhage.*
4. *Method of delivery:*

   i) Vertex presentation: vaginal delivery is allowed with,

   - continuous FHR monitoring and

- generous episiotomy ± outlet forceps to avoid compression and sudden decompression of the foetal head.

ii) Breech presentation : is best delivered by caesarean section as vaginal delivery causes sudden compression of the after-coming unmoulded head resulting in intracranial haemorrhage.

ii) Postnatal care:

1. *Air way:* suction and oxygen if needed.
2. *Incubation:* is indicated if the birth weight is less than 2.5 kg.

a- The baby is placed on his side with the head slightly lower down.

b- Temperature of the incubator is between 32-36ºC.

c- Humidity of 70%,

d- Oxygen concentration not more than 30% to avoid retrolental fibroplasia and blindness.

e- Minimal handling and no bathing but skin can be rubbed with olive oil every other day.

3- *Antibiotics* : prophylactic antibiotic as ampicillin to protect against infection.

4- *Feeding :* Breast milk is given as normal if the baby can suck, otherwise the expressed milk can be given by a dropper, spoon or nasogastric tube.

5- *Vitamins and iron:*

a- Vitamin K1mg IM is given to the neonate if it was not given to the mother during labour.

b- Iron and vitamins : can be given at the age of 2-3 weeks.

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Premature Rupture of Membranes (PROM)

Definition:

It is rupture of membranes before onset of labour so it is more accurate to call it " prelabour rupture of membranes".

Incidence:

10% of term pregnancies and more in preterm labour.

Aetiology:

The following factors are incriminated:

1. Cervical incompetence.
2. Polyhydramnios.
3. Multiple pregnancy.
4. Malpresentations as the presenting part is not fitting against the lower uterine segment.
5. Chorioamnionitis.
6. Low tensile strength of the membranes.

Diagnosis:

1- **History:** of gush of fluid per vaginum that moists *vulval pads*.

Drawback: Vulval pads can be moisted with urine or vaginal discharge which can be mistaken with the amniotic fluid.

2- **Nitrazine paper test:**

The colour turns from yellow to deep blue due to alkalinity of the amniotic fluid.

Drawback: blood, semen or vaginal infection are alkaline media give the same result.

3- **Laboratory analysis:** for creatinine, urea and uric acid in the fluid sample.

Drawback: these components are present in the urine.

4- **Fern test:**

Visualization of fern-like pattern of dried amniotic fluid on a glass slide under microscopy due to presence of protein.

Drawback: protein may be present in urine.

5- **Sterile speculum examination:**

to observe the escape of amniotic fluid from the external os.

6- Dye injection:

Through abdominal needle under ultrasonic guide into the amniotic sac and observation of its passage through the external os or even in the vulval pad.

Drawback: It carries risk of foetal trauma particularly if a large amount of the amniotic fluid was drained.

7- Vernex, meconium or alpha-fetoprotein detection:

in the fluid sample is diagnostic.

8- Ultrasound:

is an ideal non-invasive technique for the detection of the residual amount of amniotic fluid. Oligohydramnios is diagnosed if the measurements of the largest bocket of the amniotic fluid are less than 1× 1 cm. The largest bocket is usually present between the anterior

shoulder and the neck.

Complications:

1. Preterm labour: with the risk of prematurity.
2. Infection: chorio-amnionitis, septicaemia and foetal pneumonia.
3. Foetal deformities and distress: due to oligohydramnios.

Management:

(1) Gestational age over 36 weeks:

- In absence of infection, foetal distress and abnormal lie, wait for 24 hours as about 90% of patients with PROM will pass into spontaneous labour. Prophylactic antibiotic can be given during this period.

- PGE_2 and / or oxytocin is used for induction of labour in patients did not pass into labour after 24 hours.

(2) Gestational age between 34-36 weeks:

- In absence of infection and foetal distress, wait for 48 hours as rupture of membrane itself will accelerates lung surfactant production and hence lung maturity.

- Induce labour after 48 hours with PGE_2 and /or oxytocins.

- Prophylactic antibiotics is given during this period.

- Caesarean section is indicated in breech presentation < 36 weeks' gestation.

(3) Gestational age between 28-34 weeks:

In absence of infection, the main aim is to manage the case conservatively till the 35th week when lung maturity mostly occurs and the baby can survive.

Conservative management as follow:

i) Rest in bed as long as there is escape of liquor with restriction of efforts later on particularly those that increase intra-abdominal pressure.

ii) Temperature is recorded every 4 hours.

iii) Observation for malaise, abdominal pain, uterine tenderness and amount of escaped liquor on sterile vulval pads.

iv) Leucocytic count and C-reactive protein may be done every other day.

v) Prophylactic antibiotics may be given although this is not advised by some authors as it may lead to colonisation of resistant strains of organisms in the genital tract.

vi) Tocolytic drugs : are given if uterine activity starts.

vii) Corticosteroid therapy: is given for 48 hours if labour was imminent or will be induced before 35 weeks.

(4) Gestational age less than 28 weeks:

There is little chance of foetal survival and the condition is usually considered as inevitable abortion.

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Tocolytic Drugs

These are drugs that inhibit uterine contractions.

(I) Beta - sympathomimetics:

Action:

Relaxation of the smooth muscle fibres by stimulating the beta receptors present on the cell membrane.

Examples:

Ritodrine (Yutopar):

Dosage: 50 mg of ritodrine in 500 ml of 5% glucose solution. Start by 10 drops per minute and increase by 5 drops every 10 minutes until uterine contractions cease.

- The infusion should be continued for 12-48 hours after cessation of contractions.

- The treatment is then maintained by oral therapy as one tablet (10 mg) every 8 hours after meal to reduce its side effects.

- Maternal pulse and blood pressure as well as foetal heart rate should be monitored during treatment to control the dose.

Side effects:

(A) Maternal:

- Tachycardia,

- hypotension (relaxation of the smooth muscle fibres in the blood vessels wall),

- flushing,
- sweating
- nausea,
- vomiting,
- headache,
- anxiety,
- tremors,
- hyperglycaemia,
- hypokalaemia,
- acidosis and
- pulmonary oedema.

(B) Foetal:

- Tachycardia,
- arrhythmia,
- loss of beat-to-beat variation,
- neonatal hypotension and hypoglycaemia.

Contraindications:

i) Heart disease.

ii) Hypertension or hypotension.

iii) Hyperthyroidism.

iv) Antepartum haemorrhage (dilatation of the uterine arteries may increase the bleeding).

v) Diabetes.

Other β -sympathomimetic drugs:

- Terbutaline,

- Isoxuprine (Duvadilan - vasoxiprine) 20 mg 3-4 times daily.

- Salbutamol.

(II) Calcium Antagonists:

Action: Antagonise the action of calcium within the myometrial cells so reduce its contractility.

e.g. **Nifedipine** 10 mg oral tablet.

(III) Magnesium Sulphate:

Action: The intracellular calcium is displaced by magnesium ion leading to inhibition of the uterine activity.

Dosage: The initial dose is 40 c.c of 10% solution given slowly IV. The subsequent doses depend upon the response and the development of $MgSO_4$ toxicity so reflexes and respiratory rate should be observed.

(IV) Prostaglandin Inhibiting Agents:

Action:

Inhibition of uterine contractions by inhibiting prostaglandin synthesis.

Dosage:

e.g. indomethacin 100 mg suppository initially , followed by 25 mg orally every 6 hours for up to 24 hours after contractions ceased.

(V) Ethyl Alcohol

Action:

1. Inhibits the release of oxytocin from the posterior pituitary gland.
2. Suppresses the myometrial activity directly.
3. Inhibits prostaglandin F_2 a synthesis.

Dosage:

It is given IV and the dose is adjusted to maintain blood alcohol level of 0.9-1.6 mg/litre.

Side effects:

1. Nausea, vomiting and depression.
2. Drunken mother and foetus.
3. Maternal and foetal acidosis.

So it is not a practical drug.

03.12.02

Obstetrics Simplified

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Anatomy of the Female Pelvis

The female bony pelvis is divided into:

1. *False pelvis:* above the pelvic brim and has no obstetric importance.
2. *True pelvis:* below the pelvic brim and related to the child -birth.

THE TRUE PELVIS

It is composed of inlet , cavity and outlet.

(I) The Pelvic Inlet (Brim):

Boundaries:

- Sacral promontory, - alae of the sacrum, - sacroiliac joints, - iliopectineal lines,

- iliopectineal eminencies, - upper border of the superior pubic rami,

- pubic tubercles, - pubic crests and - upper border of symphysis pubis.

Diameters:

(A) Antero -posterior diameters:

(1) Anatomical antero- posterior diameter (true conjugate) = 11cm

from the tip of the sacral promontory to the upper border of the symphysis pubis.

(2) Obstetric conjugate = 10.5 cm

from the tip of the sacral promontory to the most bulging point on the back of symphysis pubis which is about 1 cm below its upper border. It is the shortest antero-posterior diameter.

(3) Diagonal conjugate = 12.5 cm

i.e. 1.5 cm longer than the true conjugate. From the tip of sacral promontory to the lower border of symphysis pubis.

(4) External conjugate = 20 cm

from the depression below the last lumbar spine to the upper anterior margin of the symphysis pubis measured from outside by the pelvimeter . It has not a true obstetric importance.

(B) Transverse diameters:

(1) Anatomical transverse diameter =13cm

- between the farest two points on the iliopectineal lines.

- It lies 4 cm anterior to the promontory and 7 cm behind the symphysis.

- It is the largest diameter in the pelvis.

(2) Obstetric transverse diameter:

It bisects the true conjugate and is slightly shorter than the anatomical transverse diameter.

(C) Oblique diameters:

(1) Right oblique diameter =12 cm

from the right sacroiliac joint to the left iliopectineal eminence.

(2) Left oblique diameter = 12 cm

from the left sacroiliac joint to the right iliopectineal eminence.

(3) Sacro - cotyloid diameters = 9-9.5 cm

from the promontory of the sacrum to the right and left iliopectineal eminence, so the right diameter ends at the right eminence and vice versa.

(II) The Pelvic Cavity:

It is a segment , the boundaries of which are:

- *the roof* is the plane of pelvic brim,
- *the floor* is the plane of least pelvic dimension,
- *anteriorly* the shorter symphysis pubis,
- *posteriorly* the longer sacrum.

(III) The Pelvic Outlet:

(A) Anatomical outlet:

It is lozenge-shaped bounded by;

- the lower border of symphysis pubis,
- pubic arch,
- ischial tuberosities,
- sacrotuberous and sacrospinous ligaments and,
- tip of the coccyx.

(B) Obstetric outlet:

It is a segment, the boundaries of which are:

- *the roof* is the plane of least pelvic dimension,
- *the floor* is the anatomical outlet,
- *anteriorly* the lower border of symphysis pubis,

- *posteriorly* the coccyx.

- *laterally* the ischial spines.

Diameters of pelvic outlet:

(A) Antero - posterior diameters:

(1) Anatomical antero-posterior diameter =11cm

from the tip of the coccyx to the lower border of symphysis pubis.

(2) Obstetric antero-posterior diameter = 13 cm

from the tip of the sacrum to the lower border of symphysis pubis as the coccyx moves backwards during the second stage of labour.

(B) Transverse diameters:

(1) Bituberous diameter = 11 cm

between the inner aspects of the ischial tuberosities.

(2) Bispinous diameter = 10.5 cm

between the tips of ischial spines.

(IV) Pelvic Planes:

These are imaginary planes lie as follow:

(1) Plane of pelvic inlet:

passing with the boundaries of pelvic brim and making an angle of 55º with the horizon (angle of pelvic inclination).

(2) Plane of mid cavity (plane of greatest pelvic dimensions):

- pass between the middle of the posterior surface of the symphysis pubis and the junction between 2nd and 3rd sacral vertebrae. Laterally, it passes to the centre of the acetabulum and the upper part of the greater sciatic notch.

- It is a round plane with diameter of 12.5 cm.

- Internal rotation of the head occurs when the biparietal diameter occupies this wide pelvic plane while the occiput is on the pelvic floor i.e. at the plane of the least pelvic dimensions.

(3) Plane of obstetric outlet (plane of least pelvic dimensions):

passes from the lower border of the symphysis pubis anteriorly, to the ischial spines laterally, to the tip of the sacrum posteriorly.

(4) Plane of anatomical outlet:

passes with the boundaries of anatomical outlet and consists of 2 triangular planes with one base which is the bituberous diameter.

a- Anterior sagittal plane: its apex at the lower border of the symphysis pubis.

b- Posterior sagittal plane: its apex at the tip of the coccyx.

- Anterior sagittal diameter: 6-7 cm

from the lower border of the symphsis pubis to the centre of the bituberous diameter.

- Posterior sagittal diameter: 7.5-10 cm

from the tip of the sacrum to the centre of the bituberous diameter.

(V) Pelvic Axes:

(1) Anatomical axis (curve of Carus):

- It is an imaginary line joining the centre points of the planes of the inlet, cavity and outlet.

- It is C shaped with the concavity directed forwards.

- It has no obstetric importance.

(2) Obstetric axis:

- It is an imaginary line represents the way passed by the head during labour.

- It is J shaped passes downwards and backwards along the axis of the inlet till the ischial spines where it passes downwards and forwards along the axis of the pelvic outlet.

Caldwell- Moloy Classification of Pelvic Types (1933):

Four types of female pelves were described. Actually, the majority of pelves are of mixed types:

(I) Gynaecoid pelvis(50%) :

It is the normal female type.

1. Inlet is slightly transverse oval.
2. Sacrum is wide with average concavity and inclination.
3. Side walls are straight with blunt ischial spines.
4. Sacro- sciatic notch is wide.
5. Subpubic angle is 90-100^{o}.

(II) Anthropoid pelvis (25%):

It is ape-like type.

1. All anteroposterior diameters are long.
2. All transverse diameters are short.
3. Sacrum is long and narrow.
4. Sacro-sciatic notch is wide.
5. Subpubic angle is narrow.

(III) Android pelvis (20%):

It is a male type.

1. Inlet is triangular or heart-shaped with anterior narrow apex.
2. Side walls are converging (funnel pelvis) with projecting ischial spines.
3. Sacro-sciatic notch is narrow.
4. Subpubic angle is narrow <90º.

(IV) Platypelloid pelvis (5%):

It is a flat female type.

1. All anteroposterior diameters are short.
2. All transverse diameters are long.
3. Sacro-sciatic notch is narrow.
4. Subpubic angle is wide.

N.B. At the Level of Ischial Spines:

1. *The plane of obstetric outlet* (plane of the least pelvic dimensions) is at this level.
2. *The levator ani muscles* are situated at this level and its ischio-coccygeous part is attached to the ischial spines.
3. *The obstetric axis of the pelvis* changes its direction.
4. *The head is considered engaged* when the vault is felt vaginally at or below this level.
5. *Internal rotation of the head* occurs when the occiput is at this level.
6. *Forceps* is applied only when the head at this level (mid forceps) or below it (low and outlet forceps).
7. *Pudendal nerve block* is carried out at this level.

8. *The external os of the cervix* is located normally.
9. *The vaginal vault* is located nearly.
10. . *The ring pessary* should be applied above this level for treatment of prolapse.

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Obstetrics Simplified

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Anatomy of the Foetal Skull

It consists of vault , face and base .

The vault is composed of:

- 2 frontal bones separated by the frontal suture,

- 2 parietal bones separated by the sagittal suture,

- the occipital bone separated by the lamboidal suture from the parietal bones, while the coronal suture separates the frontal from the parietal bones.

Each of the 2 parietal bones is separated from the temporal bone on each side by the temporal suture.

The face is the area from the junction of the chin and neck to the root of the nose and supra-orbital ridges.

The vertex is the area of the vault bounded ;

- anteriorly by the anterior fontanelle and the coronal suture,

- posteriorly by the posterior fontanelle and lamboidal suture,

- laterally by 2 lines passing by the parietal eminencies.

The brow is the area from the nose and supra-orbital ridges to the anterior fontanelle and coronal suture.

The Fontanelles:

These are 6 areas lie at the meeting of the sutures. Four fontanelles lie at the anterior and posterior end of the temporal sutures on each side and have no obstetric importance. The anterior and posterior fontanelles are important to diagnose:

i) the vertex presentation,

ii) the position of the occiput,

iii) the degree of flexion of the head.

Anterior Fontanelle (Bregma)	Posterior Fontanelle (Lambda)

Large, and lozenge-shaped.	Small and triangular.
Its floor is membranous.	Its floor is bony.
Surrounded by 4 bones.	Surrounded by 3 bones.
(2 frontal and 2 parietal).	(2 parietal and occipital).
The floor is completely ossified 1.5 years after birth.	The floor is completely ossified at full term.
The surrounding bones are not overlapping during moulding.	The surrounding bones are overlapping during moulding.

Diameters of Foetal Skull:

(A) Longitudinal diameters:

(1) Suboccipito-bregmatic = 9.5cm

- from below the occipital protuberance to the centre of the anterior fontanelle (bregma).

- It is the engagement diameter in occipito-anterior with complete flexion.

(2) Suboccipito-frontal = 10 cm

- from below the occipital protuberance to the anterior end of the bregma.

- It is the engagement diameter in occipito anterior with incomplete flexion.

- It is the diameter that distends the vulva in occipito anterior if the head is allowed to extend after crowning.

(3) Occipito-frontal = 11.5 cm

- form the occipital protuberance to the root of the nose.

- It is the engagement diameter in occipito-posterior position.

- It is the diameter that distends the vulva in face to pubis delivery.

- It is the diameter that distends the vulva if the head extends before crowing in occipito anterior.

(4) Submento -bregmatic = 9.5 cm

- from the junction of the chin and neck to the centre of the bregma.

- It is the engagement diameter in face presentation when the head is completely extended.

(5) Submento-vertical =11.5 cm

- from the junction of the chin and neck to the vertical point which is a point on the sagittal suture midway between anterior and posterior fontanelles.

- It is the engagement diameter in the incompletely extended face.

- It is the diameter that distends the vulva during face delivery.

(6) Mento-vertical =13.5 cm

- from the tip of the chin to the vertical point.

- It is the engagement diameter in brow presentation. As it is longer than the largest diameter of the pelvic brim, the head cannot enter the pelvis.

(B) Transverse diameters:

(1) Biparietal =9.5 cm

between the 2 parietal eminencies.

(2) Subparietal supraparietal = 9cm

- from below one parietal eminence to above the opposite eminence.

- It is the engagement diameter in case of asynclitism.

(3) Bitemporal = 8 cm

between the anterior ends of the temporal sutures.

(4) Bimastoid = 7.5cm

between the tips of the 2 mastoid processes.

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Obstetrics Simplified

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Obstetric Terms

Presentation:

The part of the foetus related to the pelvic brim and first felt during vaginal examination.

The presentation may be:

(a) Cephalic (96%):

i) Vertex: when the head is flexed.

ii) Face: when the head is extended.

iii) Brow: when it is midway between flexion and extension.

(b) Breech (3.5%).

(c) Shoulder (0.5%).

Cephalic presentation is the commonest as this makes the foetus more adapted to the pyriform-shaped uterus with the larger buttock in the wider fundus and the smaller head in the narrower lower part of the uterus.

Position:

The relation of the foetal back to the right or left side of the mother and whether it is directed anteriorly or posteriorly.

The denominator: is a bony landmark on the presenting part used to denote the position.

In *vertex* it is the *occiput.*

In *face* it is the *mentum (chin).*

In *breech* it is the *sacrum.*

In *shoulder* it is the *scapula.*

Occipito-anterior positions are more common than occipito - posterior positions because in occipito - anterior positions the concavity of the anterior aspect of the foetus due to its flexion fits with the convexity of the vertebral column of the mother due to its lumbar lordosis.

* In each presentation, except the shoulder , there are 8 positions. In vertex presentation they are:

- Left occipito -anterior (LOA) 60%.

- Right occipito-anterior (ROA) 20%.

- Right occipito - posterior (ROP) 15%.

- Left occipito-posterior (LOP)5%.

- Left occipito-transverse (LOT).

- Right occipito - transverse (ROT).

- Direct occipito -anterior (DOA).

- Direct occipito - posterior (DOP).

LOA is more common than ROA, and ROP is more common than LOP as in LOA and ROP the head enters the pelvis in the right oblique diameter which is more favourable than the left oblique because:

i) anatomically, the right oblique is slightly longer than the left,

ii) the pelvic colon reduces the length of the left oblique.

Lie:

It is the relation between the long axis of the foetus and that of the mother.

- *Longitudinal* in cephalic and breech presentations.

- *Transverse or oblique* in shoulder presentation.

Attitude:

The relation of foetal parts to each other.

- *Flexion* in the majority of cases.

- *Extension* in face presentation.

Synclitism:

The posture in which the 2 parietal bones are at the same level.

Asynclitism:

- The posture in which one parietal bone is at a lower level than the other due to lateral inclination of the head.

- Asynclitism is beneficial in bringing the shorter subparietal supraparietal diameter (9 cm) to enter the pelvis instead of the longer biparietal (9.5 cm).

- Slight degree of asynclitism may occur in normal labour.

(1) Anterior parietal bone presentation:

- The anterior parietal bone is lower and the sagittal suture is near to the promontory.

- It occurs more in multigravidas due to laxity of the abdominal wall.

- It occurs also in contracted flat pelvis.

(2) Posterior parietal bone presentation:

- The posterior parietal bone is lower and the sagittal suture is near to the symphysis.

- It occurs more in the primigravidas due to tense abdominal wall.

Anterior parietal bone presentation is more favarouble because;

1. The head lies more in the direction of the axis of the pelvic inlet.
2. During correction of asynclitism, the head meets only the resistance of the sacral promontory while in posterior parietal bone presentation the head meets the resistance of the whole length of the symphysis pubis.
3. In posterior parietal bone presentation the head stretches the anterior wall of the lower uterine segment with liability to rupture.

Engagement:

- It is the passage of the widest transverse diameter of the presenting part, which is the biparietal in vertex presentation, through the pelvic inlet.

- The engaged head cannot be easily grasped by the first pelvic grip, but it can be palpated by the second pelvic grip.

- Rule of fifths: 2/5 or less of the foetal head is felt abdominally above the symphysis pubis.

- Vaginally : the vertex is felt vaginally at or below the level of ischial spines.

- Stations:

- Station 0 the vertex at the level of ischial spines.
- Stations -1,-2 and -3 represents 1,2 and 3 cm respectively above the level of ischial spines.
- Stations +1, +2 and +3 represents 1,2 and 3 cm respectively below the level of ischial spines.

- In the primigravidas, engagement of the head occurs in the last 3-4 weeks of pregnancy due to the tonicity of the abdominal and uterine muscles.

- In the multipara, the head is usually engaged at the onset of labour or even at the beginning of the second stage due to less tonicity.

Causes of non-engagement:

(I) Faults in the passenger:

1- Large head.

2- Hydrocephalus.

3- Occipito-posterior positions.

4- Malpresentations.

5- Multiple pregnancy.

6- Placenta praevia.

7- Short cord.

8- Polyhydramnios.

(II) Faults in the passages:

1- Contracted pelvis.

2- Pelvic tumours.

3- Full bladder or rectum.

(III) Faults in the power:

Atony of the abdominal muscles.

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Obstetrics Simplified

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Normal Labour

Definitions:

Labour is the process by which a viable foetus i.e. at the end of 28 weeks or more is expelled or is going to be expelled from the uterus .

Delivery means actual birth of the foetus.

Normal labour

The following criteria should be present to call it normal labour:

1- Spontaneous expulsion,

2- of a single,

3- mature foetus,

4- presented by vertex,

5- through the birth canal,

6- within a reasonable time (not less than 3 hours or more than 18 hours),

7- without complications to the mother,

8- or the foetus.

Cause of Onset of Labour:

It is unknown but the following theories were postulated:

(I) Hormonal factors:

(1) Oestrogen theory:

During pregnancy, most of the oestrogens are present in a binding form. During the last trimester, more free oestrogen appears increasing the excitability of the myometrium and prostaglandins synthesis.

(2) Progesterone withdrawal theory:

Before labour, there is a drop in progesterone synthesis leading to predominance of the excitatory action of oestrogens.

(3) Prostaglandins theory:

Postaglandins E_2 and $F_{2\alpha}$ are powerful stimulators of uterine muscle activity. $PGF_{2\alpha}$ was found to be increased in maternal and foetal blood as well as the amniotic fluid late in pregnancy and during labour.

(4) Oxytocin theory:

Although oxytocin is a powerful stimulator of uterine contraction , its natural role in onset of labour is doubtful. The secretion of oxytocinase enzyme from the placenta is decreased near term due to placental ischaemia leading to predominance of oxytocin's action.

(5) Foetal cortisol theory:

Increased cortisol production from the foetal adrenal gland before labour may influence its onset by increasing oestrogen production from the placenta.

(II) Mechanical factors:

(1) Uterine distension theory:

Like any hollow organ in the body, when the uterus in distended to a certain limit, it starts to contract to evacuate its contents. This explains the preterm labour in case of multiple pregnancy and polyhydramnios.

(2) Stretch of the lower uterine segment:

by the presenting part near term.

CLINICAL PICTURE OF LABOUR

(A) Prodromal (pre - labour) stage:

The following clinical manifestations may occur in the last weeks of pregnancy.

(1) Shelfing:

It is falling forwards of the uterine fundus making the upper abdomen looks like a shelf during standing position. This is due to engagement of the head which brings the foetus perpendicular to the pelvic inlet in the direction of pelvic axis.

(2) Lightening:

It is the relief of upper abdominal pressure symptoms as dyspnoea, dyspepsia and palpitation due to :

- descent in the fundal level after engagement of the head and
- shelfing of the uterus.

(3) Pelvic pressure symptoms:

With engagement of the presenting part the following symptoms may occur:

- Frequency of micturition,

- rectal tenesmus and

- difficulty in walking.

(4) Increased vaginal discharge.

(5) False labour pain:

These are differentiated from true labour pain as follow:

True Labour Pain	False Labour Pain
Regular.	Irregular.
Increase progressively in frequency, duration and intensity.	do not.
Pain is felt in the abdomen and radiating to the back.	Pain is felt mainly in the abdomen.
Progressive dilatation and effacement of the cervix.	No effect on the cervix.
Membranes are bulging during contractions.	No bulging of the membranes.
Not relieved by antispasmodics or sedatives.	Can be relieved by antispasmodics and sedatives.

(B) Onset of Labour:

It is characterised by:

(1) True labour pain.

(2) The show:

It is an expelled cervical mucus plug tinged with blood from ruptured small vessels as a result of separation of the membranes from the lower uterine segment. Labour is usually starts several hours to few days after show.

(3) Dilatation of the cervix:

A closed cervix is a reliable sign that labour has not begun. In multigravidae the cervix may admit the tip of the finger before onset of labour.

(4) Formation of the bag of fore - waters:

Which bulges through the cervix and becomes tense during uterine contractions.

STAGES OF LABOUR

Labour is divided into four stages:

(I) First stage:

- It is the stage of cervical dilatation.

- Starts with the onset of true labour pain and ends with full dilatation of the cervix i.e. 10 cm in diameter.

- It takes about 10-14 hours in primigravida and about 6-8 hours in multipara.

(II) Second stage:

- It is the stage of expulsion of the foetus.

- Begins with full cervical dilatation and ends with the delivery of the foetus.

- Its duration is about 1 hour in primigravida and ½ hour in multipara.

(III) Third stage:

- It is the stage of expulsion of the placenta and membranes.

- Begins after delivery of the foetus and ends with expulsion of the placenta and membranes.

- Its duration is about 10-20 minutes in both primi and multipara.

(IV) Fourth stage:

- It is the stage of early recovery.

- Begins immediately after expulsion of the placenta and membranes and lasts for one hour.

- During which careful observation for the patient, particularly for signs of postpartum haemorrhage is essential. Routine uterine massage is usually done every 15 minutes during this period.

First Stage:

Causes of cervical dilatation:

1. Contraction and retraction of uterine musculature.
2. Mechanical pressure by the forebag of waters, if membranes still intact, or the presenting part, if they had ruptured. This in turn will release more prostaglandins which stimulate uterine contractions and cervical effacement.
3. Softness of the cervix which has occurred during pregnancy facilitates dilatation and effacement of the cervix.

Mechanism of cervical dilatation:

- In primigravidas, the cervical canal dilates from above downwards i.e. from the internal os downwards to the external os. So its length shorts gradually from more than 2 cm to a thin rim of few millimetres continuous with the lower uterine segment. This

process is called *effacement* and expressed in percentage so when we say effacement is 70% it means that 70% of the cervical canal has been taken up.

- Dilatation of the cervix (external os) starts after complete effacement of the cervix.

- In multigravidas, effacement and dilatation occur simultaneously.

- In normal presentation and position, the head is applied well to the lower uterine segment dividing the amniotic sac by the girdle of contact into a hindwaters above it containing the foetus and a forewaters below it. This reduces the pressure in the forewaters preventing early rupture of membranes. After full dilatation of the cervix the hind and forewaters become one sac with increased pressure in the bag of forewaters leading to its rupture.

Phases of cervical dilatation:

(A) Latent phase:

This is the first 3 cm of cervical dilatation which is slow takes about 8 hours in nulliparae and 4 hours in multiparae.

(B) Active phase:

It has 3 components:

- acceleration phase,

- maximum slope, and

- deceleration phase.

- The phase of maximum slope is the most detectable and the two other phases are of shorter duration and can be detected only by frequent vaginal examination.

- The normal rate of cervical dilatation in active phase is 1.2 cm/ hour in primigravidae and 1.5 cm/hour in multiparae. If the rate is < 1cm / hour it is considered prolonged.

(II) Second Stage:

(A) Delivery of the head:

(1) Descent:

It is continuous throughout labour particularly during the second stage and caused by:

a. Uterine contractions and retractions.

b. The auxiliary forces which is bearing down brought by contraction of the diaphragm and abdominal muscles.

c. The unfolding of the foetus i.e. straightening of its body due to contractions of the circular muscles of the uterus.

(2) Engagement:

The head normally engages in the oblique or transverse diameter of the inlet.

(3) Increased flexion:

As the atlanto-occipital joint is nearer to the occiput than the sinciput, increased flexion of the head occurs when it meets the pelvic floor according to the lever theory.

Increased flexion results in :

a. The suboccipito - bregmatic diameter (9.5cm) passes through the birth canal instead of the suboccipito- frontal diameter (10 cm).

b. The part of the foetal head applied to the maternal passages is like a ball with equal longitudinal and transverse diameters as the suboccipito-bregmatic = biparietal = 9.5 cm. The circumference of this ball is 30 cm.

c. The occiput will meet the pelvic floor.

(4) Internal rotation:

The rule is that the part of foetus meets the pelvic floor first will rotate anteriorly. So that its movement is in the direction of levator ani muscles (the main muscle of the pelvic floor) i.e. downwards, forwards and inwards.

In normal labour, the occiput which meets the pelvic floor first rotates anteriorly 1/8 circle.

(5) Extension:

The suboccipital region lies under the symphysis then by head extension the vertex, forehead and face come out successively.

The head is acted upon by 2 forces:

- the uterine contractions acting downwards and forwards.

- the pelvic floor resistance acting upwards and forwards so the net result is forward direction i.e. extension of the head.

(6) Restitution:

After delivery, the head rotates 1/8 of a circle in the opposite direction of internal rotation to undo the twist produced by it.

(7) External rotation:

The shoulders enter the pelvis in the opposite oblique diameter to that previously passed by the head. When the anterior shoulder meets the pelvic floor it rotates anteriorly 1/8 of a circle. This movement is transmitted to the head so it rotates 1/8 of a circle in the same direction of restitution.

(B) Delivery of the shoulder and body:

The anterior shoulder hinges below the symphysis pubis and with continuous descent the posterior shoulder is delivered first by lateral flexion of the spines followed by anterior shoulder then the body.

(III) Third Stage:

After delivery of the foetus, the uterus continues to contract and retract. As the placenta is inelastic, it starts to separate through the spongiosa layer by one of the following mechanisms:

(1) Schultze's mechanism(80%):

- The central area of the placenta separates first and placenta is delivered like an inverted umbrella so the foetal surface appears first followed by the membranes containing small retroplacental clot.
- There is less blood loss and less liability for retention of fragments.

(2) Duncan's mechanism (20%):

- The lower edge of the placenta separates first and placenta is delivered side ways.
- There is more liability of bleeding and retained fragments.

The 3rd stage is composed of 3 phases:

a) Placental separation. b) Placental descent. c) Placental expulsion.

PHYSIOLOGICAL EFFECTS OF LABOUR

(I) On the Mother :

(A) First stage:

minimal effects.

(B Second stage:

- *Temperature:* slight rise to 37.5ºC.

- *Pulse:* increases up to 100/min.

- *Blood pressure:* systolic blood pressure may rise slightly due to pain, anxiety and stress.

- *Oedema and congestion of the conjuctiva.*

- *Minor injuries:* to the birth canal and perineum may occur particularly in rimigravidas.

(C) Third stage:

Blood loss from the placental site is 100-200 ml and from laceration or episiotomy is 100 ml so the total average blood loss in normal labour is 250 ml.

(II) On the Foetus:

(A) Moulding:

The physiological gradual overlapping of the vault bones as the skull is compressed during its passage in the birth canal.

- One parietal bone overlaps the other and both overlap the occipital and frontal bones so fontanelles are no more detectable. It is of a good value in reducing the skull diameters but;
- severe and / or rapid moulding is dangerous as it may cause intracranial haemorrhage.

Degree of Moulding	
+	Suture lines closed but no overlap.
++	Overlap of the bones but reducible.
+++	Overlap of the bones but irreducible.

(B) Caput succedaneum:

- It is a soft swelling of the most dependent part of the foetal head occurs in prolonged labour before full cervical dilatation and after rupture of the membranes.
- It is due to obstruction of the venous return from the lower part of the scalp by the cervical ring.
- Large caput may:

  i) obscure the sutures and fontanelles making identification of the position difficult. This can be overcomed by palpation of the ear ,

  ii) give an impression that the head is lower than its true level.

- *Artificial caput succedaneum (chignon):* is induced during vacuum extraction.
- Caput succedaneum disappears spontaneously within hours to days of birth.
- As it is a vital manifestation, so it is not detected in intrauterine foetal death.

The presence of caput indicates that:

i) the foetus was living during labour,

ii) labour was prolonged and difficult,

iii) the attitude of foetal head during labour can be expected as caput is present in the most dependant part of it.

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Obstetrics Simplified

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Active Management of Normal Labour

Aims:

1. To achieve delivery of a normal healthy child with minimal physical and psychological maternal effects.
2. Early anticipation, recognition and management of any abnormalities during labour course.

(A) Antenatal Preparation:

1. *Maternal education:* about the physiology of labour and symptoms of impending labour.
2. *Breathing exercise:* adapt the mother to breathing during labour to guard against respiratory alkalosis caused by hyperventilation.

(B) First Stage of Labour:

(I) History:

(1)Complete obstetric history.

(2)History of present pregnancy:

- Duration of pregnancy.
- Medical disorders during this pregnancy.
- Complications during this pregnancy as antepartum haemorrhage.

(3)History of present labour:

- Labour pains : onset, frequency and duration.

- Passage of " show", fluid or blood per vaginum.

- Sensation of foetal movement.

(II)Examination:

(1) General examination:

- Height and built.

- Maternal vital signs : pulse, temperature and blood pressure.

- Chest and heart examination.

- Lower limbs for oedema.

(2) Abdominal examination:

- Fundal level. - Fundal grip. - Umbilical grip. - Pelvic grips.
- FHS.

- Scar of previous operations (e.g. C.S, myomectomy or hysterotomy).

(3) Pelvic examination:

a-Cervix:

- Dilatation : the diameter of the external os is measured by the finger (s) during P/V examination and expressed in cm, one finger = 2 cm , 2 fingers = 4 cm and the distance resulted from their separation is added to the 4 cm in more dilatation.
- Effacement.
- Position (posterior, midway , central).

b- Membranes: ruptured or intact. If ruptured exclude cord prolapse and meconium stained liquor.

c- Presenting part and its position.

d- Station : of the presenting part.

e- Pelvic capacity.

(4) Investigations:

If not done before or if indicated:

1- Blood group-Rh typing.

2- Urine for albumin and sugar.

3- Hb%.

4- Ultrasonography.

(III) Active procedures:

(1) Evacuation of the rectum by enema to;

i) avoid uterine inertia,

ii) help the descent of the presenting part,

iii) avoid contamination by faeces during delivery.

(2) Evacuation of the bladder:

- ask the patient to micturate every 2-3 hours, if she cannot use a catheter.
- It prevents uterine inertia and helps descent of the presenting part.

(3) Preparation of the vulva:

Shave the vulva, clean it with soap and warm water from above downwards, swab it with antiseptic lotion and apply a sterile pad.

(4) Nutrition:

- When labour is established no oral feeding is allowed , but sips of water.

- 15 ml magnesium trisilicate is given every 2 hours as an oral antacid to guard against bronchospasm occurs if the acid vomitus is inhaled during general anaesthesia " Mendelson's syndrome". Antacid injections may be used instead.
- If labour is delayed more than 8 hours, IV drip of glucose 5% or saline-glucose solution is given.

(5) Posture:

- Patient is allowed to walk during the early first stage particularly with intact membranes.
- If rest is needed the patient lies on her left lateral position to prevent inferior vena cava compression and hence placental insufficiency and foetal distress.

(6) Analgesia:

- Pethidine 100 mg IM,

- trilene inhalation, or

- epidural anaesthesia are the most common use.

N.B. Patient should not bear down during the first stage as this is useless, exhausts the patient and predisposes to genital prolapse.

(7) The partogram:

It is the graphic recording of the course of labour including the following observations:

(I) The mother:

- Pulse every 30 minutes,

-blood pressure every 2 hours,

- temperature every 4 hours,

- uterine contractions : frequency , strength and duration every 30 minutes by manual palpation or better by tocography if available,

- cervical dilatation,

- fluid input and output,

- drugs including oxytocins.

(II) The foetus

- FHR every 15 minutes by Pinard's stethoscope or better by doptone,

- descent of the presenting part,

- degree of moulding,

- Cardiotocography if available is more valuable for continuous monitoring of both uterine contractions and FHR particularly in high risk pregnancy.
- The advantages of the partogram:

    1. Allows right intervention in the proper time e.g. oxytocin usage, instrumental delivery or C.S.

    2. Allows different staff shifts to manage the case successively.

    3. A document for labour events.

(C) Second Stage of Labour:

(1) Its beginning is identified by:

1. The patient feels the desire to defecate.
2. The contractions become more prolonged and painful.
3. Reflex desire to bear down during the contractions.
4. The expulsive effort is accompanied by sustained expiratory grunt.

5. Rupture of membranes, although this is not specific as it may occur earlier even before start of labour " prelabour rupture of membranes" or later even to the degree that the foetus is delivered in an intact sac.

6. Full dilatation of the cervix (10 cm) in between uterine contractions is the most sure sign.

(2) Delivery room:

- The patient is transferred on a wheel or trolley to the delivery room.
- Put her in the lithotomy position.
- The lower abdomen, upper parts of the thighs, vulva and perineum are swabbed with antiseptic lotion.
- Sterile legs and towels are applied.

(3) Bearing down:

Ask the patient to bear down during contractions and relax in between.

(4) Delivery of the head:

The main aim during delivery of the head is to prevent perineal lacerations through the following instructions:

i) Support of the perineum:

When the labia start to separate by the head, a sterile pad is placed over the perineum and press on it with the right hand during uterine contractions. This is continued until crowning occurs to maintain flexion of the head.

Crowning:

- is the permanent distension of the vulval ring by the foetal head like a crown on the head. The head does not recede back in between uterine contractions.

- This means that the biparietal diameter is just passed the vulval ring and the occipital prominence escapes under the symphysis pubis.

- After crowning, allow slow extension of the head so the vulva is distended by the suboccipito frontal diameter 10 cm.
- If the head is allowed to extend before crowning the vulva will be distended by the occipito-frontal 11.5 cm increasing the incidence of perineal lacerations.
- *Ritgen manoeuvre*: upward pressure on the perineum by the right hand and downward pressure on the occiput by the left hand to control the extension of the head.

ii) Episiotomy:

It is done at crowning when the perineum is stretched to the degree that it is about to tear.

iii) Swab and aspirate:

the mouth and nose once the head is delivered before respiration is initiated and the liquor, meconium or blood is inhaled.

iv) Coils of the umbilical cord :

if present around the neck are slipped over the head but if tight or multiple they are cut between 2 clamps.

(5) Delivery of the shoulders:

Gentle downward traction is applied to the head till the anterior shoulder slips under the symphysis pubis. The head is lifted upwards to deliver the posterior shoulder first then downwards to deliver the anterior shoulder.

(6) Delivery of the remainder of the body:

Usually slips without difficulty otherwise gentle traction is applied to complete delivery.

(7) Clamping the cord:

The baby is held by its ankles with the head downwards at a lower level than its mother for few seconds. This is contraindicated in;

i) Preterm babies.

ii) Erythroblastosis foetalis.

iii) Suspicion of intracranial haemorrhage.

This may be enhanced by milking the cord towards the baby, to add about 100 ml of blood to its circulation.

The cord is divided between 2 clamps to avoid bleeding from a possible 2 nd uniovular twin.

(D) Third Stage of Labour:

(I) Delivery of the placenta:

i) Conservative method:

- Put the ulnar border of the left hand just above the fundus at the level of the umbilicus to detect any bleeding inside the uterus known by rising level of the atonic uterus.
- Wait for signs of placental separation and descent but do not massage the uterus.
- As soon as they are detected massage the uterus to induce its contraction, ask the patient to bear down and push the uterus downwards to deliver the placenta.
- Hold the placenta between the two hands and roll it to make the membranes like a rope in order not to miss a part of it.
- Give ergometrine 0.5 mg or oxytocin 5 units IM after delivery of the placenta to help uterine contraction and minimise blood loss. These may be given before delivery of the placenta.

Signs of placental separation and descent :

1. The body of the uterus becomes smaller, harder and globular.

2. The fundal level rises as the upper segment overrides the lower uterine segment which is now distended with the placenta.

3. Suprapubic bulge due to presence of the placenta in the lower uterine segment.

4. Elongation of the cord particularly on pressing on the uterine fundus and it does not recede back into the vagina on relieving the pressure.

5. Gush of blood from the vagina.

ii) The active method (Brandt- Andrews method):

- With delivery of the anterior shoulder, 0.5 mg ergometrine or syntometrine (0.5 mg ergometrine + 5 units oxytocin) is given IM.

- When the uterus contracts, put the left hand suprapubic and push the uterus upwards while gentle downward and backward traction is applied on the cord by the right hand when the placenta is delivered it is rolled as in the conservative method.

- *Advantage:* reduction of the blood loss.

- *Disadvantages:*

  Constriction ring may occur with retention of the placenta.

  Avulsion of the cord if undue pressure is applied.

  Inversion of the uterus if fundus is pressed while the uterus is lax.

(II) Routine examinations:

(1) Examination of the placenta and membranes:

by exploring it on a plain surface to be sure that it is complete. If there is missed part, exploration of the uterus is done under general anaesthesia.

(2) Explore the genital tract:

For any lacerations that should be immediately repaired.

(III) Repair of episiotomy:

(E) Fourth Stage of Labour:

Observation for the patient particularly atony of the uterus and vaginal bleeding.

(F) Care of The Newborn

(1) Clearance of the air passages:

- The newborn is placed in supine position with the head lower down. A metal, rubber or better disposable plastic catheter is used to aspirate the mucus from the pharynx and mouth directly by the physician's mouth or by attach it to an electric suction pump.
- Crying of the baby is usually occurs within seconds, if delayed slapping its soles, flexion and extension of the legs and rubbing the back usually stimulate breathing.

(2) Apgar score:

is calculated at 1 and 5 minutes and further steps of resuscitation are arranged according to it (see later).

(3) The umbilical cord:

- A disposable plastic umbilical clamp is applied about 5 cm from the umbilicus to avoid the possibility of tying an umbilical hernia then cut about 1.5 cm distal to the clamp. Inspect for bleeding and paint it with alcohol.
- If the plastic umbilical clamp is not available, 2 ligatures of silk are applied instead of it.
- The umbilical stump is painted daily with an antiseptic till its fall within 10 days.

(4) Congenital anomalies:

The newborn is examined for injuries or congenital anomalies as imporforate anus, hypospadius (not to be circumcised as the cut skin will be used in the repair later on), cyanotic heart diseases.... etc.

(5) Weight:

the newborn and record it.

(6) Dressing:

Dressing as well as all previous procedures should be done in a warm place better under radiant warmer to prevent heat loss which occurs rapidly after delivery increasing the metabolism and acidosis.

(7) Care of the eyes:

An antibiotic eye drops as chloramphenicol are instilled into the eyes as a prophylaxis against ophthalmia neonatorum.

(8) Identification:

of the baby by a plastic bracelet on which its mother's name is written.

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Obstetrics Simplified

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Malposition and Malpresentations

Left and right occipito-anterior are the only normal presentations and positions.

Malposition: occipito-posterior.

Malpresentations: anything except vertex as face, brow, breech , shoulder, cord and complex presentations.

Causes of Malpresentations and Malpositions:

(A) Defects in the powers:

1. Pendulous abdomen: laxity of the abdominal muscles.
2. Dextro-rotation of the uterus: rotation of the uterus in anti-clock wise favours occipito-posterior in right occipito-anterior position.

(B) Defects in the passages:

1. Contracted pelvis.
2. Android pelvis.
3. Pelvic tumours.
4. Uterine anomalies as bicornuate, septate or fibroid uterus.
5. Placenta praevia**.**

(C) Defects in the passenger:

1- Preterm foetus.

2- Intrauterine foetal death.

3- Macrosomia.

4- Multiple pregnancy.

5- Congenital anomalies as anencephaly and hydrocephalus.

6- Polyhydramnios.

7- Coils of the cord around the neck favours face presentation.

Signs Suggestive of Malpresentations:

1. Pendulous abdomen.
2. Nonengagement of the presenting part in the last 3-4 weeks in primigravida.
3. Premature rupture of membranes or its rupture early in labour.
4. Delay in the descent of the presenting part during labour.
5. Vaginal examination, X-ray or ultrasonography are more conclusive.

Complications of Malpresentations and Malpositions:

1. Premature rupture of membranes or its rupture early in labour.
2. Cord presentation and prolapse.
3. Prolonged labour due to hypotonic or hypertonic inertia.
4. Obstructed labour with higher incidence of rupture uterus.

5. Increased incidence of instrumental and operative delivery.
6. Increased incidence of trauma to the genital tract.
7. Increased incidence of postpartum haemorrhage and puerperal infection.
8. Increased incidence of perinatal mortality.

OCCIPITO-POSTERIOR POSITION

Definition:

It is a vertex presentation with foetal back directed posteriorly.

Incidence:

10% at onset of labour.

Right occipito-posterior (ROP) is more common than left occipito-posterior (LOP) because:

1. The left oblique diameter is reduced by the presence of sigmoid colon.
2. The right oblique diameter is slightly longer than the left one.
3. Dextro-rotation of the uterus favours occipito-posterior in right occipito-anterior position.

Aetiology:

1. *The shape of the pelvis:* anthropoid and android pelvis are the most common cause of occipito-posterior due to narrow fore-pelvis.
2. *Maternal kyphosis:* The convexity of the foetal back fits with the concavity of the lumbar kyphosis.

3. *Anterior insertion of the placenta:* the foetus usually faces the placenta (doubtful).

4. *Other causes of malpresentations:* as

   – placenta praevia,

   – pelvic tumours,

   – pendulous abdomen,

   – polyhydramnios,

   – multiple pregnancy.

Diagnosis:

(A) During pregnancy:

(I) Inspection:

1. The abdomen looks flattened below the umbilicus due to absence of round contour of the foetal back.

2. A groove may be seen below the umbilicus corresponding to the neck.

3. Foetal movement may be detected near the middle line.

(II) Palpation:

1-Fundal grip:

The breech is felt as a soft, bulky, irregular non-ballotable mass.

2-Umbilical grip:

- The back felt with difficulty in the flank away from the middle line.

- The anterior shoulder is at least 3 inches from the middle line.

- The limbs are easily felt near, or on both sides, of the middle line.

3-First pelvic grip:

- The head is usually not engaged due to deflexion.

- The head is felt smaller and escapes easily from the palpating fingers as they catch the bitemporal diameter instead of the biparietal diameter in occipito-anterior.

4-Second pelvic grip:

The head is usually deflexed.

(III) Auscultation:

- FHS are heard in the flank away from the middle line.

- In major degree of deflexion, the FHS may be heard in middle line.

(IV) Ultrasonography or lateral view x-ray.

(B) During labour:

In addition to the previous findings vaginal examination reveals:

1. The direction of the occiput.
2. The degree of deflexion.

Mechanism of Labour:

A certain degree of deflexion is present due to :

1. Opposition of the two convexities of the foetal and maternal spines prevents flexion and promotes deflexion.
2. The longer biparietal diameter (9.5cm) enters the narrow sacro-cotyloid diameter (9cm) while the shorter bitemporal diameter (8cm) enters the longer oblique diameter (12cm).

As a result of deflexion, the occipito-frontal diameter 11.5 cm enters the pelvis leading to delayed engagement.

Taking in consideration the rule that the part of the foetus that meets the pelvic floor first will rotate anteriorly, the degree of deflexion determines the mechanism of labour as follow:

(A) Normal mechanism(90%):

Deflexion is corrected and complete flexion occurs. The occiput meets the pelvic floor first, long anterior rotation 3/8 circle occurs bringing the occiput anteriorly and the foetus is delivered normally.

(B) Abnormal mechanism (10%):

(1) Deep transverse arrest (1%):

In mild deflexion, the occiput rotates 1/8 circle anteriorly and the head is arrested in the transverse diameter.

(2) Persistent occipito-posterior (3%):

In moderate deflexion, the occiput and sinciput meet the pelvic floor simultaneously, no internal rotation and the head persists in the oblique diameter.

(3) Direct occipito-posterior (face to bubis) (6%):

In marked deflexion, the sinciput meets the pelvic floor first, rotates 1/8 circle anteriorly and the occiput becomes direct posterior.

- In deep transverse arrest and persistent occipito-posterior no further progress occurs and labour is obstructed as the head cannot be delivered spontaneously.

- In direct occipito-posterior, the head can be delivered by flexion supposing that the uterine contractions are strong and there is no contracted pelvis.However, perineal lacerations are more liable to occur as :

  - the vulva is distended by the large occipito-frontal diameter 11.5 cm,

- the perineum is overstretched by the large occiput.

Factors favour long anterior rotation:

(1) Well flexed head.

(2) Good uterine contractions.

(3) Roomy pelvis.

(4) Good pelvic floor.

(5) No premature rupture of membranes.

Causes of failure of long anterior rotation:

(1) Deflexed head.

(2) Uterine inertia.

(3) Contracted pelvis: rotation of the head cannot easily occur in android pelvis due to projection of the ischial spines and convergence of the side walls.

(4) Lax or rigid pelvic floor.

(5) Premature rupture of membranes or its rupture early in labour.

Management of Labour:

A- First stage:

1. Exclude contracted pelvis.
2. Exclude presentation or prolapse of the cord.
3. Inertia and prolonged labour are expected so oxytocin may be indicated unless there is contraindication.
4. Contractions are sustained, irregular and accompanied by marked backache which needs analgesia as pethidine or epidural analgesia.

5. Avoid premature rupture of membranes by:-

– rest in bed,

– no straining,

– avoid high enema,

– minimise vaginal examinations.

6- The other management and observations as in normal labour.

B- Second stage:

- Wait for 60-90 minutes.
- During this period:

  - Observe the mother and foetus carefully.

  - Combat inertia by oxytocin unless it is contraindicated.

  Contraindications of oxytocins:

  1. Disproportion.
  2. Incoordinate uterine action.
  3. Uterine scar e.g. previous C.S, hysterotomy, myomectomy, metroplasty or previous perforation.
  4. Grand multipara.
  5. Foetal distress.

One of the following will occur:

(I) Long internal rotation 3/8 circle:

occurs in about 90% of cases and delivery is completed as in normal labour.

(II) Direct occipito - posterior (face to pubis):

- occurs in about 6% of cases.

- the head can be delivered spontaneously or by aid of outlet forceps.

- Episiotomy is done to avoid perineal laceration.

(III) Deep transverse arrest (1%) and persistent occipito-posterior (3%):

The labour is obstructed and one of the following should be done:

(A) Vacuum extraction (ventose):

- Proper application as near as possible to the occiput will promote flexion of the head.

- Traction will guide the head into the pelvis till it meets the pelvic floor where it will rotate.

(B) Manual rotation and extraction by forceps:

Under general anaesthesia the following steps are done:

1. Disimpaction: the head is grasped bitemporally and pushed slightly upwards.

2. Flexion of the head.

3. Rotation of the occiput anteriorly by the right hand vaginally aided by,

   - Rotation of the anterior shoulder abdominally towards the middle line by the left hand or an assistant.

- Fix the head abdominally by an assistant, apply forceps and extract it.

(C) Rotation and extraction by a forceps:

1- Kielland's forceps:

Single application for rotation and extraction of the head as this forceps has a minimal pelvic curve.

2- Barton's forceps:

- Originally was designed for deep transverse arrest.

- It has a hinge in one blade between the blade proper and shank to facilitate application.

- The axis of the handle to that of the blades is 55º i.e. the angle of the pelvic inlet to the outlet.

- It is used for rotation only then conventional forceps is applied for extraction unless it has an axis traction piece so it can be used for rotation and extraction.

3- Scanzoni double application:

- The conventional forceps is applied to rotate the occiput anteriorly then the forceps is removed and reapplied so that the pelvic curve of the forceps is directed anteriorly

and extract the head.

- This method is out of modern obstetrics as it is hazardous to the mother and foetus.

N.B. The head should be engaged for manual or forceps rotation to be done.

(D) Caesarean section:

It is indicated in :

1. Failure of the above methods.
2. Other indications for C.S as;

– contracted pelvis,

– placenta praevia,

– prolapsed pulsating cord before full cervical dilatation, and

– elderly primigravida.

(E) Craniotomy:

if the foetus is dead.

Actually speaking, the methods used in modern obstetrics are:

- Vaccum extraction and

- *Caesarean section.*

Complications:

See complications of malpresentations and malposition (mentioned before).

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Obstetrics Simplified

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Face Presentation

Definition:

It is a cephalic presentation in which the head is completely extended.

Incidence:

About 1:300 labours.

Aetiology :

(A) Primary face:

-It is less common.

- occurs during pregnancy.

-It is usually due to foetal causes which may be:

1. *Anencephaly:* due to absence of the bony vault of the skull and the scalp while the facial portion is normal.
2. *Loops of the cord around the neck.*
3. *Tumours of the foetal neck* e.g. congenital goitre.
4. *Hypertonicity of the extensor muscles of the neck.*

5. *Dolicocephaly*: long antero-posterior diameter of the head, so as the breadth is less than 4/5 of the length.
6. *Dead or premature foetus*.
7. *Idiopathic*.

(B) Secondary face:

- It is more common.

- occurs during labour.

- It may be due to:

1. *Contracted pelvis* particularly flat pelvis which allows descent of the bitemporal but not the biparietal diameter leads to extension of the head.
2. *Pendulous abdomen or marked lateral obliquity of the uterus*.
3. *Further deflexion of brow or occipito - posterior positions*.
4. *Other causes of malpresentations as* polyhydramnios and placenta praevia.

Positions:

- Right mento-posterior (RMP).

- Left mento - posterior (LMP).

- Left mento-anterior (LMA).

- Right mento-anterior (RMA), are the more common positions.

  - Right mento- transverse (lateral), left mento-transverse, direct mento-posterior and direct mento-anterior are rare and usually transient positions.

1. The first position (RMP) corresponds to the first normal position (LOA) as the back should be to the left and anterior in the first position.
2. Mento-anterior are more common than mento-posterior as most cases arise from more deflexion of the head in occipito-posterior position usually in flat contracted pelvis.

Diagnosis:

(A) During pregnancy (difficult):

1. The back is difficult to feel .
2. The limbs are felt more prominent in mento-anterior position.
3. The chin may be felt on the same side of the limbs as a horseshoe-shaped rim in mento-anterior position.
4. In mento-posterior, a groove may be felt between the occiput and the back particularly after rupture of the membranes.
5. Second pelvic grip: the occiput is at a higher level than the sinciput.
6. The FHS are heard below the umbilicus through the foetal chest wall in mentoanterior position.
7. *Ultrasound or X-ray:* confirms the diagnosis and may identify associated foetal anomalies as anencephaly.

(B) During labour:

In addition to the previously mentioned findings.Vaginal examination shows the following identifying features for face:-

- supra - orbital ridges,
- the malar processes,
- the nose (rubbery and saddle shaped),

- the mouth with hard areolar ridges. - the chin.

Late in labour, the face becomes oedematous (tumefaction) *so it can be misdiagnosed as a buttock (breech presentation) where the two cheeks are mistaken with buttocks and the mouth with anus and the malar processes with the ischial tuberosities. The following points can differentiate in-between:-*

Face Presentation	*Frank Breech*
The foetal mouth and malar processes form the apexes of a triangle.	The anus is on the same line with the ischial tuberosities.
The gum is felt hard through the mouth.	No hard object through the anus.
The examining finger may be sucked by the foetal mouth during vaginal examination.	The anus does not suck the finger.

Mechanism of Labour

(A) Mento - anterior position:

1. Descent.
2. Engagement by submento-bregmatic diameter 9.5cm.
3. *Increased extension*.
4. Internal rotation of chin 1/8 circle anteriorly.
5. *Flexion :* is the movement by which the head is delivered in mento-anterior position when the submental region hinges below the symphysis. The vulva is much distended by the submento-vertical diameter 11.5 cm.
6. Restitution.

7. External rotation.

Engagement is delayed because:

a. The biparietal diameter does not pass the plane of pelvic inlet until the chin is below the level of the ischial spines and the face begins to distend the perineum.

b. Moulding does not occur as in vertex presentation.

(B) Mento - posterior position:

1- Long anterior rotation 3/8 circle (2/3 of cases):

so the head is delivered as mento-anterior.

2- *In about 1/3 of cases* one of the following may occur:

i- Deep transverse arrest of the face: when the chin rotates 1/8 circle anteriorly.

ii- Persistent mento-posterior: when no rotation occurs.

iii- Direct mento-posterior: When the chin rotates 1/8 circle posteriorly.

In the last 3 conditions (i) , (ii) and (iii) no further progress occurs and labour is obstructed.

Direct mento-posterior, unlike direct occipito-posterior, cannot be delivered because:

1. Delivery should occur by extension while the head is already maximally extended.
2. As the length of the sacrum is 10 cm and that of neck is only 5 cm, the shoulders enter the pelvis and become impacted while the head still in the pelvis, thus the labour is obstructed.

Management of Labour:

Exclude: – Foetal anomalies and – Contracted pelvis.

(A) Mento-anterior:

First stage: as in occipito-posterior.

Second stage:

- Spontaneous delivery usually occurs.

- Forceps delivery may be indicated in prolonged 2nd stage.

- Episiotomy is necessary because of over distension of the vulva.

(B) Mento-posterior:

First stage: as mento-anterior.

Second stage:

(I) Wait for long anterior rotation of the mentum 3/8 circle and the head will be delivered as mento-anterior. During this period oxytocin is used to compete inertia which is common in such conditions as long as there is no contraindication. Failure of this long rotation is more common than in occipito-posterior position so earlier interference is usually indicated.

(II) Failure of long anterior rotation 3/8 circle or

– development of foetal or maternal distress at any time, is managed by:

1. *Caesarean section:* which is the safest and the current alternative in modern obstetrics.
2. *Manual rotation and forceps extraction* as mento-anterior , or
3. *Rotation and extraction by kielland forceps*.

In the last 2 methods the head should be engaged but they are hazardous to both the mother and foetus so they are nearly out of modern obstetrics.

4. Craniotomy : if the foetus is dead.

The face of the foetus is oedematous after delivery so the mother is assured that this will be spontaneously relieved within few days.

Complications:

See complications of malpresentations and malposition.

03.12.02

Obstetrics Simplified

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Brow Presentation

Definition:

It is a cephalic presentation in which the head is midway between flexion and extension.

Incidence :

About 1:1000 labour.

Aetiology:

As face presentation.

Diagnosis:

(A) During pregnancy:

- It is difficult.

- The occiput and sinciput may be felt at the same level.

- Ultrasonography and X-ray may be helpful.

(B) During labour:

In addition to the previous findings, vaginal examination reveals the following features:

- frontal bones,

- supra-orbital ridges, and

- root of the nose but not the chin.

Mechanism of Labour:

I- Persistent brow:

The engagement diameter is the mento -vertical 13.5 cm which is longer than any diameter of the inlet so there is no mechanism of labour and labour is obstructed.

II- Transient brow:

may occur during conversion of vertex into face presentation. So if brow is flexed to become vertex or extended to become face it may be delivered.

Management:

(A) Early in the first stage:

1. Exclude contracted pelvis, if present do caesarean section.
2. The case is considered as *transient brow*, observed carefully and given a chance for spontaneous conversion into either face or vertex.
3. The rest of management as other malpresentation.

(B) In the second stage:

The case is considered as *persistent brow* so:

1. Caesarean section is done if the foetus is living.
2. Craniotomy if the foetus is dead.

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Complex (Compound) Presentation

Definition:

It is the presence of a limb alongside the presenting part usually the arm presents with the head.

Incidence:

About 1:800 labours.

Aetiology:

Interference of adaptation of the presenting part to the pelvic brim which may be:

(A) Foetal causes :

(1) Malpresentations.

(2) Prematurity.

(3) Multiple pregnancy.

(4) Polyhydramnios.

(B) Maternal causes:

(1) Contracted pelvis.

(2) Pelvis tumours.

Diagnosis:

Vaginal examination reveals limb beside the head.

Management:

Exclude:

- contracted pelvis and

- cord prolapse.

(A) First stage:

Nothing is done as in most cases the arm will be displaced spontaneously away from the head.

(B) Second stage:

(1) Forceps extraction with or without reposition of the arm: reposition of the arm is tried first, if difficult apply forceps without reposition but do not include the arm in the blades. This is done if the head is engaged.

(2) Caesarean section : is indicated in

– Nonengagement of the head.

– Contracted pelvis.

– Other indications for caesarean section.

(3)Craniotomy: if the foetus is dead and labour is obstructed.

BREECH PRESENTATION

Definition:

It is a longitudinal lie in which the buttocks is the presenting part with or without the lower limbs.

Incidence:

3.5% of term singleton deliveries and about 25% of cases before 30 weeks of gestation as most cases undergo spontaneous cephalic version up to term.

Aetiology:

In general, the foetus is adapted to the pyriform shape of the uterus with the larger buttock in the fundus and smaller head in the lower uterine segment.

Any factor that interferes with this adaptation, allows free mobility or prevents spontaneous version, can be considered a cause for breech presentation as :

1- Prematurity : due to

- relatively small foetal size,
- relatively excess amniotic fluid, and
- more globular shape of the uterus.

2- Multiple pregnancy: one or both will present by the breech to adapt with the relatively small room.

3- Poly-and oligohydramnios. 4-Hydrocephalus.

5- Intrauterine foetal death. 6-Bicornuate and septate uterus.

7- Uterine and pelvic tumours. 8-Placenta praevia.

Types:

(A) Complete breech:

- The feet present beside the buttocks as both knees and hips are flexed.

- More common in multipara.

(B) Incomplete breech:

(1) Frank breech:

- It is breech with extended legs where the knees are extended while the hips are flexed.

- More common in primigravida.

(2) Footling presentation:

- The hip and knee joints are extended on one or both sides.

- More common in preterm singleton breeches.

(3) Knee presentation:

The hip is partially extended and the knee is flexed on one or both sides.

Positions : (8 positions)

1- Left sacro- anterior.

2- Right sacro-anterior.

3- Right sacro - posterior.

4- Left sacro-posterior.

In addition to

5,6- left and right sacro - transverse (lateral).

7,8 - Direct sacro- anterior and posterior.

Sacro-anterior positions are more common than sacro-posterior as in the first the concavity of the foetal front fits into the convexity of the maternal spines.

Diagnosis:

(A) During pregnancy:

(I) Inspection:

1. A transverse groove may be seen above the umbilicus in sacro-anterior corresponds to the neck.
2. If the patient is thin , the head may be seen as a localised bulge in one hypochondrium.

(II) Palpation:

1. Fundal grip: the head is felt as a smooth, hard, round ballottable mass which is often tender.
2. Umbilical grip: the back is identified and a depression corresponds to the neck may be felt.
3. First pelvic grip: the breech is felt as a smooth, soft mass continuous with the back. Trial to do ballottment to the breech shows that the movement is transmitted to the whole trunk.

(III) Auscultation:

FHS is heard above the level of the umbilicus. However in frank breech it may be heard at or below the level of the umbilicus.

(IV) Ultrasonography:

It is used for the following:

1. To confirm the diagnosis.
2. To detect the type of breech.
3. To detect gestational age and foetal weight:Different measures can be taken to determine the foetal weight as the biparietal diameter with chest or abdominal circumference using a special equation.
4. To exclude hyperextension of the head.
5. To exclude congenital anomalies.
6. Diagnosis of unsuspected twins.

(B) During Labour:

In addition to the previous findings, *vaginal examination* reveals;

1. The 3 bony landmarks of breech namely 2 ischial tuberosities and tip of the sacrum.
2. The feet are felt beside the buttocks in complete breech.
3. Fresh meconium may be found on the examining fingers.
4. Male genitalia may be felt.

Mechanism of Labour:

Delivery of the buttocks:

- The engagement diameter is the *bitrochanteric diameter 10 cm* which enters the pelvis in one of the oblique diameters.

- The anterior buttock meets the pelvic floor first so it rotates 1/8 circle anteriorly.

- The anterior buttock hinges below the symphysis and the posterior buttock is delivered first by lateral flexion of the spines followed by the anterior buttock.

- External rotation occurs so that the sacrum comes anteriorly.

Delivery of the shoulders:

- The shoulders enter the same oblique diameter with the *biacromial diameter 12 cm* (between the acromial processes of the scapulae).

- The anterior shoulder meets the pelvic floor first, rotates 1/8 circle anteriorly, hinges under the symphysis , then the posterior shoulder is delivered first followed by the anterior shoulder.

Delivery of the after-coming head:

- The head enters the pelvis in the opposite oblique diameter.

- The occiput rotates 1/8 circle anteriorly, *in case of sacro- anterior position* and 3/8 circle anteriorly *in case of sacro- posterior position.*

- Rarely, the occiput rotates posteriorly and this should be prevented by the obstetrician.

N.B.

The head is delivered by movement of flexion in:

1. Direct occipito-posterior (face to pubis).
2. Face mento-anterior.
3. The aftercoming head in breech presentation.

   The head is delivered by extension in normal labour only i.e. occipito - anterior positions.

Management of Breech Presentation

(I) External Cephalic Version:

It regains its importance after increased rate of caesarean sections nowadays.

Timing:

After the 32th weeks up to the 37th week and some authors extend it to the early labour as long as the membranes are intact and there is no contraindications.

Version is not done earlier because:

1. Spontaneous version is liable to occur.
2. Return to breech presentation is liable to occur.
3. If labour occurs the foetus will have a lesser chance for survival.

Version is difficult after 37 th weeks due to :

1. Larger foetal size.
2. Relatively less liquor.
3. More irritability of the uterus.

The aim :

1. To detect cephalo-pelvic disproportion.
2. Cephalic delivery is safer for the mother and foetus.

Success rate:

50-70%.

Causes of failure:

1- Large sized foetus.

2- Oligo - or polyhydramnios.

3- Short umbilical cord.

4- Uterine anomalies as bicornuate or septate uterus.

5- Irritable uterus. Tocolytic drugs may be started 15 minutes before the procedure to overcome this.

6- Obesity.

7- Rigid abdominal wall.

8- Frank breech because the legs act as a splint.

Contraindications:

1- Contracted pelvis.

2- Multiple pregnancy.

3- Hydrocephalus.

4- Antepartum haemorrhage.

5- Uterine scar.

6- Hypertension as the placenta is more susceptible to separation.

7- Elderly primigravida.

8- Ruptured membranes.

9-Anaesthesia during version is contraindicated as pain is a safeguard against rough manipulations.

Complications:

1- Accidental haemorrhage due to separation of the placenta.

2- Rupture of membranes .

3- Preterm labour.

4- Foetal distress.

5- Cord presentation or prolapse.

6- Entangling of the cord around the foetus.

7- Isoimmunization in Rh-negative mothers due to foeto - maternal transfusion.

(II) Caesarean Section:

Indications:

1. Large foetus i.e. > 3.75 kg estimated by ultrasound.
2. Preterm foetus but estimated weight is still more than 1.25 kg.
3. Footling or complete breech :as the presenting irregular part is not well fitting with the lower uterine segment leading to;

    - Less reflex stimulation of uterine contractions.

    - Susceptibility to cord prolapse.

    - Early bearing down as the foot passes through partially dilated cervix and reaches the perineum.

4. Hyperextended head: diagnosed by ultrasound or X-ray.

5. Contracted pelvis: of any degree.

6. Uterine dysfunction.

7. Complicated pregnancy with:

- Hypertension.
- Diabetes mellitus.
- Placenta praevia.
- Pre - labour rupture of membranes for ≥ 12 hours.
- Post-term.
- Intrauterine growth retardation.
- Placental insufficiency.

8. Primigravidas: breech in primigravida equals caesarean section in opinion of most obstetricians as the maternal passages were not tested for delivery before.

(III) Vaginal Delivery:

Prerequisites:

1. Frank breech.
2. Estimated foetal weight not more than 3.75 kg.
3. Gestational age : 36-42 weeks.

4. Flexed head.
5. Adequate pelvis.
6. Normal progress of labour by using the partogram.
7. Uncomplicated pregnancy.
8. Multiparas.
9. An experienced obstetrician.
10. . In case of intrauteine foetal death.

N.B.

During vaginal delivery, prematures are more susceptible to:

- hypoxia,

- trauma, and

- retained after-coming head as the partially dilated cervix allows the passage of the body but the less compressible relatively larger head will be retained.

However, caesarean section should only be done if the premature foetus has a reasonable chance of post - natal survival.

Management of Vaginal Breech Delivery:

First stage: as other malpresentations.

Second stage: The foetus may be delivered by one of the following methods:

(I) Spontaneous breech delivery:

This is rarely occurs in multipara with adequate pelvis, strong uterine contractions and small sized baby. The baby is delivered spontaneously without any assistance but perineal lacerations may occur.

(II) Assisted breech delivery:

- This is the method of delivery in far majority of cases.

- The assistance is indicated for delivery of the shoulders and after-coming head and the infant is allowed to be delivered up to the umbilicus spontaneously.

(1) Delivery of the buttocks:

- The golden rule is to *"Keep your hands off"*.

- The patient is asked to bear down during uterine contractions and relax in between until the perineum is distended by the buttocks.

- An episiotomy is done especially in primigravida to avoid much lateral flexion of the spines, perineal lacerations and intracranial haemorrhage due to sudden compression and decompression of the after - coming head.

- The legs are hooked out but without traction.

- When the umbilicus appears, a loop of the cord is hooked to prevent traction or compression of the cord and detect its pulsation.

- The foetus is covered with warm towel to prevent premature stimulation of respiration.

(2) Delivery of the shoulders:

- Gentle steady downward traction is applied to the foetal pelvic girdle during uterine contractions with gradual rotation of the foetus to bring the shoulders in the antero-posterior diameter of the pelvis.

- When the anterior scapula appears below the symphysis, both arms are delivered by hooking the index finger at the elbow and sweep the forearm across the chest of the foetus

- The back is rotated anteriorly.

- *Kristeller manoeuvre*: gentle fundal pressure is done during uterine contractions to guide the head into the pelvis and maintain its flexion.

(3) Delivery of the after -coming head:

It is delivered by one of the following methods:

(a) Jaw flexion- shoulder traction (Mauriceau- Smellie -viet) method:

- Two fingers of the left hand, (as originally described) or better on the malar eminencies (the maxillae) to avoid dislocation of the jaw.

- The index and ring finger of the right hand are placed on each shoulder while the middle finger is pressing against the occiput to promote flexion and act as a splint for the neck , preventing hyperextension and hence cervical spine injury.

- Traction is commenced downwards and backwards till the nape of the foetus appears, the body is lifted towards the mother's abdomen.

(b) Burns - Marshall's method:

The foetus is left hanging so that its weight exerts gentle downwards and backwards traction. When the nape appears, grasp the feet and left the body towards the mother's abdomen.

(C) Forceps:

- Piper's forceps is more suitable than the ordinary forceps as it has a perineal but not pelvic curve and has longer shanks. It is applied from the ventral aspect of the foetus.

- Traction is applied downwards and backwards till the nape appears, then downwards and forwards to deliver the head by flexion.

- Forceps delivery has the following advantages:

1. It promotes flexion of the head.
2. Traction is applied on the head and not on the neck.
3. It prevents sudden compression and decompression of the head.
4. It protects the head from compression by pelvic bones or rigid perineum.

(III) Breech extraction:

Indications:

1. Maternal or foetal distress.
2. Prolonged second stage.
3. To shorten the second stage in maternal respiratory and heart diseases.
4. Prolapsed pulsating cord with fully dilated cervix.

Technique:

Like assisted breech delivery except that:-

i) It is done under general anaesthesia.

ii) Both legs are bringing down.

iii) Traction on the legs is done helped by fundal pressure to deliver the breech and the trunk.

iv) The after - coming head is delivered by jaw flexion - shoulder traction or forceps.

Complicated Breech Delivery

(I) Arrest of the buttocks at the pelvic brim:

Causes	Management
1-Inefficient uterine contractions.	Oxytocin drip,if contraindicated do caesarean section. Breech extraction - if cervix is fully dilated.
2- Contracted pelvis.	Caesarean section.
3- Large - sized baby.	Caesarean section.

(II) Arrest of the buttocks at the pelvic outlet

Causes	Management
1- Inefficient uterine contractions.	Breech extraction.
2- Contracted outlet.	Caesarean section.
3- Rigid perineum.	Episiotomy.
4- Extended legs (frank breech).	Breech deeply impacted : Groin traction. Breech not deeply impacted : Bring down a leg+ breech extraction. If the outlet is contracted or the baby is large do C.S.

Groin traction:

a- Living foetus :

- traction is done by the index or the index and middle fingers put in the anterior groin in a downward and backward direction.

- The traction is done towards the trunk to avoid dislocation of the femur.

- Traction is done during uterine contractions and aided by fundal pressure.

- When the posterior buttock appears traction is done by the 2 index fingers in both groins in a downward and forward direction.

b- Dead foetus:

Groin traction is done by breech hook.

Bringing down a leg (Pinard's method):

- Under general anaesthesia.

- Press by 2 fingers in the popliteal fossa of the anterior leg to flex it then grasp the ankle and bring it down.This will prevent the anterior buttock from over-riding the symphysis pubis.

- If the posterior leg was brought down first it must be rotated anteriorly with the trunk then bring the other leg which is now becomes posterior.

N.B. The foot has the following features differentiating it from the hand:

1-Presence of the heel.

2- Absence of the mobile thumb.

3- The toes are shorter than the fingers.

(III) Arrest of the shoulders:

Causes	Management
Extension of the arms: due to traction on the breech before full dilatation of the cervix.	The shoulders are delivered by: -Classical method or -Lövset's method.
Nuchal position of the arm: The forearm is displaced behind the neck due to rotation of the trunk in a wrong direction.	Rotation of the foetal trunk in the direction of the finger tips of the displaced arm.

Classical method:

- Under epidural or general anaesthesia.

- As there is more space posteriorly, bring down the posterior arm first by using 2 fingers pressing against the cubital fossa and sweep the arm in front of the foetal body to avoid fracture humerus.

- The anterior arm is then brought down by the same manoeuvre. If this is difficult rotate the body180º to make the anterior arm posterior and bring it down.

Lövset method:

- Under epidural or general anaesthesia.

- Gentle downward and backward traction is applied to the foetus by grasping its pelvis till the inferior angle of the anterior scapula appears, the foetal trunk is rotated 180º to bring the posterior shoulder anteriorly emerging beneath the symphysis pubis. So the arm can be brought down.

- The trunk is again rotated 180º in the opposite direction to bring the other shoulder anteriorly emerging beneath the symphysis so the second arm can be brought down.

- The back should be kept always anterior during rotation.

(IV) Arrest of the after - coming head:

Causes	Management
(A) Faults in the head: 1- Large head.	Living foetus : Symphysiotomy. Dead foetus : Craniotomy.
2- Hydrocephalus.	Craniotomy.
3- Extended head.	Jaw flexion - shoulder traction.
4- Posterior rotation of the occiput.	Jaw flexion - shoulder traction till the sinciput hinges below the symphysis then deliver the head by flexion. If the head is extended do Prague manoeuvre.
(B) Faults in passages: 1- Contracted pelvis.	Living foetus : Symphysiotomy. Dead foetus : Craniotomy.
2- Rigid perineum.	Episiotomy + forceps delivery.
3- Incompletely dilated cervix.	Dührssen cervical incisions especially if the foetus is living : 2 incisions of 1-2 cm are made with scissors at 2 and 10 o'clock then sutured after delivery. A third incision at 6 o'clock may be needed.

Prague manoeuvre:

- When the occiput rotates posteriorly and the head extends, the chin hangs above the symphysis pubis.

- Foetus is grasped from its feet and flexed towards the mother's abdomen, while the other hand is doing simultaneous traction on the shoulders to deliver the head by flexion.

Complications of Breech Delivery:

(A) Maternal:

1. Prolonged labour with maternal distress.
2. Obstructed labour with its sequelae may occur as in impacted breech with extended legs.
3. Laceration especially perineal.
4. Postpartum haemorrhage due to prolonged labour and lacerations.
5. Puerperal sepsis.

(B) Foetal:

(I) Foetal mortality :

Is about 4% in multipara and 8% in primigravida which may be due to:

1. Intracranial haemorrhage : is the commonest cause of death due to sudden compression and decompression of the head as there is no gradual moulding of the head.

This can be avoided by:

a) Forceps delivery of the after -coming head.

b) Episiotomy.

c) Slow delivery of the head.

d) Vitamin K to the mother early in labour.

2. Fracture dislocation of the cervical spines prevented by avoiding lifting the body towards the mother's abdomen until the nape appears below the symphysis.

3. Asphyxia due to:

i- Cord prolapse or compression by the head.

ii- Premature stimulation of respiration leading to inhalation of mucus, liquor or blood. This can be avoided by covering the body of the foetus with warm towels during delivery.

4. *Rupture of an abdominal organ :* from rough manipulations avoided by grasping the foetus from its hips only.

(II) Non-fatal injuries:

1. Fracture femur, humerus or clavicle.
2. Dislocation of joints or lower jaw.
3. Injury to the external genitalia.
4. Brachial plexus injury.
5. Lacerations to the sternomastoid muscles.

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Obstetrics Simplified

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Shoulder Presentation

(Transverse or Oblique lie)

Definition:

- The longitudinal axis of the foetus does not coincide with that of the mother.
- These are the most hazardous malpresentations due to mechanical difficulties that occur during labour .
- The oblique lie which is deviation of the head or the breech to one iliac fossa, is less hazardous as correction to a longitudinal lie is more feasible.

Incidence:

3-4% during the last quarter of pregnancy but 0.5% by the time labour commences.

Aetiology:

Factors that

- change the shape of pelvis ,uterus or foetus,

- allow free mobility of the foetus or

- interfere with engagement as:

(A) Maternal:

1- Contracted pelvis.

2- Lax abdominal wall.

3- Uterine causes as bicornuate , subseptate and fibroid uterus.

4- Pelvic masses as ovarian tumours.

(B) Foetal causes:

1- Multiple pregnancy.

2- Polyhydramnios.

3- Placenta praevia.

4- Prematurity.

5- Intrauterine foetal death.

Positions:

The scapula is the denominator

1- Left scapulo - anterior.

2- Right scapulo - anterior.

3- Right scapulo - posterior.

4- Left scapulo - posterior.

Scapulo-anterior are more common than scapulo-posterior as the concavity of the front of the foetus tends to fit with the convexity of the maternal spines.

Diagnosis:

(A) During pregnancy:

(I) Inspection:

The abdomen is broader from side to side.

(II) Palpation:

a. Fundal level : lower than that corresponds to the period of amenorrhoea.

b. Fundal grip : The fundus feels empty.

c. Umbilical grip: The head is felt on one side while the breech one the other. In transverse lie, they are at the same level, while in oblique lie one pole , usually the head as it is heavier, is in a lower level i.e. in the iliac fossa.

d. First pelvic grip: Empty lower uterine segment.

(III) Auscultation:

FHS are best heard on one side of the umbilicus towards the foetal head.

(IV) Ultrasound or X-ray:

Confirms the diagnosis and may identify the cause as multiple pregnancy or placenta praevia.

(B) During labour:

In addition to the previous findings ,*vaginal examination* reveals:

- The presenting part is high.
- Membranes are bulging.
- Premature rupture of membranes with prolapsed arm or cord is common. The dorsum of the supinated hand points to the foetal back and the thumb towards the head. The right hand of the foetus can be shaked, correctly by the right hand of the obstetrician and the left hand by the left one.
- When the cervix is sufficiently dilated particularly after rupture of the membranes, the scapula, acromion, clavicle, ribs and axilla can be felt.

Mechanism of Labour:

- As a rule no mechanism of labour should be anticipated in transverse lie and labour is obstructed.

- If a patient is allowed to progress in labour with a neglected or unrecognized transverse lie, one of the following may occur:

(1) Impaction :

1. This is the usual and most common outcome.
2. The lower uterine segment thins and ultimately ruptures.
3. The foetus becomes hyperflexed, placental circulation is imparied , cord is prolapsed and compressed leading to foetal asphyxia and death.

(2) Spontaneous rectification:

Rarely the foetal lie may be corrected by the splinting effect of the contracted uterine muscles so that the head presents.

(3) Spontaneous version:

Rarely, by similar process the breech may come to present.

(4) Spontaneous expulsion:

Very rarely, if the foetus is very small or dead and macerated, the shoulder may be forced through the pelvis followed by the head and trunk.

(5) Spontaneous evolution:

Very rarely, the head is retained above the pelvic brim, the neck greatly elongates, the breech descends followed by the trunk and the after -coming head, i.e. spontaneous version occurs in the pelvic cavity.

Management:

(I) External cephalic version:

Can be done in late pregnancy or even early in labour if the membranes are intact and vaginal delivery is feasible. In early labour, if version succeeded apply abdominal binder and rupture the membranes as if there are uterine contractions.

(II) Internal podalic version:

- It is mainly indicated in 2nd twin of transverse lie and followed by breech extraction.
- *Prerequisites:*

a- General or epidural anaesthesia. b- Fully dilated cervix.

c- Intact membranes or just ruptured.

(III) Caesarean section:

- It is the best and safest method of management in nearly all cases of persistent transverse or oblique lie even if the baby is dead.
- As rupture of membranes carries the risk of cord prolapse, an elective caesarean section should be planned before labour commences.

Neglected (Impacted) shoulder:

Clinical picture (impending rupture uterus):

- Exhaustion and distress of the mother.

- Shoulder is impacted may be with prolapsed arm and / or cord.

- Membranes are ruptured since a time.

- Liquor is drained.

- The uterus is tonically contracted.

- The foetus is severely distressed or dead.

Management:

- Caesarean section is the safest procedure even if the baby is dead. A classical or low vertical incision in the uterus facilitates extraction of the foetus as a breech in such a condition.
- Any other manipulations will lead eventually to rupture uterus so they are contraindicated.

UNSTABLE LIE

Definition:

A foetus which changes its lie fequently from transverse to oblique to longitudinal.

Aetiology:

1- Polyhydramnios.

2- Prematurity and IUFD.

3- Contracted pelvis.

4- Placenta praevia.

5- Pelvic tumours.

6- Multiparae with a lax uterus and abdominal wall.

Management:

(I) External cephalic (or even podalic) version:

- Can be done whenever the woman in examined but in majority of cases it will recure so it is better to defer it until full term (37-40 weeks).

- After correcting the foetal lie to longitudinal, apply an abdominal binder, start oxytocin infusion and do amniotomy when the uterine contractions started and the presenting part is well settled into the pelvic brim.

(II) Caesarean section is indicated in:

- Failure of external version .

- Some do it selectively in cases discovered after 40 weeks' gestation.

03.12.02

Obstetrics Simplified

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Cord Presentation and Prolapse

Definitions :

In both conditions a loop of the cord is below the presenting part. The difference is in the condition of the membranes; if intact it is cord presentation and if ruptured it is cord prolapse.

Incidence: 1:200.

The Risk:

As long as the membranes are intact there is no risk. In cord prolapse, the foetal perinatal mortality is 25-50% from asphyxia due to:

i) mechanical compression of the cord between the presenting part and bony pelvis and

ii) spasm of the cord vessels when exposed to cold or manipulations.

The prognosis is more worse when the cord is more liable for compression as in:

1. Primigravida than multipara.
2. Cephalic than breech presentation or transverse lie.
3. Partially than fully dilated cervix.
4. Generally contracted than flat pelvis.
5. Anterior than posterior position of the cord.

Aetiology:

(I) The presenting part is not fitting in the lower uterine segment due to:

(A) Foetal causes:

1- Malpresentations : e.g. complete or footling breech, transverse and oblique lie.

2- Prematurity.

3- Anencephaly.

4- Polyhydramnios.

5- Multiple pregnancy.

(B) Maternal causes:

1- Contracted pelvis.

2- Pelvic tumours.

(II) Predisposing factors:

1- Placenta praevia.

2- Long cord.

3- Sudden rupture of membranes in polyhydramnios.

Diagnosis:

- It is diagnosed by *vaginal examination* . If the cord is prolapsed it is necessary to detect whether it is pulsating i.e. living foetus or not i.e. dead foetus but this should be documented by auscultating the FHS.

- *Ultrasound:* occasionally can diagnose cord presentation.

Management:

(A) Cord presentation:

- ***Caesarean section*:** for contracted pelvis.
- In other conditions the treatment depends upon the degree of cervical dilatation:

  i) Partially dilated cervix : prevent rupture of membranes as long as possible by:

- putting the patient in trendlenberg position,

- avoiding high enema,

- avoiding repeated vaginal examination.

- When the cervix is fully dilated manage as mentioned later .

ii) Fully dilated cervix: the foetus should be delivered immediately by:

- Rupture of the membranes and forceps delivery : in engaged vertex presentation.

- Rupture of the membranes and breech extraction: in breech presentation.

- Rupture of the membranes + internal podalic version + breech extraction : may be tried in transverse lie otherwise,

- Caesarean section : is indicated as well as for non-engaged vertex and other cephalic malpresentations.

(B) Cord prolapse:

Management depends upon the foetal state:

i) Living foetus:

(I) Partially dilated cervix: Immediate caesarean section is indicated. During preparing the theatre minimise the risk to the foetus by:

1. putting the patient in trendlenberg position,
2. manual displacement of the presenting part higher up,
3. if the cord protrudes from the vulva, handle it gently and wrap it in a warm moist pack.

4. giving oxygen to the mother.

(II) *Fully dilated cervix*: the foetus should be delivered immediately as in cord presentation.

ii) Dead foetus:

1. Spontaneous delivery is allowed.
2. Caesarean section : is the safest procedure in obstructed labour as destructive operations is out of modern obstetrics.

03.12.02

Obstetrics Simplified

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Multiple Pregnancy

Definition:

Pregnancy carrying more than one foetus.

Incidence:

According to Hellin's formula:

Twins 1:80, triplets $1:80^2$, quadruplets $1:80^3$ etc...

The following factors are associated with higher incidence:

1. Racial: more in Negro.
2. Familial: whether the wife's or the husband's family has a history of multiple pregnancies.
3. Induction of ovulation: particularly with gonadotrophins.
4. Multiparas than primiparas.
5. Maternal age: incidence increases with increasing age up to 40.
6. Previous multiple pregnancy: the incidence of another multiple pregnancy is 10 times the normal incidence.

Varieties:

(I) Binovular (dizygotic = non-identical) twins:

- developed from two separate ova which may or may not come from the same ovary and fertilised by two separate spermatozoa.

- The twins are of the same or different sex.

- The similarity between them is not more than that between members of the same family.

- They have : - two placenta, -two chorions, - two amnions, - two umbilical cords.

Binovular twins are 4 times more common than the uniovular variety.

(II) Uniovular (monozygotic = identical) twins:

- developed from a single ovum which after fertilisation, by a single sperm, has undergone division to form two embryos.

- The twins are of the same sex.

- They have similar physical and mental characters as well as the blood group but not finger prints.

- The foetal circulations often communicate in the placenta which results in foetofoetal transfusion with one twin having polycythaemia, hypervolaemia,dominant heart, polyuria and polyhydramnios. While the other twin will have anaemia, hypovolaemia, microcardia, oligouria and oligohydramnios. The latter twin may die and retained till term where it is seen flat and compressed and called foetus papyraceous. The retained dead foetus may cause disseminated intravascular coagulation.

- The placentation and development in uniovular twins depend on the time when division occurs as follow:

Day post-fertilisation	*Placentation*	*Incidence*
0-3	2 placentas, 2 chorions, 2 amnions & 2 umbilical cords as binovular twins but 2 identical twins (monozygotic).	23%
4-7	One placenta, one chorion, 2 amnions & 2 umbilical cords with vascular connections.	75%
8-11	One placenta, one chorion, one amnion & 2 umbilical cords (monoamniotic monochorionic). Higher foetal loss due to cord entanglement.	1%

>11	Conjoined twins (monsters), joined by the head (craniopagus), chest (thoracopagus), abdomen (omphalopagus), back (pygopagus) or pelvic (ischiopagus). Sometimes the viscera or limbs are shared.	<1%

Superfecundation: is fertilisation of two ova produced in the same menstrual cycle by two spermatozoa deposited in two separate acts of coitus.

Superfoetation: is fertilisation of two ova produced in two different menstrual cycles by two separate spermatozoa. Actually, this cannot occur in human as ovulation is suppressed once pregnancy occurs.

Diagnosis:

(I) History:

1. Family history of multiple pregnancy (wife and/ or husband).
2. Recent intake of ovulatory drugs.
3. Increased foetal movement.

(II) Inspection:

More enlargement of the abdomen.

(III) Palpation:

1. *Fungal level:* higher than that corresponds to the period of amenorrhoea.
2. *Fundal, umbilical and first pelvic grips:* can detect multiple foetal poles. At least, 3 poles should be palpated to diagnose twin pregnancy.
3. *Foetal limbs:* felt as multiple knobs.

(IV) Auscultation:

1. *Foetal heart sounds:* are heard with maximum intensity in 2 separate points by 2 observers with a minimum difference of 10 beats per minute.

2. *Arnaux sign:* occasionally, the superimposition of two foetal heart sounds produces a galloping rhythm.

(V) Ultrasonography:

(1) Diagnosis of twins:

- At 7th week: two separate gestation sacs can be identified.
- At 8th week : separate foetal bodies can be detected.
- At 12th week: separate heads can be distinguished.
- If routine scanning of all pregnant women is carried out at 16 weeks twins should rarely be missed.

(2) Detection of :

- Presentations and positions.
- Gestational age.
- Congenital anomalies.
- Polyhydramnios.
- Placental site.

(VI) X-ray:

If ultrasound is not available it can detect foetal heads and vertebral columns.

(VII) Vaginal examination during labour:

The presenting part is small if compared to the oversized abdomen.

Differential Diagnosis:

from other causes of oversized uterus (see before).

Risk of Multiple Pregnancy:

(A) During pregnancy:

1- *Anaemia* : because of the increased foetal demand for iron and folic acid.

2- *Hyperemesis gravidarum.*

3- *Pregnancy induced hypertension.*

4- Polyhydramnios .

5- *Abortion and preterm labour*.

6- *Placenta praevia* due to the presence of 2 placentae or one large placenta.

7- *Pressure symptoms*: dyspnoea, palpitation and oedema of the lower limbs.

8- *Congenital anomalies*: double its incidence in singleton pregnancy.

(B) During labour:

(1) Complications of malpresentations:

- In 45% of cases both twins present by head.

- In 35% one foetus presents by the head and the other by the breech.

- In 10% both present by breech.

- In 10% one is transverse lie and the other is cephalic or breech.

- Very rare that both twins lie transversely.

(2) Premature rupture of membranes. (3) Cord prolapse.

(4) Dysfunctional uterine action: of all types may occur due to overdistension of the uterus and malpresentations.

(5) Locked twins: occurs when the after- coming head of the first breech foetus is locked with the head of the second cephalic foetus. This is managed by:

a. Disimpaction: tried under general anaesthesia by grasping the head of the second twin, rotating and pushing it up. If failed do,

b. Sacrification of the first foetus: which is usually dead by decapitation, the second twin can then be delivered followed by extraction of the head of the first twin.

(6) Retained second twin.

(7) Postpartum haemorrhage due to:

a. atony results from overdistended uterus and prolonged labour,

b. large placental site,

c. placenta praevia or early separation of the placenta after delivery of the first twin.

Management:

(A) During pregnancy:

1. *Frequent antenatal visits:* to detect early any complication mentioned before and manage it.
2. *Proper diet:* with prophylactic supplementation of iron and folic acid.
3. *Adequate rest:* to improve placental blood flow and avoid preterm labour.
4. *Prophylactic tocolytics or cerclage :* is of no actual benefit.

(B) During labour:

- Delivery should be in a hospital .
- A team of experienced obstetrician, assistant, anaesthetist and neonatologist is necessary for safety.

- First stage: is managed as usual unless there is an indication for caesarean section (see later).
- Second stage:

(I) Delivery of the first twin:

- If it is cephalic : proceed as normal usually there is no problem.

- If it is breech : caesarean section is safer for fear of locked twins, although vaginal delivery may pass without this complication.

- Immediate clamping of the cord is essential after delivery of the first twin to avoid bleeding from a uniovular second twin.

(II) Delivery of the second twin:

It depends upon its presentation;

(1) Longitudinal lie (vertex or breech) :

- Amniotomy is done during uterine contraction which may be delayed up to 5 minutes .
- If delay is more than 5 minute, start oxytocin drip.
- Delivery of the second twin is usually easy due to dilatation of the maternal passages by delivery of the first twin.
- If there is foetal distress or cord prolapse, rapid delivery is indicated by ;

  - breech extraction in breech presentation.

  - Forceps delivery in engaged vertex presentation.

  - Vacuum extraction or rarely internal podalic version and breech extraction may be indicated in non-engaged head.

(2) Transverse or oblique lie:

a. External cephalic or podalic version is done then do amniotomy and deliver the foetus as cephalic or by breech extraction respectively or ,

b. Internal podalic version and breech extraction under general or epidural anaesthesia.

Caesarean section is indicated in :

1. The first baby is transverse lie.
2. Prolapsed pulsating cord or foetal distress in the first stage.
3. Retained second twin when it is;

   - transverse lie,
   - membranes are ruptured,
   - uterus is retracted and
   - cervix is not fully dilated.

5. Conjoined twins.
6. Triplets or more are safer delivered by C.S.
7. Other indications of C.S as placenta praevia, contracted pelvis ....etc.

Third stage of labour:

Active management and observation is indicated to guard against postpartum haemorrhage.

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Obstetrics Simplified

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Abnormal Uterine Action

Classification :

(I) Over - efficient uterine action:

1. Precipitate labour: in absence of obstruction.
2. Excessive contraction and retraction: in presence of obstruction.

(II) Inefficient uterine action:

1. Hypotonic inertia.
2. Hypertonic inertia.

   a- Colicky uterus. b- Hyperactive lower uterine segment.

3. Constriction (contraction) ring.

(III) Cervical dystocia.

PRECIPITATE LABOUR

Definition:

A labour lasting less than 3 hours.

Aetiology:

It is more common in multiparas when there are;

1- strong uterine contractions,

2- small sized baby,

3- roomy pelvis,

4- minimal soft tissue resistance.

Complications:

(A) Maternal:

(1) Lacerations of the cervix, vagina and perineum.

(2) Shock.

(3) Inversion of the uterus.

(4) Postpartum haemorrhage :

a- no time for retraction,

b- lacerations.

(5) Sepsis due to :

a- lacerations,

b- inappropriate surroundings.

(B) Foetal:

1- *Intracranial haemorrhage* due to sudden compression and decompression of the head.

2- *Foetal asphyxia due to* :

- strong frequent uterine contractions reducing placental perfusion,

- lack of immediate resuscitation.

3- *Avulsion of the umbilical cord*.

4- *Foetal injury* due to falling down.

Management:

(I) Before delivery :

Patient who had previous precipitate labour should be hospitalized before expected date of delivery as she is more prone to repeated precipitate labour.

(II) During delivery:

- *Inhalation anaesthesia:* as nitrous oxide and oxygen is given to slow the course of labour.

- *Tocolytic agents*: as ritodrine (Yutopar) may be effective.

- *Episiotomy:* to avoid perineal lacerations and intracranial haemorrhage.

(III) After delivery:

Examine the mother and foetus for injuries.

EXCESSIVE UTERINE CONTRACTION AND RETRACTION

- **Physiological Retraction Ring:**

It is a line of demarcation between the upper and lower uterine segment present during normal labour and cannot usually be felt abdominally.

- **Pathological Retraction Ring (Bandl's ring):**

- It is the rising up retraction ring during obstructed labour due to marked retraction and thickening of the upper uterine segment while the relatively passive lower segment is markedly stretched and thinned to accommodate the foetus.

- The Bandl's ring is seen and felt abdominally as a transverse groove that may rise to or above the umbilicus.

- *Clinical picture:* is that of obstructed labour with impending rupture uterus (see later).

- Obstructed labour should be properly treated otherwise the thinned lower uterine segment will rupture.

HYPOTONIC UTERINE INERTIA

Definition:

The uterine contractions are infrequent, weak and of short duration.

Aetiology:

Unknown but the following factors may be incriminated:

(A) General factors:

1. Primigravida particularly elderly.
2. Anaemia and athenia.
3. Nervous and emotional as anxiety and fear.
4. Hormonal due to deficient prostaglandins or oxytocin as in induced labour.
5. Improper use of analgesics.

(B) Local factors:

1. Overdistension of the uterus.
2. Developmental anomalies of the uterus e.g. hypoplasia.
3. Myomas of the uterus interfering mechanically with contractions.
4. Malpresentations, malpositions and cephalopelvic disproportion. The presenting part is not fitting in the lower uterine segment leading to absence of reflex uterine contractions.
5. Full bladder and rectum.

Types:

1. Primary inertia: weak uterine contractions from the start.
2. Secondary inertia: inertia developed after a period of good uterine contractions when it failed to overcome an obstruction so the uterus is exhausted.

Clinical Picture:

1. Labour is prolonged.
2. Uterine contractions are infrequent, weak and of short duration.
3. Slow cervical dilatation.
4. Membranes are usually intact.
5. The foetus and mother are usually not affected apart from maternal anxiety due to prolonged labour.
6. More susceptibility for retained placenta and postpartum haemorrhage due to persistent inertia.
7. Tocography: shows infrequent waves of contractions with low amplitude.

Management:

(A) General measures:

1. Examination to detect disproportion, malpresentation or malposition and manage according to the case.
2. Proper management of the first stage (see normal labour).
3. Prophylactic antibiotics in prolonged labour particularly if the membranes are ruptured.

(B) Amniotomy:

Providing that;

a. vaginal delivery is amenable,

b. the cervix is more than 3 cm dilatation and

c. the presenting part occupying well the lower uterine segment.

Artificial rupture of membranes augments the uterine contractions by:

1. release of prostaglandins.
2. reflex stimulation of uterine contractions when the presenting part is brought closer to the lower uterine segment.

(C) Oxytocin:

Providing that there is no contraindication for it, 5 units of oxytocin (syntocinon) in 500 c.c glucose 5% is given by IV infusion starting with 10 drops per minute and increasing gradually to get a uterine contraction rate of 3 per 10 minutes.

(D) Operative delivery:

1- Vaginal delivery: by forceps, vacuum or breech extraction according to the presenting part and its level providing that,

- cervix is fully dilated.
- vaginal delivery is amenable.

2- *Caesarean section is indicated in :*

i- failure of the previous methods.

ii- contraindications to oxytocin infusion including disproportion.

iii- foetal distress before full cervical dilatation.

HYPERTONIC UTERINE INERTIA

(Incoordinate Uterine Action)

Types:

a. Colicky uterus: incoordination of the different parts of the uterus in contractions.

b. Hyperactive lower uterine segment: so the dominance of the upper segment is lost.

Clinical Picture:

The condition is more common in primigravidae and characterised by:

1. Labour is prolonged.
2. Uterine contractions are irregular and more painful. The pain is felt before and throughout the contractions with marked low backache often in occipito-posterior position.
3. High resting intrauterine pressure in between uterine contractions detected by tocography (normal value is 5-10 mmHg).
4. Slow cervical dilatation .
5. Premature rupture of membranes.
6. Foetal and maternal distress.

Management:

(A) General measures: as hypotonic inertia.

(B) Medical measures:

- Analgesic and antispasmodic as pethidine.

- Epidural analgesia may be of good benefit.

(C) Caesarean section is indicated in :

i- Failure of the previous methods.

ii- Disproportion.

iii- Foetal distress before full cervical dilatation.

CONSTRICTION (CONTRACTION) RING

Definition:

- It is a persistent localised annular spasm of the circular uterine muscles.
- It occurs at any part of the uterus but usually at junction of the upper and lower uterine segments.
- It can occur at the 1st, 2nd or 3 rd stage of labour.

Aetiology:

unknown but the predisposing factors are:

1. Malpresentations and malpositions.
2. Clumsy intrauterine manipulations under light anaesthesia.
3. Improper use of oxytocins e.g.

   - use of oxytocin in hypertonic inertia.

   - IM injection of oxytocin.

Diagnosis:

- The condition is more common in primigravidae and frequently preceded by colicky uterus.

- The exact diagnosis is achieved only by feeling the ring with a hand introduced into the uterine cavity.

Complications:

1. *Prolonged 1st stage:* if the ring occurs at the level of the internal os.
2. *Prolonged 2nd stage :* if the ring occurs around the foetal neck.
3. *Retained placenta and postpartum haemorrhage:* if the ring occurs in the 3rd stage (hour- glass contraction).

Pathological Retraction Ring	*Constriction Ring*
Occurs in prolonged 2nd stage.	Occurs in the 1st , 2nd or 3rd stage.
Always between upper and lower uterine segments.	At any level of the uterus.
Rises up.	Does not change its position.
Felt and seen abdominally.	Felt only vaginally.
The uterus is tonically retracted,tender and the foetal parts cannot be felt.	The uterus is not tonically retracted and the foetal parts can be felt.
Maternal distress and foetal distress or death.	Maternal and foetal distress may not be present.
Relieved only by delivery of the foetus.	May be relieved by anaesthetics or antispasmodics.

Management:

1. Exclude malpresentations, malposition and disproportion.
2. In the 1st stage: Pethidine may be of benefit.
3. In the 2nd stage: Deep general anaesthesia and amyl nitrite inhalation are given to relax the constriction ring:

   a- If the ring is relaxed, the foetus is delivered immediately by forceps.

   b- If the ring does not relax, caesarean section is carried out with lower segment vertical incision to divide the ring.

4. In the 3rd stage: Deep general anaesthesia and amyl nitrite inhalation are given followed by manual removal of the placenta.

CERVICAL DYSTOCIA

Definition:

Failure of the cervix to dilate within a reasonable time in spite of good regular uterine contractions.

Varieties :

(I) Organic (secondary) due to:

1. Cervical stances as a sequel to previous amputation, cone biopsy ,extensive cauterisation or obstetric trauma.
2. Organic lesions as cervical myoma or carcinoma.

(II) Functional (primary):

In spite of the absence of any organic lesion and the well effacement of the cervix, the external os fails to dilate.

This may be due to lack of softening of the cervix during pregnancy or cervical spasm resulted from overactive sympathetic tone.

Complications:

1. *Annular detachment of the cervix:* surprisingly the bleeding from the cervix is minimal because of fibrosis and avascular pressure necrosis leading to thrombosis of the vessels before detachment.
2. *Rupture uterus*.
3. *Postpartum haemorrhage* : particularly if cervical laceration extends upwards tearing the main uterine vessels.

Management:

(I) Organic dystocia:

Caesarean section is the management of choice.

(II) Functional dystocia:

1. Pethidine and antispasmodics: may be effective.
2. Caesarean section : if

   – medical treatment fails or

   – foetal distress developed.

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Obstetrics Simplified

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Prolonged Labour

The term is applied mainly to the prolongation of the first stage of labour.

The labour pattern is recorded on the partogram and prolonged labour can be identified as follow (Friedman 1983) :

Pattern	*Diagnostic criterion*	
Prolonged latent phase	Nulliparas Multiparas	20 hours or more 14 hours or more
Primary dysfunctional labour (protractional disorder)	Nulliparas Multiparas	< 1.2 cm / hour < 1.5 cm / hour
Prolonged deceleration phase (7-10 cm dilatation)	Nulliparas Multiparas	3hours or more 1 hour or more
Secondary arrest of dilatation	Arrest	2 hours or more
Protracted descent	Nulliparas Multiparas	< 1cm / hour < 2cm / hour
Arrest of descent	Arrest 1 hour or more	
Prolonged 2nd stage	No descent in the 2nd stage	

The progression of labour is judged by two criteria:

(1) The cervical dilatation.

(2) Descent of the presenting part.

Most of the errors occur when the condition is diagnosed as there is no progress while the patient is still in the latent phase or even did not go into labour from the start.

Causes:

1. Excessive analgesia.
2. Disproportion.
3. Malpresentations and malpositions.

Management:

1. **Reassessment** of the condition.
2. **Pain relief :** Pethidine or epidural analgesia.
3. **Amniotomy :** if membranes still intact.
4. **Oxytocin:** if amniotomy does not bring good uterine contractions and there is no contraindication for it.
5. **Caesarean section** is indicated in :

   1- Failure of the above measures.

   2- Disproportion.

   3- Malpresentations not amenable for vaginal delivery.

   4- Contraindications to oxytocin.

   5- Foetal distress.

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Obstructed Labour

Definition:

It is arrest of vaginal delivery of the foetus due to mechanical obstruction.

Aetiology:

(I) Maternal causes:

1-Bony obstruction : e.g.

- Contracted pelvis.

- Tumours of pelvic bones.

2-Soft tissue obstruction:

i) Uterus: - Impacted subserous pedunculated fibroid.

- Constriction ring opposite the neck of the foetus.

ii) Cervix: cervical dystocia.

iii) Vagina: – Septa. – Stenosis. – Tumours.

iv) Ovaries : Impacted ovarian tumours.

(II) Foetal causes:

1- Malpresentations and malpositions : e.g.

- Persistent occipito- posterior and deep transverse arrest,

- Persistent mento-posterior and transverse arrest of the face presentation.

- Brow,
- Shoulder,
- Impacted frank breech.

2- Large sized foetus (macrosomia).

3- Congenital anomalies : e.g.

- Hydrocephalus.
- Foetal ascitis.
- Foetal tumours.

4- Locked and conjoined twins.

Diagnosis:

It is the clinical picture of obstructed labour with impending rupture uterus (excessive uterine contraction and retraction).

(A) History: of

- prolonged labour,
- frequent and strong uterine contractions,
- rupture membranes.

(B) General examination :

shows signs of maternal distress as:

- exhaustion,
- high temperature (≥ 38^{o}C),
- rapid pulse,
- signs of dehydration : dry tongue and cracked lips.

(C) Abdominal examination:

1- The uterus :

- is hard and tender,

- frequent strong uterine contractions with no relaxation in between (tetanic contractions).

- rising retraction ring is seen and felt as an oblique groove across the abdomen.

2- The foetus :

- foetal parts cannot be felt easily.

- FHS are absent or show foetal distress due to interference with the utero-placental blood flow.

(D) Vaginal examination:

1- *Vulva:* is oedematous.

2- *Vagina* : is dry and hot.

3- *Cervix:* is fully or partially dilated, oedematous and hanging.

4- *The membranes* : are ruptured.

5- *The presenting part*: is high and not engaged or impacted in the pelvis. If it is the head it shows excessive moulding and large caput.

6- *The cause of obstruction* can be detected.

(E) Differential diagnosis:

1- Constriction ring.

2- Full bladder.

3- Fundal myoma.

Complications:

(I) Maternal :

1- Maternal distress and ketoacidosis.

2- Rupture uterus.

3- Necrotic vesico -vaginal fistula.

4- Infections as chorioamnionitis and puerperal sepsis.

5- Postpartum haemorrhage due to injuries or uterine atony.

(II) Foetal:

1- Asphyxia.

2- Intracranial haemorrhage from excessive moulding.

3- Birth injuries.

4- Infections.

Management:

(A) Preventive measures:

Careful observation , proper assessment, early detection and management of the causes of obstruction.

(B) Curative measures:

Caesarean section is the safest method even if the baby is dead as labour must be immediately terminated and any manipulations may lead to rupture uterus.

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Contracted Pelvis

Definition

Anatomical definition: It is a pelvis in which one or more of its diameters is reduced below the normal by one or more centimetres.

Obstetric definition: It is a pelvis in which one or more of its diameters is reduced so that it interferes with the normal mechanism of labour.

Factors influencing the size and shape of the pelvis:

1. Developmental factor : hereditary or congenital.
2. Racial factor.
3. Nutritional factor: malnutrition results in small pelvis.
4. Sexual factor: as excessive androgen may produce android pelvis.
5. Metabolic factor : as rickets and osteomalacia.
6. Trauma, diseases or tumours of the bony pelvis, legs or spines.

Aetiology of Contracted Pelvis:

(I) Causes in the pelvis:

(A) Developmental (congenital):

1- Small gynaecoid pelvis (generally contracted pelvis).

2- Small android pelvis.

3- Small anthropoid pelvis.

4- Small platypelloid pelvis (simple flat pelvis).

5- Naegele's pelvis: absence of one sacral ala.

6- Robert's pelvis: absence of both sacral alae.

7- High assimilation pelvis:The sacrum is composed of 6 vertebrae.

8- Low assimilation pelvis:The sacrum is composed of 4 vertebrae.

9- Split pelvis: splitted symphysis pubis.

(B) Metabolic:

1- Rickets.

2- Osteomalacia (triradiate pelvic brim).

(C) Traumatic : as fractures.

(D) Neoplastic: as osteoma.

(II) Causes in the spine:

1- Lumbar kyphosis.

2- Lumbar scoliosis.

3- Spondylolisthesis: The 5th lumbar vertebra with the above vertebral column is pushed forward while the promontory is pushed backwards and the tip of the sacrum is pushed forwards leading to outlet contraction.

(III) Causes in the lower limbs:

1. Dislocation of one or both femurs.
2. Atrophy of one or both lower limbs.

N.B. oblique or asymmetric pelvis: one oblique diameter is obviously shorter than the other. This can be found in:

1- Naegele's pelvis.

2- Scoliotic pelvis.

3- Diseases, fracture or tumours affecting one side.

Diagnosis of Contracted Pelvis

(A) History:

1. Rickets: is expected if there is a history of delayed walking and dentition.
2. Trauma or diseases : of the pelvis, spines or lower limbs.

3. Bad obstetric history: e.g. prolonged labour ended by;

   - difficult forceps,

   - caesarean section or

   - still birth.

(B) Examination:

(I) General examination:

1. *Gait:* abnormal gait suggesting abnormalities in the pelvis, spines or lower limbs.
2. *Stature:* women with less than 150 cm height usually have contracted pelvis.
3. *Spines and lower limbs:* may have a disease or lesion.
4. *Manifestations of rickets as*:

   - square head,

   - rosary beads in the costal ridges.

   - pigeon chest,

   - Harrison’s sulcus and - bow legs.

5. Dystocia dystrophia syndrome: the woman is

   - short,

   - stocky,

   - subfertile,

   - has android pelvis and

   - masculine hair distribution,

   - with history of delayed menarche.

This woman is more exposed to occipito-posterior position and dystocia.

(II) Abdominal examination:

1. *Nonengagement of the head:* in the last 3-4 weeks in primigravida.

2. *Pendulous abdomen:* in a primigravida.

3. *Malpresentations*: are more common.

(C) Pelvimetry:

It is assessment of the pelvic diameters and capacity done at 38-39 weeks. It includes:

(I) Clinical pelvimetry:

i) Internal pelvimetry for:

- inlet,

- cavity, and

- outlet.

ii) External pelvimetry for:

- inlet and

- outlet.

(II) Imaging pelvimetry:

i) X-ray.

ii) Computerised tomography (CT).

iii) Magnetic resonance imaging (MRI) .

N.B. CT and MRI are recent and accurate but expensive and not always available so they are not in common use.

Internal pelvimetry (is done through vaginal examination):

(I) The inlet:

1- Palpation of the forepelvis (pelvic brim):

The index and middle fingers are moved along the pelvic brim. Note whether it is round or angulated, causing the fingers to dip into a V-shaped depression behind the symphysis.

2- Diagonal conjugate:

Try to palpate the sacral promontory to measure the diagonal conjugate. Normally, it is 12.5 cm and cannot be reached. If it is felt the pelvis is considered contracted and the true conjugate can be calculated by subtracting 1.5 cm from the diagonal conjugate .This assessment is not done if the head is engaged.

(II) The Cavity :

1. *Height, thickness and inclination of the symphysis.*

2. *Shape and inclination of the sacrum.*
3. *Side walls:*

To determine whether it is straight, convergent or divergent starting from the pelvic brim down to the base of ischial spines in the direction of the base of the ischial tuberosity. Then relation between the index and middle finger of the base of ischial spines and the thumb of the other hand on the ischial tuberosity is detected. If the thumb is medial the side wall is convergent and if lateral it is divergent.

4- Ischial spines:

Whether it is blunt (difficult to identify at all), prominent (easily felt but not large) or very prominent (large and encroaching on the mid-plane).

The ischial spines can be located by following the sacrospinous ligament to its lateral end.

5- Interspinous diameter:

By using the 2 examining fingers, if both spines can be touched simultaneously, the interspinous diameter is ≤ 9.5 cm i.e. inadequate for an average-sized baby.

6- Sacrosciatic notch:

If the sacrospinous ligament is two and half fingers, the sacrosciatic notch is considered adequate.

(III) The outlet:

1- Subpubic angle:

Normally, it admits 2 fingers.

2- Bituberous diameter:

Normally, it admits the closed fist of the hand (4 knuckle).

3- Mobility of the coccyx.

by pressing firmly on it while an external hand on it can determine its mobility.

4- Anteroposterior diameter of the outlet:

from the tip of the sacrum to the inferior edge of the symphysis.

FINDINGS INDICATING ADEQUATE PELVIS:

Data	*Finding*

Forepelvis (pelvic brim)	Round.
Diagonal conjugate	≥ 11.5 cm.
Symphysis	Average thickness, parallel to sacrum.
Sacrum	Hollow , average inclination.
Side walls	Straight.
Ischial spines	Blunt.
Interspinous diameter	≥ 10.0 cm.
Sacrosciatic notch	2.5 -3 finger - breadths.
Subpubic angle	2finger - breadths.
Bituberous diameter	4 knuckles (> 8.0 cm).
Coccyx	Mobile.
Anterposterior diameter of outlet	≥ 11.0 cm.

External pelvimetry:

- It is of little value as it measures diameters of the false pelvis.
- Thom's , Jarcho's or crossing pelvimeter can be used for external pelvimetry.
  1. *Interspinous diameter (25cm) :* between the anterior superior iliac spines.
  2. *Intercrestal diameter (28 cm)* : between the most far points on the outer borders of the iliac crests.
- In rickets, the interspinous equals or even exceeds the intercrestal diameter.

3. *External conjugate (20 cm).*

4. *Bituberous diameter:* can be measured by pelvimeter.

Radiological pelvimetry:

It is indicated mainly in borderline pelvic contraction.

1- *Lateral view:* The patient stands with the X-ray tube on one side and the film cassette on the opposite side.

It is the most important view as it shows the anteroposterior diameters of the pelvis, angle of inclination of the brim, width of sacrosciatic notch, curvature of the sacrum and cephalo-pelvic relationship.

2- *Inlet view*: The patient sits on the film cassette and leans backwards so that the plane of the pelvic brim becomes parallel to the film.

3- *Outlet view:* The patient sits on the film cassette and leans forwards.

N.B. The measurements can be identified by using a graduated scale or Thom's perforated grid, in which the perforations are 1cm apart, while taking the X-ray film.The picture of the scale or grid on the X-ray film allows the measurement.

Cephalometry:

1- *Ultrasonography:* is the safe accurate and easy method and can detect:

i- The biparietal diameter (BPD).

ii- The occipito-frontal diameter.

iii- The circumference of the head.

2- *Radiology (X-ray):* is difficult to interpret.

(D) Cephalopelvic disproportion tests:

These are done to detect contracted inlet if the head is not engaged in the last 3-4 weeks in a primigravida.

(1) Pinard's method:

- The patient evacuates her bladder and rectum.

- The patient is placed in semi-sitting position to bring the foetal axis perpendicular to the brim.

- The left hand pushes the head downwards and backwards into the pelvis while the fingers of the right hand are put on the symphysis to detect disproportion.

(2) Muller - Kerr's method:

- It is more valuable in detection of the degree of disproportion.

- The patient evacuates her bladder and rectum.

- The patient is placed in the dorsal position.

- The left hand pushes the head into the pelvis and vaginal examination is done by the right hand while its thumb is placed over the symphysis to detect disproportion.

Degrees of Disproportion:

(1) Minor disproportion:

The anterior surface of the head is in line with the posterior surface of the symphysis.During labour the head is engaged due to moulding and vaginal delivery can be achieved.

(2) Moderate disproportion (1st degree disproportion):

The anterior surface of the head is in line with the anterior surface of the symphysis. Vaginal delivery may or may not occur.

(3) Marked disproportion (2nd degree disproportion):

The head overrides the anterior surface of the symphysis. Vaginal delivery cannot occur.

Degrees of Contracted Pelvis:

1. *Minor degree:* The true conjugate is 9-10 cm. It corresponds to minor disproportion.
2. *Moderate degree:* The true conjugate is 8-9 cm. It corresponds to moderate disproportion.
3. *Severe degree:* The true conjugate is 6-8 cm. It corresponds to marked disproportion.
4. *Extreme degree:* The true conjugate is less than 6 cm. Vaginal delivery is impossible even after craniotomy as the bimastoid diameter (7.5 cm) is not crushed.

Mechanism of Labour in Contracted Pelvis

(I) The Flat Rachitic Pelvis:

Characters:

1. *Inlet* : reduced antero-posterior diameter.
2. *The pelvic inclination* : is exaggerated due to increased lumbar lordosis.
3. *The sacrum* has the following characters:

   - The promontory is pushed forwards so the tip is pushed backwards.

- Diminished or obliterated concavity.

- Bent at the middle may be present.

4. *The outlet* has the following characters:

   a- Increased antero-posterior diameter.

   b- Increased bituberous diameter.

5. *The interspinous equal the intercrestal diameter*.

Mechanism of labour:

1. Engagement : with the sagittal suture in the transverse diameter.
2. Asynclitism with anterior parietal bone presentation so that the shorter subparietal supraparietal diameter (9cm) is passed instead of the biparietal (9.5cm) in the narrow true conjugate.
3. Lateral displacement of the head so that the bitemporal diameter is passed through the narrow true conjugate .
4. Deflexion of the head as the descent of the occiput is resisted by the lateral pelvic wall .
5. Correction of the asynclitism and deflexion with further descent of the head.
6. Rotation of the occiput 2/8 circle anteriorly and the head is delivered easily due to wide outlet.

(II) Simple Flat Pelvis:

Characters:

1. Reduced antero-posterior diameters of the inlet, cavity and outlet.
2. No rachitic manifestations.

Mechanism of labour:

The process passes as flat rachitic pelvis till the mid cavity where internal rotation and further descent cannot occur due to persistence of flattening of the pelvis and contracted outlet. So deep transverse arrest is common and vaginal delivery is obstructed.

(III) Contracted Outlet (Funnel Pelvis):

Characters:

1- The pelvic capacity is diminished from the inlet to the outlet.

2- Subpubic angle is acute.

3- Convergent side walls.

4- Bituberous diameter is 8 cm or less.

Causes:

1- Android pelvis.

2- Anthropoid pelvis.

3- Osteomalacia.

4- High assimilation pelvis.

5- Spondylolisthesis.

6- Oblique pelvis.

7- 20% of generally contracted pelvis.

Mechanism of labour:

1. Normal descent and engagement as the pelvic inlet is normal.
2. Extreme flexion and moulding of the head at the level of the jutting ischial spines.
3. Because of the narrow subpubic angle, the head is pushed backwards with more liability to perineal tears.
4. In case of occipito-posterior , the funnel pelvis interferes with long anterior rotation so persistent occipito-posterior and deep transverse arrest are common. The face to pubis position is more favourable as it brings the short bitemporal diameter in the narrow subpubic angle.

Management:

It depends on Thom's dictum:

1. If the sum of bituberous + posterior sagittal is >15 cm and bituberous diameter is >8cm: vaginal delivery is allowed with episiotomy and low forceps.
2. If the Thom's dictum is <15 cm or the bituberous diameter is <8cm: caesarean section is performed.

3. Symphysiotomy: may be done in distant areas with no facilities for C.S and the foetus is living.

Management of Contracted Pelvis

It depends mainly on the degree of disproportion.

(I) **Minor disproportion** (minor degree of contracted pelvis) : vaginal delivery.

(II) **Moderate disproportion** (moderate degree of contracted pelvis): trial labour, if failed → caesarean section.

(III) **Marked disproportion** (severe or extreme degree of contracted pelvis) : caesarean section.

Trial of Labour:

It is a clinical test for the factors that cannot be determined before start of labour as :

1. Efficiency of uterine contractions.
2. Moulding of the head.
3. Yielding of the pelvis and soft tissues.

Procedure:

1- Trial is carried out in a hospital where facilities for C.S is available.

2- Adequate analgesia.

3- Nothing by mouth.

4- Avoid premature rupture of membranes by:

– rest in bed,

– avoid high enema,

– minimise vaginal examinations.

5- The patient is left for 2 hours in the 2nd stage with good uterine contractions under close supervision to the mother and foetus.

Suitable cases for trial of labour:

1. Young primigravida of good health.
2. Moderate disproportion.
3. Vertex presentation.
4. No outlet contractions.
5. Average sized baby.

Termination of trial of labour:

Vaginal delivery:

either spontaneously or by forceps if the head is engaged.

Caesarean section if :

- failed trial of labour i.e. the head did not engage or

- complications occur during trial as foetal distress or prolapsed pulsating cord before full cervical dilatation.

Indications of caesarean section in contracted pelvis:

1. Moderate disproportion if trial of labour is contraindicated or failed.
2. Marked disproportion.
3. Extreme disproportion whether the foetus is living or dead.
4. Contracted outlet.
5. Contracted pelvis with other indications as;

   - elderly primigravida,

   - malpresentations, or

   - placenta praevia.

Complications of Contracted Pelvis:

(A) Maternal:

(I) During pregnancy:

1- Incarcerated retroverted gravid uterus.

2- Malpresentations.

3- Pendulous abdomen.

4- Nonengagement.

5- Pyelonephritis especially in high assimilation pelvis due to more compression of the ureter.

(II) During labour :

1. Inertia, slow cervical dilatation and prolonged labour.
2. Premature rupture of membranes and cord prolapse.
3. Obstructed labour and rupture uterus.
4. Necrotic genito-urinary fistula.
5. Injury to pelvic joints or nerves from difficult forceps delivery.
6. Postpartum haemorrhage.

(B) Foetal :

1- Intracranial haemorrhage.

2- Asphyxia.

3- Fracture skull.

4- Nerve injuries.

5- Intra-amniotic infection.

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Obstetrics Simplified

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Dystocia due to Oversized Foetus

CAUSE	MANAGEMENT
(I) Generalised foetal enlargement (macrosomia)	– See later.
(II) Localised foetal enlargement (1) Hydrocephalus (2) Meningocele or encephalocele	– See later. – If small → no effect as it will be flattened or ruptured. – If large → tapping of the cyst.
(3) Abdominal ascitis	– Tapping.
(4) Abdominal tumours	– Evisceration but if huge do – caesarean section.
(5) Foetal monsters (conjoined twins)	– Caesarean section is the safest.
(6) Shoulder dystocia	– See later.

GENERALISED FOETAL ENLARGEMENT (MACROSOMIA)

Definition:

A foetal weight of more than 4 kg.

Causes :

1. Genetic or constitutional : large women tend to give birth to large babies.
2. Diabetes and prediabetes.
3. Post-date (postmaturity).
4. Multiparity: The first baby is about 100 gm smaller than the next.
5. Hydrops foetalis.

Risk Factors:

1. Excessive maternal weight gain during pregnancy.

2. Advanced maternal age.

3- Male foetus than female.

4. Previous macrosomic infant.

Diagnosis:

1. *Clinical palpation* : can give a rough idea.
2. *Ultrasonography:* can calculate the foetal weight.

Hazards:

1- Prolonged pregnancy.

2- Cephalopelvic disproportion.

3- Obstructed labour.

4- Shoulder dystocia.

5- Meconium aspiration syndrome.

6- Nerve and bone injuries.

7- Future baby obesity.

Management:

1. *Proper antenatal care:* to prevent macrosomia and diagnose it before labour commences.
2. *Caesarean section :* is the safest for both mother and foetus .

HYDROCEPHALUS

Definition:

It is an enlargement of the foetal head due to accumulation of excessive cerebro-spinal fluid (C.S.F) within the ventricles.

Incidence:

0.5-1.8 per 1000 births. Incidence of recurrence in subsequent pregnancy is about 3%.

Aetiology:

Obstruction of aqueduct of sylvius which may be due to :

1. Genetic aberration as trisomies.
2. Infections: as cytomegalovirus, toxopalsmosis and rubella.
3. No detected cause.

Diagnosis:

(A) During pregnancy:

1. Breech presentation in 50% of cases.
2. Head is large with soft bones.

(B) During labour:

i) Cephalic presentation:

1- High non-engaged head.

2- Thin compressible skull bones.

3- Wide sutures and large fontanels.

ii) Breech presentation:

1- Retained large after-coming head.

2- Spina bifida is common (30%).

(C) X-ray and ultrasound:

1. Large head with biparietal diameter >12 cm (not in every case).
2. Dilated cerebral lateral ventricles each measures >1.5 cm and together >1/3 the biparietal diameter (more diagnostic).
3. Small face in relation to the head size.
4. The thickness of cerebral cortex which determines postpartum prognosis of the foetus can be measured by ultrasound.

Complications:

1. *Obstructed labour :* with its sequel as rupture uterus . This is more common in mild degrees of hydrocephalus which cannot be detected before or during labour.
2. *Foetus :* Still birth or live birth with neurological manifestations and low growth rate.

Management:

(I) Antepartum:

(1) Ventriculo-amniotic shunt:

With the recent advances in intrauterine foetal therapy *ventriculo-amniotic shunt* with a one way valve can be done to drain the CSF from the cerebral ventricles into the amniotic cavity preventing compression of the brain tissues.

(2) Induction of preterm labour: after draining of the fluid through a transabdominal needle puncture.

(II) Intrapartum:

(1) Cephalic presentation:

i) If the cervix is dilated : transcervical aspiration by a needle or perforation through a gaping suture or fontanelle is done.

ii) If the cervix is not dilated: transabdominal aspiration by a needle is done.

- Traction on the collapsed head can then applied by Willet's scalp forceps.

(2) Breech presentation:

CSF is drained through:

1. perforation in the roof of the mouth , foramen magnum or behind the mastoid process.
2. Spinal tapping which is easier through spina bifida if present.

(III) Postpartum:

The living newborn should be referred for shunt operation to drain the cerebral ventricles into the jugular vein or right atrium.

SHOULDER DYSTOCIA

Definition:

It is a difficulty in shoulder delivery.

Incidence:

about 0.5% of deliveries.

Causes:

1. *Large shoulder*s which may be due to :
   – Maternal obesity.
   – Diabetic mothers.
   – Post-term pregnancy.
   – Anencephaly.
2. *Failure of shoulder rotation.*
3. *Contracted and platypelloid pelvis.*

Prediction:

1. *Presence of risk factors of macrosomia* (see before).
2. *Ultrasonographic assessment of foetal weight.*

Clinical Picture:

- The head is delivered and the chin is applied firmly against the perineum.
- There is no further progress in spite of gentle traction on the head.

Management:

(A) Prophylaxis:

1. Proper antenatal care particularly for high risk mothers as diabetics.
2. Antepartum assessment of foetal weight---- macrosomic babies should be delivered by caesarean section.

(B) of shoulder dystocia:

Calling urgently an anaesthetist and paediatrician.

The following methods are used in a rapid succession when the previous one failed:

(1) *Rotation of the anterior shoulder :* if unrotated by fingers transvaginally to bring it in the antero - posterior diameter.

(2) *Generous episiotomy + gentle downward traction + suprapubic pressure* by an assistant obliquely to flex the anterior shoulder against the foetal chest.

(3) *Mc Roberts' manoeuvre:* It is sharp flexion of the maternal thighs against her abdomen. This can free the shoulders by:

i- backward displacement of the sacral promontory.

ii- upward displacement of the symphysis pubis.

iii- Decrease the inclination of the pelvic inlet.

iv- Decrease in lumbar lordosis.

(4) Woods screw manoeuvre:

- Woods (1943) described this manoeuvre to rotate the foetus as a screw between the resisted promontory and symphysis.
- Two fingers of the right hand is pressing from the posterior aspect of the posterior shoulder to rotate it 180^{o} anteriorly where it escapes from below the symphysis.
- The left hand is placed on the mother’s abdomen and assists this rotation by pressing on the foetal buttock in the same direction of rotation.

(5) *Extraction of the posterior arm:* by pressing with 2 fingers against the cubital fossa to sweep the posterior arm in front of the chest and deliver it giving space for the anterior shoulder to escape from below the symphysis.This is aided by suprapubic pressure.

(6) *Zavanelli manoeuvre (cephalic replacement):*

1. Prepare for caesarean section.
2. Subcutaneous terbutaline (tocolytic) is given to relax the uterus.
3. Rotate the head manually to the antero-posterior diameter (pre-restitution position).
4. Flex the head and press on it firmly and constantly to replace it intravaginally where it is supported by an assistant.

5. Immediate caesarean section is performed.

(7) Clavicular fracture:

was described to reduce the diameter of the shoulders. It is done by upward pressure against its midportion to avoid injury of the subclavian vessels.

(8) Cleidotomy:

It is cutting of the clavicle and usually reserved for a dead foetus.

(9) Symphysiotomy:

It is advocated by some authors to overcome contracted pelvis in women living in uncivilised areas.

Complications:

(I) Foetal :

1. Asphyxia and death.
2. Brachial plexus injury causing Erb's palsy.
3. Fracture clavicle or humerus.

(II) Maternal :

Injuries from manoeuvres which may extend up to rupture uterus.

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Obstetrics Simplified

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Maternal Obstetric Injuries

These include:

1. Rupture of the uterus.
2. Cervical tears.
3. Vaginal tears.
4. Haematoma of the vulva.
5. Perineal tears.
6. Trauma to the pelvic joints and nerves.

Rupture of the Uterus

Incidence:

About 1:4000, 95% of cases occur in multipara particularly grand multipara.

Causes:

(A) During pregnancy

(I) Spontaneous:

1. Rupture of a uterine scar: e.g. previous C.S. especially upper segment, myomectomy, hysterotomy, uteroplasty or perforation.
2. Abruptio placenta with severe concealed haemorrhage.
3. Anterior sacculation in case of incarcerated retroverted gravid uterus or posterior sacculation due to previous ventrofixation of the uterus.

4. Rupture of a rudimentary horn at the 4th - 5th month.
5. Perforating vesicular mole.

(II) Traumatic

1. Perforation during vaginal evacuation.
2. External trauma.

(B) During labour:

(I) Spontaneous:

1. *Obstructed labour.*
2. *Rupture of a uterine scar.*
3. *Grand multipara:* due to degeneration and overthinning of the uterine muscles.

(II) Traumatic :

1. Internal version: particularly after drainage of liquor.
2. Manual separation of the placenta.
3. Destructive operations.
4. Extending cervical tear due to e.g. forceps or ventose applications before full cervical dilatation.

(III) Improper use of oxytocins.

Weak uterine scar may be a result to:

1. *Imperfect suture* with improper coaptation of the edges.
2. *Bad haemostasis* results in blood clot formation which prevents good coaptation and predisposes to wound infection.
3. *Wound infection.*
4. *Subsequent implantation of the placenta over it.*

5. *Subsequent overdistension of the uterus* e.g. polyhydramnios or multiple pregnancy.
6. *Upper segment caesarean section scar* is weaker than lower segment scar.
7. *Repeated vaginal deliveries* after a previous C.S weaken the scar .

Types:

1. Complete : involving the whole uterine wall including the peritoneum.
2. Incomplete: not involving the peritoneal coat.

Sites:

It depends upon the cause of rupture.

(1) In obstructed labour:

- It is usually in lower uterine segment.

- Usually oblique or transverse.

- More on the left side due to;

  i) dextrorotation of the uterus.

  ii) left occipito-positions are more common.

- Extended tear may pass laterally injuring the uterine vessels leading to broad ligament haematoma formation. This rupture may involve the ureter or bladder.

(2)In rupture scar:

At the site of the scar.

Clinical Picture:

(A) Impending rupture :

before actual rupture the following manifestations may be detected:

1- Lower abdominal pain.

2- Tender uterine scar.

3- Vaginal spotting (minimal bleeding).

(B) Actual rupture:

i) Symptoms:

1. *Sudden severe abdominal pain* : It is differentiated from labour pain being continuous .
2. If the patient was in labour there is *cessation of uterine contractions.*
3. *Shoulder pain* on lying down due to irritation of the phrenic nerve by accumulating blood under the diaphragm.
4. *Silent rupture*: minimal symptoms may occur in rupture lower segment scar due to presence of fibrosis and minimal internal haemorrhage.

ii) Signs

1- General examination:

Variable degrees of collapse is present according to amount of blood loss. This may appear postpartum in case of traumatic rupture uterus.

2- Abdominal examination:

- Scar of the previous operation.

- Foetal parts are prominent and felt easy.

- The presenting part recedes upwards.

- Abnormal foetal attitude and lie.

- FHS usually not heard.

- The uterus is felt separated from the foetus .

- In incomplete rupture, the foetus still inside the uterus with suprapubic painful tender swelling which is an accumulated blood in the vesico-uterine pouch.

3- Vaginal examination:

- The presenting part recedes upwards.

- Vaginal bleeding may be present.

- Contracted pelvis may be detected.

- A cervical tear may be found extending to the lower uterine segment and a broad ligament haematoma may be present.

Differential Diagnosis:

1. Abruptio placentae.
2. Disturbed advanced extrauterine pregnancy.
3. Other causes of acute abdomen.

Management:

(A) Prophylactic:

1. Early detection of causes of obstructed labour as contracted pelvis and malpresentations.
2. Proper use of oxytocins.
3. Version is not done if liquor amnii is drained.
4. Forceps application and breech extraction should not be done before full cervical dilatation.
5. Elective caesarean section for susceptible scars for rupture as upper segment C.S.

6. Exploration of the genital tract after difficult or instrumental delivery.

(B) Curative:

1- *Blood transfusion and antishock measures.*

2- *Immediate laparotomy.*

3- *Deliver the foetus and placenta*.

4- *Explore the rupture site:*

- If it is amenable for repair and the patient did not complete her family → repair is done.

- If it is not amenable for repair→ hysterectomy. Subtotal hysterectomy is less time consuming so it is done if there is no cervical tear.

5- *Exploration of the other viscera* mainly the bladder.

6- *Internal iliac artery ligation* may be needed in case of broad ligament haematoma as the uterine artery is usually retracted and difficult to be identified.

7- Vaginal repair: may be amenable if there is slight extension of a cervical tear with accessible apex.

Complications:

(A) Maternal:

1- Shock.

2- Haemorrhage.

3- Paralytic ileus.

4- Bladder, ureter or visceral injuries.

5- Infection.

(B) Foetal :

Death due to asphyxia from detachment of the placenta.

Cervical Lacerations

Aetiology:

1. Forceps, ventose or breech extraction before full cervical dilatation.
2. Manual dilatation of the cervix.
3. Improper use of oxytocins.
4. Precipitate labour.

Predisposing Factors:

1- Cervical rigidity.

2- Scarring of the cervix.

3- Oedema as in prolonged labour.

4- Placenta praevia due to increased vascularity.

Types:

1- *Unilateral :* more common on the left side due to:

i) Dextro-rotation of the uterus.

ii) Left occipito-anterior position is the commonest.

2- *Lateral* .

3- *Stellate:* multiple tears extending radially from the external os like a star.

4- *Annular detachment*.

Diagnosis:

1. *Postpartum haemorrhage,* in spite of well contracted uterus.
2. *Vaginal examination :*The tear can be felt.
3. *Speculum examination:* using a posterior wall self retaining speculum or vaginal retractors and 2 ring forceps to grasp the anterior and posterior lips of the cervix so the tear can be visualised.

Complications:

1. Postpartum haemorrhage.
2. Rupture uterus due to upward extension.
3. Infection: cervicitis and parametritis.
4. Cervical incompetence leading to future recurrent abortion or preterm labour.
5. Ureteric injury: from the extension of the tear or during its repair.

Management:

(1) Immediate repair: is carried out under general anaesthesia with good light exposure.

- An assistant applies downward pressure on the uterus while the operator is grasping the anterior and posterior lips in a downward direction.
- The vaginal walls are held apart with retractors.
- Interrupted cut gut dexon or vicryl sutures are taken starting from above the apex of the tear to control bleeding from the retracted blood vessels.

- If the apex is not easily seen a traction on a stitch taken as high as possible in the tear will show the apex.

(2) In cases of annular detachment *:* there is usually no bleeding due to ischaemia at the edges of detachment. Sutures are rarely indicated.

Vaginal Lacerations

Causes:

(I) Primary lacerations less common and caused by :

1- Forceps application.

2- Destructive operations.

3- Vacuum extraction if the cup sucks a part from the vaginal wall.

(II) Secondary lacerations: more common and are due to extension from perineal or cervical tears.

Management:

1. *Immediate repair :* Continuous locked cut gut sutures are taken starting from above the apex to control bleeding from the retracted blood vessels.
2. *Tight pack:* may be needed to control bleeding from a raw surface area. Foley's catheter should be inserted before packing and both are removed after 12-24 hours.

Haematoma of the Genital Tract

(I)Vulval (Infra-Levator) Haematoma:

Causes:

(1) Traumatic due to :

- incomplete haemostasis during repair of episiotomy or tear.

- Direct trauma as kick or falling down.

(2) Spontaneous : due to rupture of a varicose vein.

Clinical picture:

- The haematoma usually appears 12-48 hours after delivery.

- The collection of blood is limited by the levator ani above but laterally it may extend to fill the ischiorectal fossa reaching a volume of 500 ml or more.

- There is a progressive enlarged , painful, tender , tense, bluish swelling at the vulva.

- Manifestations of hypovolaemia (e.g. hypotension and rapid pulse) and anaemia may be present.

Management :

(1) Small not- increasing haematoma: is managed conservatively as it usually resolves spontaneously. Prophylactic antibiotic may be given to guard against secondary infection.

(2) Large increasing haematoma:

- It is incised longitudinally,

- evacuation of the clotted blood,

- bleeding points are ligated,

- the gap is closed in layers.

(II) Vaginal (Supra-Levator) Haematoma:

Causes:

Deep vaginal lacerations (see before).

Clinical picture:

- The blood is collected paravaginally above the levator ani muscle.

- It may not be visible externally.

- It may not be painful until reaching a large size.

- Manifestations of hypovolaemia and anaemia may be present.

Management:

As vulval haematoma.

(III) Broad Ligament (Retroperitoneal) Haematoma:

Causes

Upper vaginal ,cervical or uterine tears which usually involve the vaginal or uterine artery.

Clinical picture:

1. *Hypovolaemia , anaemia or shock:* is usually present due to large amount of internal haemorrhage.
2. *Swelling* on one side of the uterus which increasing over a period of hours or days and may reach up to the lower pole of the kidney or even the diaphragm.
3. *The uterus* is felt separate and deviated to the opposite side.
4. *Fever, ileus and unilateral leg oedema*: may develop later.

Management:

(A) Small not-increasing haematoma: is managed conservatively as vulval haematoma.

(B) Large increasing haematoma:

- Laparotomy.

- Incision in the anterior leaflet of the broad ligament.

- Evacuation of the blood clots.

- Securing haemostasis, bilateral internal artery ligation or hysterectomy may be indicated.

Perineal Lacerations

Anatomy:

The perineal body is a pyramidal mass of tissues about 4× 4 cm between the lower vagina anteriorly, the anal canal and lower rectum posteriorly.

It is composed of the following layers respectively:

1- Skin.

2- Superficial fascia.

3- Perineal muscles;

- external anal sphincter,

- superficial and deep perinei muscles,

- bulbocavernosus, and

- ischiocavernosus.

4- The decussation of the levator ani muscles between the vagina and rectum forms the apex of the perineal body.

N.B. - All the perineal muscles , except the ischiocavernosus, are inserted in the central part of the perineal body.

- They contract during intercourse and defecation.

- During delivery,they may be markedly stretched and teared.

Aetiology:

(I) Lack of perineal elasticity:

1. Elderly primigravida.
2. Excessive scarring from a previous operation as posterior colpoperineorrhaphy.
3. Friability due to perineal oedema.

(II) Marked perineal stretch:

1- Allowing head extension before crowning.

2- Macrosomic baby.

3- Face to pubis delivery.

4- Forceps delivery.

5- Narrow subpubic angle pushing the head backward.

(III) Rapid perineal stretch:

1- Precipitate labour.

2- Rapid delivery of the after-coming head in breech presentation.

Degrees:

1. *First degree:* involves the perineal skin, fourchette and the posterior vaginal wall.
2. *Second degree:* involves the previous structures + the muscles of the perineal body but not the external anal sphincter.
3. *Third degree :* involves the previous structures + the external anal sphincter.

4. *Fourth degree:* involves the previous structures + the anterior wall of the anal canal or rectum.

N.B

– *Incomplete perineal tear* = 1st or 2nd degrees.

– *Complete perineal tear* = 3rd or 4th degrees.

– *Hidden perineal tear:* The levator ani muscle is teared without apparent perineal tear predisposing to future prolapse.

Complications:

1- Postpartum haemorrhage.

2- Puerperal infection.

3- Incontinence of stool and flatus in unrepaired or imperfectly repaired 3rd or 4th degree tear.

4- Residual recto-vaginal fistula in imperfectly repaired 4th degree tear.

5- Future genital prolapse.

6- Dyspareunia due to tender vaginal scar.

Prevention:

1. Proper management of second stage of labour.
2. Episiotomy in the proper time.

Treatment:

Any perineal tear should be repaired within 24 hours.

(I) Incomplete perineal tear:

Can be repaired under local infiltration anaesthesia.

i- First degree tear: The vaginal wall is repaired with continuous locked or interrupted sutures and the skin with interrupted sutures.

ii- Second degree tear:

- The perineal muscles are approximated by interrupted chromic cut gut sutures including the torn ends of the levator ani.

- The vagina is sutured as in the 1st degree tear.

- The superficial perineal muscles are sutured by interrupted chromic cutgut.

- The skin is sutured as in the 1st degree tear.

(II) Complete perineal tear:

i) Third degree tear:

- The torn ends of the external anal sphincter is identified and sutured together by interrupted cutgut.

- The levator ani muscles are approximated in front of the rectum.

- The vagina, superficial muscles and skin are sutured as before.

ii) Fourth degree tear:

- The rectal wall is sutured by 2 layers of inverted interrupted cutgut not including the mucosa.

- The external sphincter, levator ani, superficial muscles and skin are sutured as before.

Post-operative care:

1. The perineal wound is kept clean and sterile by using antiseptic solution after each micturition or defecation.

2. In the complete perineal tear:

   - Intravenous fluid for 48 hours,

- clear fluids for the next 24 hours,

- soft, low residue diet for an additional 48 hours,

- regular diet after that,

- laxative are not used in the first 4-5 days, but stool softeners are allowed.

3. Prophylactic antibiotic is given.

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Obstetrics Simplified

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Complications of the Third Stage of Labour

Include:

1- Postpartum haemorrhage.

2- Retained placenta.

3- Inversion of the uterus.

4- Obstetric shock (collapse).

POSTPARTUM HAEMORRHAGE

Definition:

It is excessive blood loss, from the genital tract after delivery of the foetus exceeding 500 ml or affecting the general condition of the patient.

Types:

(1)Primary postpartum haemorrhage:

Bleeding occurs during the 3rd stage or within 24 hours after childbirth. It is more common.

(2)Secondary postpartum haemorrhage:

Bleeding occurs after the first 24 hours until 6 weeks (the end of puerperium).

PRIMARY POSTPARTUM HAEMORRHAGE

Aetiology:

(A) Placental site haemorrhage:

(I) Atony of the uterus:

is the cause of primary postpartum haemorrhage in more than 90% of cases.

The factors that predispose to uterine atony are:

1- Antepartum haemorrhage.

2- Severe anaemia.

3- Overdistension of the uterus.

4- Uterine myomas.

5- Prolonged labour exhausting the uterus.

6- Prolonged anaesthesia and analgesia.

7- Full bladder or rectum.

8- Idiopathic.

(II) Retained placenta.

(III) Disseminated intravascular coagulation (DIC).

(B) Traumatic haemorrhage:

Rupture uterus, cervical, vaginal , vulval or perineal lacerations.

Diagnosis:

(A) General examination:

- The general condition of the patient is corresponding to the amount of blood loss.
- In excessive blood loss, manifestations of shock appear as hypotension, rapid pulse, cold sweaty skin, pallor, restlessness, air hunger and syncope.

(B) Abdominal examination:

In atonic postpartum haemorrhage: The uterus is larger than expected, soft and squeezing it leads to gush of clotted blood per vaginum.

In traumatic postpartum haemorrhage: The uterus is contracted. Combination of the 2 causes may be present.

(C) Vaginal examination:

In atony: Bleeding is usually started few minutes after delivery of the foetus.

- It is dark red in colour.

- The placenta may be not delivered.

In trauma: Bleeding starts immediately after delivery of the foetus.

- It is bright red in colour.

- Lacerations can be detected by local examination.

Management:

(A) Prevention:

(I) During pregnancy:

1. *Detection and correction of anaemia.*
2. *Hospital delivery* with ready cross-matched blood for high risk patients as:

   - Antepartum haemorrhage.

   - Previous postpartum haemorrhage.

   - Polyhydramnios and multiple pregnancy.

   - Grand multipara.

(II) During labour:

1- Proper use of analgesia and anaesthesia.

2- Avoid prolonged labour by proper oxytocin which should be extended to the end of the 3rd stage if used.

3- Avoid lacerations by :

- Proper management of the 2nd stage.

- Follow the instructions for instrumental delivery (see later).

4- Routine use of ecbolics in the 3rd stage of labour.

5- Routine examination of the placenta and membranes for completeness.

(III) Postpartum:

1. *Exploration of the birth canal* after difficult or instrumental delivery as well as precipitate labour.
2. *Careful observation in the fourth stage of labour* (1-2 hours postpartum).

(B) Treatment:

(I) Restoration of blood volume:

Urgent cross-matched blood transfusion with the other antishock measures is given. Colloids and/or crystalloids therapy can be started till availability of the blood.

(II) Arrest of bleeding:

i) Placental site bleeding:

(a) Before delivery of the placenta:

The placenta should be delivered by;

- Ergometrine and massage with gentle cord traction if failed,

- Brandt -Andrews manoeuvre if failed do,

- Crédé's method if failed do,

- manual separation of the placenta.

(b) After delivery of the placenta:

The following steps are done in succession if each previous one fails to arrest bleeding:

1. *Inspection of the placenta and membranes* : any missed part should be removed manually under anaesthesia.
2. *Massage of the uterus and ecbolics as:*

   - Oxytocin drip: 10-20 units in 500 ml glucose 5% or normal saline. It may be given (5 units) directly intramyometrial in case of C.S.

   - Ergometrine (Methergin) : 1-2 ampoules (0.25-0.50 mg) IV or IM.

   - Syntometrine 0.5 mg IV if available.

(3)Prostaglandins (PG_s):

- 0.25 mg methyl PG $F_{2\alpha}$ IM (Prostin methyl ester) or

- 1 mg PG $F_{2\alpha}$ intramyometrial in case of C.S. or

- 20 mg PG E_2 (Prostin E_2) rectal suppositories every 4-6 hours.

(4) Bimanual compression of the uterus:

- Under general anaesthesia, the uterus is firmly compressed for 5-30 minutes between the closed fist of the right hand in the anterior vaginal fornix and the left hand abdominally behind the body of the uterus.

- The compression is maintained until the uterus is firmly contracted. During this period, blood transfusion,oxytocin and ergometrine are given.

(5) Bilateral uterine artery ligation:

- The surgeon stands on the left side of the patient to control the procedure more.

- The uterus is grasped by the assistant and elevated upwards and to the opposite side of the uterine artery which will be ligated to expose the vessels coarse through the broad ligament.

- A large atraumatic needle with no. 1 chromic cutgut, O-vicryl or O-Dexon is passed through and into the myometrium from anterior to posterior 2-3 cm medial to the uterine vessels.

- The needle is brought forward through avascular area in the broad ligament lateral to the uterine artery and vein. The suture is tied anteriorly.

- In case of caesarean section, the sutures are placed 2-3 cm below the level of uterine incision under the reflected peritoneal flap which should be displaced downwards with the bladder to avoid ligation of the ureters.

- If caesarean section was not done, peritoneal incision is not indicated and bladder can be simply pushed downwards.

- Uterine artery ligation is haemostatic by reducing the pulse pressure to the uterus as 90% of its blood supply is from the uterine vessels.

- Collateral circulation and recanalization of the uterine vessels will be established within 6-8 weeks.

- It has a success rate of 95%.

(6) Bilateral ligation of ovarian supply to the uterus:

If bleeding continues after uterine arteries ligation a second mass bilateral ligation is done high up in the site of anastomosis between the uterine and ovarian arteries near the cornua of the uterus.

(7) Bilateral internal iliac artery ligation:

- The posterior peritoneum lateral to the infundibulo-pelvic vessels is opened.

- The ureter is indentified on the posterior leaf of the broad ligament and retracted medially.

- The bifurcation of the common iliac artery at the level of the sacroiliac joint is identified and the internal iliac vessels are identified and ligated with no.1 non-absorbable silk suture.

- Most surgeons do not close the peritoneum over this area.

- It has a success rate of 40%.

(8) Hysterectomy:

Subtotal hysterectomy which is more rapid and easy than total hysterectomy is done.

Other less commonly used methods to arrest bleeding:

(1) Uterine packing:

- Under general anaesthesia. - Foley's catheter is applied.

- Packing the whole uterus, cervix and vagina with a sterile gauze starting from the fundus downwards in tightly packed layers where each roll of gauze is tied to the next.

- It is removed after 6-12 hours.

(2) Foley's balloon :

A large Foley's catheter balloon is inflated to control haemorrhage from lower uterine segment which may result from placenta praevia or cervical pregnancy.

(3) Aortic compression:

The aorta is compressed manually against the lumbar spines through the abdomen providing temporary control of heavy bleeding till preparing for surgical interference.

(4) Radiographic trans-arterial immobilisation:

By a trained radiologist selective immobilisation of the pelvic vessels may be done using the angiographic techinque.

ii) Lacerations:

are dealt with (see maternal obstetric injuries).

Complications:

1- Maternal death in 10% of postpartum haemorrhages.

2- Acute renal failure.

3- Embolism.

4- Sheehan's syndrome.

5- Sepsis.

6- Anaemia.

7- Failure of lactation.

SECONDARY POSTPARTUM HAEMORRHAGE

Aetiology:

(1)Retained parts:

of the placenta, membranes, blood clot or formation of a placental polyp.

(2) Infection:

– separation of infected retained parts.

– infected C.S. wound.

– infected genital tract lacerations.

– infected placental site.

(3) Fibroid polyp: necrosis and sloughing of its tip.

(4) Subinvolution of the uterus.

(5) Local gynaecological lesions: e.g. cervical ectopy or carcinoma.

(6) Choriocarcinoma.

(7) Puerperal inversion of the uterus.

(8) Oestrogen withdrawal bleeding: if oestrogen was given for supression of lactation.

Treatment:

depends on the cause:

(1) Retained parts:

(a) with minimal bleeding :

can be spontaneously expelled using:

– ergometrine and

– antibiotics.

(b) with severe bleeding :

vaginal evacuation under anaesthesia is indicated.

(2) Infection : antibiotics.

(3) Other causes : treatment of the cause.

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Obstetrics Simplified

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Retained Placenta

Definition:

Failure of placental delivery within 30 minutes after delivery of the foetus.

Incidence: 1%.

Causes:

(A) Retained separated placenta due to:

1. *Atony of the uterus:* due to causes mentioned before.
2. *Constriction ring.*
3. *Rupture uterus :* where the placenta passes to the peritoneal cavity.

(B) Retained non-separated placenta due to:

1. *Atony of the uterus.*
2. *Abnormal adherence of the placenta* which may be:

   i) Simple adhesion: Manual separation can be done easily.

   ii) Morbid adhesion:

      a. Placenta accreta: There is deficient or absent decidua basalis so that chorionic villi penetrate the superficial layer of the myometrium either partially (partial placenta accreta) or completely (complete placenta accreta).

b. Placenta increta : The chorionic villi penetrate deeply in the myometrium.

c. Placenta percreta: Penetration up to the peritoneal coat.

The condition is more associated with placenta praevia due to defective decidual reaction in the lower segment.

Clinical Picture:

1. *Bleeding :* occurs only if the placenta is separated partially or completely.
2. *Uterus:* is lax in case of atony.
3. *Vaginal examination* may reveal:

   i- Constriction ring.

   ii- Rupture uterus.

   iii- Morbid placental adherence where there is no plane of cleavage.

Management:

(I) Uterine atony :

1. Ergometrine and massage with gentle cord traction if failed do,
2. Brandt-Andrews manoeuvre if failed do,
3. Crédé's method if failed do,
4. Manual separation of the placenta.

(II) Constriction ring:

Deep anaesthesia and amyl nitrite inhalation are given before manual separation of the placenta.

(III) Morbid adherence of the placenta:

1. *Simple adhesion and partial placenta accreta:* Manual separation is usually successful.

2. *Complete accreta:* Hysterectomy is the treatment. If the patient is young and in need of more children, the umbilical cord is cut short and placenta is left in situ to undergo autolysis. The patient is given antibiotics to guard against infection and methotrexate to enhance the autolysis.

(IV) In case of rupture uterus:

Manage as in rupture uterus.

Crédé's method:

1. The bladder is evacuated.
2. The uterus is massaged to induce contraction.
3. The fundus is grasped by 4 fingers behind and the thumb in front to squeeze the placenta.
4. The fundus is then pushed downwards and backwards to expel the placenta.

Complications:

1- Shock.

2- Inversion of the uterus.

3- Partial separation of the placenta causing postpartum haemorrhage.

4- Retained parts of the placenta or membranes.

5- Failure due to;

- obesity,

- non-co-operative patient,

- placenta accreta,

- rigidity of the abdominal wall,or

- constriction ring.

Manual Removal of The Placenta:

1. The procedure is done under general anaesthesia.
2. The right hand is introduced along the umbilical cord into the uterus.
3. The lower edge of the placenta is identified and by a sawing movement from side to side the placenta is separated from its bed.
4. Grasp the placenta and deliver it out.
5. Examine the placenta and membranes for completeness.
6. The left hand is supporting the uterus abdominally throughout the procedure.

Complications:

1- Perforation of the uterus.

2- Retained parts.

3- Infection.

Complications of Retained Placenta:

1- Shock.

2- Postpartum haemorrhage.

3- Puerperal sepsis.

4- Subinvolution.

5- Retained parts with subsequent haemorrhage, infection, placental polyp formation or choriocarcinoma.

6- Complications of the methods used for its separation.

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Obstetrics Simplified

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Acute Inversion of the Uterus

Definition:

The body of the uterus is partially or completely turned inside out.

Incidence:

very rare about 1: 20.000 deliveries.

Aetiology:

(I) Spontaneous inversion caused by:

1- Precipitate labour.

2- Traction on a short cord by the foetus.

3- Straining or coughing while the uterus is lax, particularly if the cervix is torn or gaped.

4- Submucous fundal myoma.

(II) Iatrogenic inversion caused by:

1. pressure on the fundus or,
2. traction on the cord while the uterus is lax.

Degrees:

1. **First degree :** The fundus is just depressed.
2. **Second degree:** The inverted fundus protrudes through the cervix.

3. **Third degree:** The whole uterus, including the cervix, is inverted and may drag the vagina and appear outside the vulva.

N.B.

– *Incomplete inversion :* First or second degree.

– *Complete inversion*: Third degree.

Clinical Picture:

(A) Symptoms:

1. *Pain :* in the lower abdomen.
2. *Sensation of vaginal fullness:* with a desire to bear down after delivery of the placenta.
3. *Vaginal bleeding:* unless the placenta is not separated.
4. *Subacute inversion:* There is minimal symptoms and the condition is discovered later when the patient develops blood stained offensive vaginal discharge due to infection.

(B) Signs:

(1) General examination:

Shock is out of proportion to the amount of blood loss as it is more neurogenic due to traction on the peritoneum and pressure on tubes, ovaries and may be the intestine.

(2) Abdominal examination:

- Cupping of the fundus -------- in the 1st and 2nd degrees.

- Absence of the uterus --------- in the 3rd degree.

(3) Vaginal examination:

In the 2nd and 3rd degrees the inverted uterus appears as a soft purple mass in the vagina or at the vulva.

Management:

(1) Anti - shock measures.

(2) Manual reduction:

- After resuscitation , the inverted uterus is reduced manually under anaesthesia, but do not delay reduction as the uterus will be oedematous and difficult to be replaced.

- The part inverted last is replaced first so fundus is replaced finally.

- If the placenta is still attached it is removed.

- Massage the uterus and give ergometrine, IV oxytocin drip and antibiotics.

(3) Hydrostatic reduction:

Replacement is possible by fluid pressure with warm saline delivered into the vagina through a wide bore tube from a container held at a height of about 60 cm. The vaginal introitus is closed by holding the labia major together.

(4) Surgical reduction:

- It is indicated in subacute and chronic inversions.

- The cervix is incised posteriorly or anteriorly either vaginally or abdominally to reposite the uterus.

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Obstetrics Simplified

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Shock in Obstetrics

Definition:

Shock is a condition resulting from inability of the circulatory system to provide the tissues requirements from oxygen and nutrients and to remove metabolites.

Types and Causes:

(I) Haemorrhagic shock excessive blood loss may be due to:

1. Causes of bleeding early in pregnancy.
2. Causes of antepartum haemorrhage.
3. Causes of postpartum haemorrhage.

(II) Neurogenic shock painful conditions my be due to :

1- Disturbed ectopic pregnancy.

2- Concealed accidental haemorrhage.

3- Forceps or breech extraction before full cervical dilatation.

4- Rough internal version.

5- Crédé's method.

6- Rupture uterus.

7- Acute inversion of the uterus.

8- Rapid evacuation of the uterine contents as in precipitate labour and rupture of membranes in polyhydramnios. This is accompanied by rapid accumulation of blood in the splanchnic area due to sudden relief of pressure (splanchnic shock).

(III) Cardiogenic shock : ineffective contraction of the cardiac muscle due to

1- Myocardial infarction.

2- Heart failure.

(IV) Endotoxic shock: generalised vascular disturbance due to release of toxins.

(V) Anaphylactic shock: caused by sensitivity to drugs.

(VI) Other causes:

1. *Embolism:* amniotic fluid , air or thrombus.
2. *Anaesthetic complications :* as Mendelson's syndrome.

The shock may be caused by more than one factor as:

- Incomplete abortion : leads to haemorrhagic and endotoxic shock.
- Disturbed ectopic and rupture uterus: lead to haemorrhagic and neurogenic shock.

Classic Clinical Picture of Shock:

1- Low blood pressure.

2- Rapid weak (thready) pulse.

3- Pallor.

4- Cold clammy sweat.

5- Cyanosis of the fingers.

6- Air hunger.

7- Dimness of vision.

8- Restlessness.

9- Oliguria or anuria.

HAEMORRHAGIC SHOCK

Classification of Haemorrhage:

Class	Blood Loss%	Clinical Picture
I	15%	Normal pulse & blood pressure. Tilt test +ve .
II	20-25%	Tachycardia. – Tachypnoea. Pulse pressure (<30mmHg). Low systolic pressure. Delayed capillary filling.

III	30-35%	Skin: cold, clammy and pale. Severe drop in blood pressure. Restlessness. Oliguria (<30 ml/hour). Metabolic acidosis (blood pH <7.5).
IV	40-45%	Profound hypotension. The carotid pulse is the only felt one. Irreversible shock.

Tilt test:

- It is done in patient with considerable bleeding but the blood pressure and/ or pulse rate are normal.
- When this patient is in a sitting position, she develops hypotension and / or tachycardia.

Phases of Haemorrhagic Shock:

The normal pregnant woman can withstand blood loss of 500 ml and even up to 1000 ml during delivery without obvious danger due to physiological cardiovascular and haematological adaptations during pregnancy.

(I) Phase of compensation:

- *Sympathetic stimulation:* It is the initial response to blood loss leading to peripheral vasoconstriction to maintain blood supply to the vital organs.
- *Clinical picture:* - Pallor, - tachycardia, - tachypnoea.

(II) Phase of decompensation:

- Blood loss exceeds 1000 ml in normal patient or less if other adverse factors are operating.
- *Clinical picture:* is the classic clinical picture of shock (see before).
- Adequate treatment at this phase improves the condition rapidly without residual adverse effects.

(III) Phase of cellular damage and danger of death:

- Inadequately treated haemorrhagic shock results in prolonged tissue hypoxia and damage with the following effects:
  1. *Metabolic acidosis:* due to anaerobic metabolism initiated after lack of oxygen.
  2. *Arteriolar dilatation :* caused by accumulation of metabolites leading to pooling and stagnation of blood in the capillaries and leakage of fluid into the tissues.
  3. *Disseminated intravascular coagulation:* caused by release of thromboplastin from the damaged tissues.
  4. *Cardiac failure*: due to diminished coronary blood flow.
- In this phase death is imminent, transfusion alone is inadequate and if recovery from acute phase occurs residual tissue damage as renal and/ or pituitary necrosis will occur.

Management:

Urgent interference is indicated as follow:

1. *Detect the cause and arrest haemorrhage.*
2. *Establish an airway and give oxygen* by mask or endotracheal tube.
3. *Elevate the legs* to encourage return of blood from the limbs to the central circulation.

4. *Two or more intravenous ways are established* for blood, fluids and drugs infusion which should be given by IV route in shocked patient. If the veins are difficult to find a venous cut down or intrafemoral canulation is done.

5. *Restoration of blood volume by:*

   a. Whole blood: cross-matched from the same group if not available group O-ve may be given as a life -saving.

   b. Crystalloid solutions: as ringer lactate, normal saline or glucose 5%. They have a short half life in the circulation and excess amount may cause pulmonary oedema.

   c. Colloid solutions: as dextran 40 or 70, plasma protein fraction or fresh frozen plasma.

6-Drug therapy:

a. *Analgesics:* 10-15 mg morphine IV if there is pain, tissue damage or irritability.

b. *Corticosteroids:* Hydrocortisone 1gm or dexamethazone
20 mg slowly IV. Its mode of action is controversial; it may decrease peripheral resistance and potentiate cardiac response so it improves tissue perfusion.

c. *Sodium bicarbonate:* 100 mEq IV if metabolic acidosis is demonstrated.

d. *Vasopressors:* to increase the blood pressure so maintain renal perfusion.

- Dopamine : 2.5m g/ kg/ minute IV is the drug of choice.
- ß -adrenergic stimulant: isoprenaline 1mg in 500 ml 5% glucose slowly IV infusion.

7- Monitoring:

a- Central venous pressure (CVP) : normal 10-12 cm water.

b- Pulse rate.

c- Blood pressure.

d- Urine output: normal 60 ml/hour.

e- pulmonary capillary wedge pressure: Normal 6-18 Torr.

f- Clinical improvement in the : pallor, cyanosis, air hunger, sweating and consciousness.

Complications:

1. Acute renal failure.
2. Pituitary necrosis (Sheehan's syndrome).
3. Disseminated intravascular coagulation.

ENDOTOXIC (SEPTIC OR BACTERAEMIC) SHOCK

Obstetric Causes:

1- Septic abortion.

2- Prolonged rupture of membranes.

3- Manipulations and instrumentations.

4- Trauma.

5- Retained placental tissues.

6- Puerperal sepsis.

7- Severe acute pyelonephritis.

Causative Organisms:

- *Gram-negative bacilli:* E.coli, proteus, pseudomonas and bacteroids. The endotoxin is a phospho-lipo-polysacharide released by lysis of its cell envelope.

- A similar picture is produced from *exotoxin* of ß - haemolytic streptococci, anaerobic streptococci and clostridia.

Pathology:

Release of endotoxin results in increased lysosomal permeability and cytotoxicity. The sequence of events thereafter may occur in few minutes and include :

Stimulation of the adrenal medulla and sympathetic nervous system → constriction of arterioles and venules → local acidosis → arteriolar dilatation but with continuing constriction of the venules → capillary pooling of blood → haemorrhagic engorgement of bowel, liver , kidneys and lungs.

There is associated extensive disseminated intravascular coagulation due to sudden massive plasmin generation with which the antiplasmins cannot cope.

Clinical Features:

Endotoxic shock passes with 2 main stages:

(I) Reversible stage:

which has 2 phases:

(A) Early (warm) phase : there are;

- hypotension,
- tachycardia,
- pyrexia,
- rigors,
- flushed skin,
- patient is alert,
- leucocytosis develops within hours.

(B) Late (cold) phase: there are;

- cold and clammy skin,
- mottled cyanosis,
- purpura,
- jaundice,
- progressive mental confusion,
- coma.

(II) Irreversible stage:

Prolonged cellular hypoxia leads to :

- metabolic acidosis,
- acute renal failure,
- cardiac failure,
- pulmonary oedema,
- adrenal failure and ultimately death.

Differential Diagnosis:

1- Amniotic fluid embolism.

2- Pulmonary embolism.

3- Pulmonary aspiration syndrome.

4- Myocardial infarction.

5- Incompatible blood transfusion.

Management:

It includes 3 major lines of treatment:

(I) Restoration of circulatory function and oxygenation:

1. Replacement of blood loss: by whole blood, if not available start with colloids or crystalloids. The CVP measurement is essential to guard against circulatory overload.

2. Corticosteroids: as;

- Hydrocortisone 1gm IV / 6 hours or,

- Dexamethasone 20 mg initially followed by 200 mg/day by IV infusion.

3. β -adrenergric stimulants: as isoprenaline cause arteriolar dilatation, increase heart rate and stroke volume improving tissue perfusion. Blood volume must be normal prior to its administration.

4. Oxygen : if respiratory function is impaired.

5. Aminophylline: improves respiratory function by alleviating bronchospasm.

(II) Eradication of infection:

(1) Antibiotic therapy:

- Swabs for culture and sensitivity are taken first.

- Antibiotic therapy is starting immediately till the result of culture and given by IV route. The therapy should cover the wide range of organisms:

	Antibiotic	***Acts upon***	***Dose***
Regimen 1	Ampicillin or Cephalosporines	Aerobic gram +ve organisms and gram -ve cocci.	500-1000 mg/6 hours.
	Gentamycin	Aerobic gram -ve bacilli.	80 mg/ 8 hours. (not to be given in the solutions).
	Metronidazole	Anaerobic.	500 mg/ 8 hours.
Regimen 2	Clindamycin	Aerobic gram +ve organisms + gram -ve cocci + Anaerobic organisms.	600 mg/ 6 hours.

	Gentamycin	Aerobic gram-ve bacilli.	80 mg/ 8 hours.

(2) Surgical treatment:

is indicated when there is retained infected tissues as in septic abortion. It should be removed as soon as antibiotic therapy and resuscitative measures have been started by:

- suction evacuation ,

- digital evacuation,or

- hysterectomy in advanced infection with a gangrenous (clostridium welchii) or traumatised uterus.

(III) Correction of fluid and electrolyte deficits.

(IV) Disseminated intravascular coagulation:

Heparin therapy (see DIC) except if there is active bleeding where the condition is best treated by fresh blood transfusion.

AMNIOTIC FLUID EMBOLISM

Definition:

Passage of amniotic fluid into the maternal circulation leads to sudden collapse during labour but can only be confirmed at necropsy.

Pathology:

- The condition is more common with strong uterine contraction, whether spontaneous or induced , occurs after rupture of membranes particularly when there are open maternal blood vessels in the placental site or in cervical lacerations.

- The embolism passes to the pulmonary vessels leads to :

  - *sudden death,*

  - *shock,* or

  - *Later death* due to DIC and postpartum haemorrhage.

Clinical Picture:

- The onset is acute with sudden collapse, cyanosis and severe dyspnoea.

- This is soon followed by twitching, convulsions and right side heart failure, with tachycardia, pulmonary oedema and blood stained frothy sputum.

- If death does not occur in this stage, DIC develops within 1 hour leading to generalised bleeding.

Investigations:

1. *ECG:* evidence of right side heart failure.
2. *X-ray:* non - specific mottled chest appearance.
3. *Lung scan* : with technetium- 99m albumin shows perfusion defect.
4. *Laboratory tests:* evidence of DIC.

Differential Diagnosis:

1. Acute pulmonary oedema.
2. Pulmonary aspiration (Mendelson’s) syndrome.

3. Other coagulation defects.

Treatment:

Urgent treatment includes:

1. *Oxygen:* endotracheal intubation and positive pressure respiration is usually indicated as the patient is often unconscious.
2. *Aminophylline:* 0.5 gm slowly IV to reduce bronchospasm.
3. *Isoprenaline :*0.1gm IV to improve pulmonary blood flow and cardiac activity.
4. *Digoxin and atropine:* if central venous pressure is raised and pulmonary secretions are excessive.
5. *Hydrocortisone :* 1 gm IV followed by slow IV infusion causes vasodilatation and improves tissue perfusion.
6. *Bicarbonate solution:* if there is respiratory acidosis.
7. *Low molecular weight dextran:* reduces platelets aggregation in vital organs.
8. *Heparin:* for treatment of DIC if there is no active bleeding.
9. *Vaginal delivery:* is safer than C.S if the baby is not yet delivered.

CARDIAC ARREST

Definition:

Sudden circulatory collapse caused by sudden failure of the heart to pump the blood adequately.

Types:

1. *Complete cessation of mechanical and electrical activity*: asystole.
2. *Rapid ineffective activity:* ventricular tachycardia and ventricular fibrillation.
3. *Slow ineffective activity*: sinus bradycardia and complete heart block.

In practice, asystole and ventricular fibrillation account for almost all cases of cardiac arrest.

Causes:

Any cause of obstetric shock can end by cardiac arrest, the commonest of which are:

1. Severe haemorrhage.
2. Hypoxia due to eclampsia or anaesthesia.
3. Mendelson's syndrome: gastric aspiration with pneumonitis.
4. Embolism of whatever the nature.

Diagnosis:

1- Sudden collapse.

2- Loss of consciousness.

3- Absence of pulse including the carotid and femoral pulse.

4- Apnoea and cyanosis of variable degree.

5- Fixed dilatation of the pupils.

N.B. Attempts to auscultate the heart, to record blood pressure or ECG are only time wasting procedures unless the patient is already being monitored during surgery.

Management :

- Urgent pairs of hands are needed to save the patient's life.

- Put the patient in the dorsal position onto a firm surface, even the floor.

- A single firm thump with the closed fist over the lower sternum may be sufficient to correct the condition otherwise,

- The following ABC steps are carried out:

A- Airway:

1. *Clear it :* from vomitus, blood, teeth, foreign body ...etc.
2. *Maintain it :* - Pull mandible and tongue forward.

   - Insert an airway.

   - Endotracheal intubation as soon as possible.

B- Breathing:

One of the following is used:

1. Mouth-to- mouth artificial respiration.
2. Mask and ambubag with 100 % oxygen.
3. Cuffed endotracheal tube with intermittent positive pressure of 100% oxygen.

C- Cardiac massage:

- Using the heel of one hand, with the other on top, and with the arms extended, apply pressure to the lower sternum using the full body weight.

- This should provide a palpable femoral or carotid pulse.

- The optimal compressions is 60 / minute in a ratio of 4:1 to ventillation.

D- Drip and Drugs:

1. *Sodium bicarbonate 8.4% solution:* to counteract metabolic acidosis. Give 100 ml initially and a further 10 ml for each subsequent minute of inadequate circulation.
2. *Cardiac stimulants (inotropic drugs):* can be given IV or intracardiac e.g.

    - Adrenaline 0.5-1.0 mg.

    - Atropine 0.6 mg.

    - Isoprenaline 4 mg in 500 ml solution.

    - Dopamine 500 mg in 500 ml solution (1-3 μ g/ kg/ min).

    - Calcium chloride 10% solution.

E- Electrocardiogram:

to assess the condition and response to the therapy.

F- Fibrillation treatment

Direct current (DC) defibrillator is used.

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Obstetrics Simplified

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The Puerperium

NORMAL PUERPERIUM

Definition:

It is the 6-8 weeks following delivery during which the anatomical and physiological changes of pregnancy regress.

Physiological changes:

(A) General changes:

1- Temperature: normal but,

- A reactionary rise may occur after difficult labour. It does not exceed 38ºC and drops within 24 hours.

- A slight rise may occur at the 3rd day due to engorgement of the breasts.

2- Pulse: normal but may rise if there is haemorrhage or infection.

3- After pains: Painful uterine contractions occur in early puerperium increasing with suckling due to oxytocin release. If intolerable use analgesics.

4- Breasts:

- Colostrum is secreted in the first 3 days.

- With the establishment of milk secretion at the 3rd to 4th day, the breasts become engorged, larger, painful,tender while suckling relieves the discomfort.

- Suckling stimulates prolactin secretion, which causes milk production and oxytocin release, which stimulates milk ejection.

5- Urine : Diuresis by the 2nd - 4th day, lasting for 3-4 days.

Retention of urine may occur due to:

a- Atony of the bladder.

b- Laxity of the abdomen.

c- Recumbancy.

d- Reflex inhibition if the perineum is sutured.

e- Compression of the urethra by vulval oedema or haematoma

6- Bowel : Tendency to constipation due to;

a- Atony of the intestine.

b- Laxity of abdomen and perineum.

c- Anorexia.

d- Loss of fluids.

7- Loss of weight: due to

a- Evacuation of the uterine contents.

b- More fluid loss in urine and sweat.

8- Blood :

- Increased coagulability of the blood continues during the first two weeks in spite of significant decrease in a number of coagulation factors.

- Haemoglobin concentration : tends to fall in the first 2-3 days.

9- Menstruation: is regained by the 6th - 8th weeks after delivery but in lactating women a variable period of amenorrhoea may be present.

(B) Local changes:

(I) The uterus is involuted as follow:

1. *Structure:* i) Autolysis of the excess muscle fibres. ii) The blood vessels are obliterated by thrombosis and become degenerated while its remnants are transformed into elastic tissues iii) The decidua, except the basal layer, is separated.

2. *Weight:* After delivery the uterine weight is 1000 gm . By the end of 6 weeks it is 50 gm.

3. *Size* : After delivery the length of the uterus is 20 cm and felt at the level of umbilicus. After one week it is midway between umbilicus and symphysis pubis. After 2 weeks it is at the level of symphysis. By the end of the 6th week it is 7.5 cm long.

4. *Uterine ligaments:* are involuted and subinvolution predisposes to prolapse and retroversion.

(II) Lochia:

- It is the genital tract discharge in the first 15 days of peurperium.

- It is alkaline and composed of blood, decidual fragments, cervical mucus, vaginal transudate and bacteria.

a. Lochia rubra (red): consists mainly of blood and decidua. It lasts for 5 days.

b. Lochia serosa (pale): due to relative decrease in RBCs and predominance of leukocytes. It lasts for 5 days.

c.Lochia alba (white): consists mainly of leukocytes and mucus. It lasts for 5 days.

- Persistence of red lochia means subinvolution.

- Offensive lochia means infection.

- In severe infection with septicaemia, lochia is scanty and not offensive.

(III) Cervix: is closed by the end of the first week.

(IV) Vagina : Vaginal rugae appear in the 3rd week.

(V) Vulva : Its gaping disappears by the end of puerperium.

(VI) Perineum: regains its tone by the end of puerperium while persistence of its laxity predisposes to prolapse.

Management of The Puerperium:

(1) Rest and exercises:

- Rest in bed for 2 days is advised after uncomplicated vaginal delivery and for a longer few days in complicated or operative delivery.

- Semisitting position encourage drainage of lochia with 2 hours in prone position daily to encourage anteversion of the uterus.

- Movement in and outside the bed and breathing exercises are advised during this period to minimise the risk of deep venous thrombosis (DVT).

- Pelvic floor exercise is started in the 3rd day if there is no perineal wound by alternating contraction and relaxation of the pelvic floor muscles. Abdominal exercises are done later on. These exercises have the following advantages:

i) Diminish respiratory and vascular complications.

ii) Minimise future prolapse and stress incontinence.

iii) Give a better cosmetic appearance later on.

(2) Local asepsis:

- The vulva and perineum are washed with antiseptic lotion from before backwards after each micturition and defecation and a sterile vulval pad is applied.

- If there is perineal stitches add local antibiotic.

(3) Diet:

rich in proteins, vitamins, minerals and fluids.

(4) Care of the bowel:

Constipation is prevented by plenty of green vegetables and fruits, sufficient fluids and local glycerine suppositories if needed.

(5) Care of the bladder:

Patient is encourage to micturate frequently. If there is retention a catheter is applied under aseptic conditions.

(6) Care of the breasts:

- Wash the nipple and areola with warm water and soap before each feed.

- Breast disorders in the puerperium : see later.

(7) Observations:

1. *Mother :* Pulse, temperature, breasts, lochia and involution of the uterus.
2. *Foetus :* jaundice and umbilical stump.

POST -NATAL EXAMINATION

Time:

At the end of the 6th week postpartum, but earlier in complicated pregnancy or delivery.

Aims:

1. Detection or follow up of complications of pregnancy or labour.
2. To be sure of involution of the genital tract.
3. Choice of the method of contraception.

A- History:

Ask about:

1. Vaginal bleeding or discharge.
2. Breast disorders.
3. Urinary or gastrointestinal symptoms.

B- General examination:

for – pulse, – temperature, – blood pressure, – breasts.

C- Abdominal examination:

- to ensure involution of the uterus (not felt abdominally).

- for detection of abdominal wall tone.

D- Local examination:

1. *Vulva and perineum:* for healing of the wound if present, gaping of the introitus, bleeding or discharge, stress incontinence and tone of the pelvic floor.
2. *Vagina :* for prolapse or vaginitis.
3. *Cervix* : for ectopy, lacerations or cervicits.
4. *Uterus:* for size, position, tenderness , consistency and mobility.
5. *Adnexae:* for salpingitis, parametritis or adnexael swellings.

Gynaecological Problems May Be Present:

1. **Perineal tear:** If not well repaired within 24 hours of delivery the tissues become oedematous, infected and friable that stitches will cut through the tissues, so repair is delayed 3-6 months.
2. **Vesico - vaginal fistula:** A Foley's catheter is applied for 14 days during which antibiotics are given. The fistula may heal or become smaller and needs an operation after 3-6 months.
3. **Prolapse or stress incontinence**: Conservative treatment as kegel exercise and vaginal cones (see GYNAECOLOGY SIMPLIFIED) is advised , if not responding surgical treatment is carried out after 3-6 months.

4. **Cervical ectopy:** Many of these are due to hormonal effect and usually regress spontaneously within 3 months. If persists and is symptomatizing it is cauterised.

5. **Retroversion of the uterus:** If it was present before pregnancy or not associated with symptoms as subinvolution it needs no treatment. Otherwise, manual correction is done and Hodge Pessary is applied for 4-6 weeks.

6. **Subinvolution of the uterus:** The uterus did not regress to its pre-pregnancy size by the end of the puerperium. This may be due to :

a- Retained placental fragments.

b- Infection.

c- Retroversion causing congestion

d- Myomas.

e- Antepartum overdistension e.g. multiple pregnancy.

f- Non-lactating women. g- Bad general condition.

Treatment:

1- Ergot preparations.

2- Antibiotics.

3- Uterine curettage: to remove retained fragments if there is considerable bleeding.

PUERPERAL PYREXIA

Definition:

It is a rise of temperature reaching 38ºC or more and lasting for 24 hours or more during the first 3 weeks of puerperium.

Causes:

1. Puerperal infection (sepsis).
2. Urinary tract infection.
3. Breast infection.
4. Respiratory infection.
5. Intercurrent febrile illness.
6. Complicated pelvic tumours as infected ovarian cyst or red degeneration of myoma.

Any case of puerperal pyrexia should be considered puerperal infection (sepsis) until proved otherwise.

PUERPERAL SEPSIS

Definition:

It is a genital tract infection resulted from bacterial invasion during or after labour.

Causative Organisms:

Aerobic		Anaerobic	
Gram+ve	**Gram-ve**	**Gram +ve**	**Gram -ve**
-Haemolytic streptococcus group A (severe cases).	-E.coli. -Proteus.	-Anaerobic streptococci (the commonest)	- Cl.Welchii. - Bacteroids.
-Non-haemolytic streptococci.	-Pseudomonas.		
-Staphylococcus aureus.	- Klebsiella.		
- Gonococci.			

Mode of Infection:

(I) Endogenous origin: It may be present in the genital tract as anaerobic streptococci which are normal non-pathogenic commensals that become pathogenic in presence of devitalised tissues.

- It may be outside the genital tract as in the gastrointestinal tract, perineum or in a distant part as tonsils where it is transmitted by blood stream.

(II) Exogenous origin: from infected attendants, dust, instruments...etc.

Predisposing Factors:

1. *Bad general condition*: as anaemia, diabetes and debilitating diseases.
2. *Large number of bacteria:* introduced into the genital tract due to improper asepsis.
3. *Intrapartum factors*:

   - Premature rupture of membranes. - Prolonged labour. - Instrumental delivery.

- Lacerations. - Marked blood loss. - Retained fragments.

Pathology and Clinical Picture:

(A) Primary sites:

(I) Uterus:

	Localised or Putrid	***Generalised or Septic***
Type of infection	is mild.	is severe.
Organism virulence	is low as anaerobic streptococci.	Virulent organism as haemolytic streptococci.
Resistance of the patient	is good	is low.
Uterus	Subinvoluted and soft.	Well involuted.
Uterine cavity	Offensive retained necrotic parts.	Empty but lined with purulent membrane.
Lochia	is excessive and offensive.	Scanty and not offensive.
Microscopically	Well defined zone of leukocytes next to the endometrium preventing spread of infection.	Absent or deficient leucocytic zone favouring spread of infection.
Clinical picture	4 days after delivery there is fever, tachycardia, rigors and malaise.	1-2 days after delivery with more severe manifestations.

(II) Infected lacerations:

- The wound edges are red, oedematous and extruding greenish or yellowish offensive pus.

- There is mild fever with local pain and tenderness.

(B) Secondary sites:

- Extension to the secondary sites occurs usually in the 2nd week of puerperium and rarely before that .

- Extension occurs by direct ,lymphatic or vascular spread.

- Predisposing factors for secondary extension:

i) Virulent organisms. ii) Low resistance of the patient.

iii) Delayed effective treatment of the primary infection.

(I) Parametritis and pelvic cellulitis:

Manifestations develop about the 10th day in the form of:

i) mild fever and tachycardia,

ii) pain and tenderness in both iliac fossae,

iii) firm, tender mass felt by P/V in one adnexa or both pushing the uterus to the opposite side or restricting its mobility.

iv) if parametric abscess is formed the mass becomes fluctuating and the fever is hectic.

(II) Salpingo-ophritis:

Manifestations:

i) Fever, rigors and vomiting.

ii) Lower abdominal pain, tenderness and rigidity.

iii) Tender lateral vaginal fornices with marked pain on moving the cervix from side to side.

(III) Peritonitis:

a- Localised (pelvic) peritonitis:

i) Fever, tachycardia and vomiting.

ii) Lower abdominal pain, tenderness and rigidity.

iii) If pelvic abscess is formed a tender fluctuating bogginess of the Douglas pouch is felt by P/V. Rectal symptoms as tenesmus and diarrhoea may develop.

b- Generalised peritonitis:

- usually occurs after caesarean section, unrecognised uterine rupture, intestinal injury or if localised peritonitis had been neglected.

- The classic signs of pain, tenderness and rigidity may be absent due to previous distension of the abdomen by pregnancy but;

- The patient is clearly ill, toxic and dehydrated.

- There is high fever, rapid pulse, vomiting and absent intestinal sounds due to paralytic ileus.

(IV) Thrombophlebitis:

- Extension of infection to the pelvic veins leads to high fever, rapid pulse and deep seated pelvic pain.

- If extension progresses to the femoral vein, pain and tenderness extends to the leg which becomes swollen, oedematous and hot.

(V) Septicaemia:

- High fever with severe tachycardia up to 140/min, rigors,severe headache, jaundice due to haemolysis in cl. welchii infection , hypotension and loss of consciousness.

- In virulent organisms manifestations may develop within 48-72 hours of delivery .

- Local abdominal and pelvic manifestations may be undetected.

Diagnosis of the Cause of Puerperal Pyrexia:

(A) History :

1. Pre-existing infection before labour as chest or urinary tract infection.
2. Symptoms of infection else where as cough, dysuria, breast pain or sore throat.
3. Complicated labour as PROM, instrumental or prolonged delivery.
4. The onset of manifestations in relation to labour.

(B) General examination:

1. Temperature, pulse ,blood pressure, level of consciousness.
2. Skin eruption or jaundice (Cl. welchii infection).
3. Tonsils.
4. Breasts, chest and heart.
5. Lower limbs for signs of thrombophlebitis.

(C) Abdominal examination:

1- Loin tenderness

2- Abdominal rigidity and tenderness.

3- Uterine size, tenderness and abdominal masses related to the uterus.

(D) Local examination:

1. The perineum for infected episiotomy or lacerations.
2. Lochia for amount, colour and odour.
3. Bimanual examination for :
    - uterine size, consistency, tenderness, position and mobility.
    - cervix: closed or opened, contents felt through it or lacerations.
    - Adnexae : mass.
    - Douglas pouch: bogginess.
4. Speculum examination : to visualise the cervix and vagina.

(E) Investigations:

1. *Swab and culture*: from the cervix and upper vagina for aerobic and anaerobic cultures.
2. *Blood culture:* taken at peak of temperature in case of septicaemia.
3. *Blood picture:* haemoglobin and leukocytes.
4. *Urine analysis and culture:* midstream or catheter specimen.

Prevention of Puerperal Sepsis:

(A) Antenatal:

1. Proper diet , vitamins and minerals.
2. Anaemia and diabetes should be treated.

3. Local or distant infection should be treated.
4. Avoid sexual intercourse late in pregnancy.

(B) Intranatal:

1. Strict aseptic and antiseptic measures for the patient, attendants and instruments.
2. Minimise vaginal examinations.
3. Avoid bleeding and excessive blood loss should be replaced.
4. Lacerations should be properly sutured immediately.
5. Prophylactic antibiotics in PROM and prolonged or instrumental delivery.

(C) Postnatal:

1. Maintenance of aseptic precautions.
2. Care of the perineal or abdominal wounds.
3. Minimise visitors and keep whom are infected away.
4. Early isolation of cases of puerperal sepsis.

Treatment of Puerperal Sepsis:

(A) General treatment:

1. *Isolation* in a separate room or fever hospital.
2. *Diet:* light diet rich in vitamins and minerals with plenty of fluids.
3. *Supportive treatment:* restoration of fluid and electrolyte balance, correction of anaemia and tonics.

4. *Symptomatic treatment:*

- Analgesics,

- antipyretics and cold fomentations.

5. *Observations* : pulse, temperature, blood pressure, vaginal bleeding, lochia , manifestations of DVT.

(B) Antibiotic therapy:

1. Broad spectrum antibiotic (ampicillin or cephalosporin) + gentamycin + metronidazole or

2. Clindamycin + gentamycin.

One of these regimen is started till the result of culture and sensitivity.

Antitoxin serum is given in Cl. welchii infection.

(C) Promotion of drainage:

1. Fowler's or semisitting position.

2. Removal of stitches if there is purulent discharge from a wound.

3. Ergot preparations: help drainage of lochia.

4. Incision and drainage of the abscess:

- In pelvic abscess → posterior colpotomy + drain.

- In parametric abscess → incision + drain at the pointing point (usually above the inguinal ligament).

5. Manual removal of retained parts: if felt during P/V examination.

(D) Treatment of complicated cases:

(1) General peritonitis:

- No oral feeding.
- Ryle tube and suction.
- Intravenous fluids.
- Parentral antibiotics.

(2) Thrombophlebitis:

- Antibiotics.
- Anticoagulant therapy (see DIC).
- Immobilisation and elastic stocking.

03.12.02

Obstetrics Simplified

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Breast Disorders in Puerperium

Physiology of Lactation:

- The sudden fall in oestrogen level after delivery is associated with reduction in the secretion of prolactin inhibiting factor from the hypothalamus and release of prolactin from the anterior pituitary.

- Prolactin is responsible for milk formation.

- Oxytocin released from the posterior pituitary due to suckling is responsible for milk ejection.

(I) Breast Engorgement:

Usually occurs in the 3rd day after delivery when secretion of milk begins.

Clinical picture:

- Breasts are overdistended with visible dilated veins.

- Breasts are painful and tender.

- Pyrexia may develop.

Treatment:

1. *Breast evacuation:* in early stage baby suckling can be sufficient, but later on congestion press on the ducts preventing flow of milk so an electric breast pump is needed.
2. *Cold fomentations or one-two doses of bromocriptine (2.5 mg):* may occasionally needed and there is no risk of suppressing lactation.

3. *Analgesics -antipyretics.*

(II) Deficient Lactation:

Causes:

1- Constitutional.

2- Bad general condition and malnutrition.

3- Infrequent or irregular suckling.

4- Sheehan's syndrome.

Treatment:

1. Regular breast feeding.

2. Good diet and plenty of fluids.

(III) Cracked Nipples:

Causes:

1. Lack of cleanness and dryness of the nipples.

2. Vigorous suckling of a hungry baby in deficient lactating breasts.

3. Leaving the baby too long at the breast.

4. Repeated taking and leaving the nipple by the baby to breathe if its nose is obstructed by the breast.

5. Monilial infection.

Treatment:

1. *Rest:* the baby should not put on the affected breast till healing occurs while it is emptied manually. Gradual going back to the breast is recommended to prevent recurrence.

2. *Hot fomentations.*

3. *Panthenol ointment or flavine in liquid paraffin*: applied locally.

(IV) Acute Mastitis:

Causative organism:

Staphylococcus aureus which may reach the breast from infected baby.

Clinical picture:

1. Breast is painful, tender, red , tense and hot.
2. Axillary lymph nodes are enlarged.
3. High fever may reach 40.5ºC.

Treatment:

Proper treatment is indicated otherwise breast abscess will develop.

1. *Stop lactation* : from the affected breast and breast is emptied manually or by an electric pump. When the acute phase is over breast feeding can be resumed.
2. *Support the breast:* over a pad of cotton wall.
3. *Antibiotic therapy:* A sample of milk is sent for culture and sensitivity then antibiotic started.Flucloxacillin 500 mg/6 hours is suitable.
4. *Analgesics - antipyretics.*

(V) Breast Abscess:

Clinical picture:

1. A segment of the breast becomes painful and tender and fluctuation can be detected.
2. The skin over it is oedematous.
3. Fever and enlarged axillary lymph nodes.

Treatment:

As soon as an abscess is formed it should be incised and drained under general anaesthesia. Do not wait for fluctuation as by that time breast disorganisation would occur.

(VI) Galactocele:

- It is a retention cyst of a large mammary duct due to its obstruction.

- If it is persistent it is excised or aspirated.

(VII) Inhibition of Lactation:

Indications:

(A) Maternal :

1- Decompensated heart failure.

2- Active pulmonary tuberculosis.

3- Acquired immune deficiency syndrome (AIDS).

4- Acute illness as pneumonia.

(B) Foetal:

1- Cleft palate.

2- Marked hare lip.

3- Marked prematurity.

4- Death of the infant.

Methods:

1- Cold fomentations.

2- Restriction of fluids and diuretics.

3- Tight breast binders to prevent accumulation of milk.

4- Dopamine agonists: starting as early as possible for 14 days;

- Bromocriptine (Parlodel) 2.5mg twice daily.

- Lysuride (Dopergin) 0.2 mg twice daily.

5- Oestrogens: alone, with androgen or in contraceptive pills was used but they have the following disadvantages:

- increase the risk of thrombo-embolic complications,

- withdrawal bleeding usually occurs,

- lactation may return again and

- not effective if not started immediately after delivery.

03.12.02

Obstetrics Simplified

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The Foetus

THE FOETAL PHYSIOLOGY

THE FOETAL CIRCULATION

The foetal circulation differs mainly from the adult one by the presence of 3 major vascular shunts:

1. *Ductus venosus* : between the umbilical vein and inferior vena cava.
2. *Foramen ovale:* between the right and left atrium.
3. *Ductus arteriosus:* between the pulmonary artery and descending aorta.

The rationale of these shunts is to divert the oxygenated blood from the less functioning organs as lungs, liver, kidney and intestine as placenta carries their functions, to the brain, heart and other parts of the body.

The circulation is as follow:

- Oxygen and nutrients are carried from the placenta to the foetus in a single large umbilical vein.

- The oxygen saturation in the blood of the *umbilical vein* is reduced from 95% in the maternal arterial blood to 80% due to its consumption by the placental metabolism.

- As the umbilical vein entering the foetal body most of its oxygenated blood passes to the *inferior vena cava (IVC)* through the *ductus venosus*. While the remainder communicates the portal vein to supply the liver.

- The liver drains into the IVC through the hepatic veins.

- The blood in the IVC is a mixture of the oxygenated blood from the umbilical vein and the desaturated blood from the lower limbs and abdominal organs including the liver so its O_2 saturation is reduced to 65% when it enters the *right atrium.*

- Most of the blood is directed to the *left atrium* through the *foramen ovale* and from it to the *left ventricle and descending aorta.*

- The remainder of the blood in the right atrium passes with that coming from the head and upper limbs via the superior vena cava to the *right ventricle* $\rightarrow$ *pulmonary artery* where most of it passes also to the aorta through the *ductus arteriosus* because of the high resistance of the unexpanded foetal lungs.

- The blood passes finally from the aorta to the *hypogastric arteries* $\rightarrow$ *umbilical arteries* $\rightarrow$ *placenta.*

Changes At Birth:

- With clamping of the umbilical cord, the pressure in the ductus venosus drops leading to its closure to form the *ligamentum venosum.*

- The initiation of respiration creates a negative intrathoracic pressure which is transmitted to the right ventricle and atrium, while the pressure in the left atrium is increased due to returning blood from the lungs this leads to *closure of the foramen ovale.*

- With diversion of most of the blood into the lungs, no further blood passes through the *ductus arteriosus* so it is *closed*.

Gradual Changes:

- The umbilical vein is obliterated to form the *ligamentum teres* in the falciform ligament of the liver.

- The hypogastric arteries are obliterated to form the *hypogastric ligaments.*

THE FOETAL BLOOD

- *Site of haematopoiesis* (formation of blood cells) : first in the yolk sac then foetal liver and lastly in the bone marrow.

- *Erythrocytes :* are all nucleated but at term only about 5-10% of them are nucleated. The number is 6 millions/ mm^3.

- *Haemoglobin:*

  - Concentration at term is 15-20 gm/dl.
  - 10-45% of it is adult haemoglobin (HbA), the remainder is foetal haemoglobin (HbF).At age of one year , less than 2% is HbF.
  - HbF has more affinity to oxygen than HbA as it contains less 2,3 diphosphoglycerate (2,3 DPG) than that in HbA. 2,3 DPG competes for oxygen binding sites in the haemoglobin molecule , so the less 2,3 DPG contents the more affinity to oxygen.

- *Serum iron*: At term it is 150 µ g/dl.

- *Leucocytic count:* At term it is 2-3 times the adult one.

- *The Rhesus factor*: can be detected in the foetal blood from the 10th week.

- *Anti-A and Anti-B:* appear in the foetal blood at about 4-8 months after birth. Those present at birth are acquired form the maternal blood and usually disappear 2 weeks after birth.

RESPIRATORY SYSTEM

- Foetal respiratory movement can be detected by ultrasound as early as 11 weeks as a chest wall movement. From the beginning of the 4th month, this respiratory movement is sufficient to move the amniotic fluid in and out the respiratory tract.

- Pulmonary surfactant :

- It is formed by type II pneumocytes that line the alveoli.
- This starts at the 20th week and level increases gradually up to term.
- Detection of lecithin/ sphingomyelin (L/S) ratio of 2 or more or detection of phosphatidyl glycerol in the amniotic fluid indicates lung maturity.
- Pulmonary surfactant facilitates distension of the alveoli thus preventing the development of neonatal respiratory distress syndrome.

- Initiation of respiration:

During intrauterine life, the foetal respiratory centre in the medulla is inhibited by cortical impulses. Anoxia at birth affects the cortical centres leads to release of the respiratory centre from its inhibition and becomes sensitive to cutaneous stimuli, muscle stretch and biochemical changes in foetal blood as CO_2 concentration.

DIGESTIVE SYSTEM

(1) Intestine:

The small intestine undergoes peristalsis by the 11th week of gestation.

(2) Foetal swallowing:

Starting from the 2nd trimester, the foetus swallows and absorbs amniotic fluid.

(3) Meconium:

It consists of undigested debris from the swallowed amniotic fluid, secretions and desquamation from the gastrointestinal tract.

(4) Liver:

a. Glucuronidation: i.e. conjugation of free bilirubin is limited.

b. Glycogen: appears in low concentration in foetal liver during the 2nd trimester but near term it is 2-3 times those in adult liver.

c. Clotting factors: fibrinogen, factors II, VII, IX, XI and XII are produced by the liver in a low level at birth .

d. Vitamin K stores in the liver are deficient at birth as vitamin K is formed by bacteria in the intestine.

e. Gall bladder : It secretes bile from the 3rd month of gestation.

(5) Pancreas:

The foetal pancreas responds to hyperglycaemia by increasing insulin secretion. However, the alpha cells of pancreas do not respond to hypoglycaemia by secreting glucagon.

URINARY SYSTEM

- By the end of the first trimester, the kidneys can excrete urine which is hypotonic due to low electrolytes concentrations.

- The full foetal bladder, seen by ultrasound, indicates functioning kidneys.

CENTRAL NERVOUS SYSTEM

- At full term is partially developed and functioning.

- By the end of the first year of life the brain doubles its weight and triple it by the end of the fifth year.

ENDOCRINE GLANDS

Anterior pituitary:

Before the end of the 17th week, the foetal pituitary is able to synthesise and store all pituitary hormones.

Thyroid gland and parathyroid glands:

They are capable of function by the end of the first trimester.

Adrenal glands:

The outer (adult) zone of the foetal adrenal cortex produces cortisol.

The inner (foetal) zone produces dehydroepiandrosterone, the precursor of oestrogen.

The adrenal medulla produces small amount of catecholamines.

Gonads:

Testosterone is synthesised by the foetal testis from progesterone and pregnenolone by 10 weeks of gestation.

Oestrogen is synthesised by the foetal ovaries but it is not required for female phenotypic development.

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Obstetrics Simplified

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Assessment of Foetal Maturity and Wellbeing

(A) Antenatal :

1. Clinical assessment.
2. Ultrasonography.
3. Daily foetal movement count.
4. Antenatal cardiotocography.
5. Biophysical profile.
6. Amniotic fluid study.
7. Hormonal studies.
8. Vaginal smear.
9. Amnioscopy.
10. . Foetoscopy.
11. . Chorionic villus biopsy.
12. . Radiological methods.

(B) Intranatal:

1. Monitoring of the foetal heart rate.
2. Monitoring of the uterine contractions.
3. Foetal blood sampling.
4. The partogram.
5. Recent advances in intranatal monitoring.

CLINICAL ASSESSMENT

Clinical examination in each antenatal visit is the primary and main assessment of foetal wellbeing. This includes detection of :

- foetal heart sound,

- foetal size,

- fundal level

- amount of amniotic fluid.

ULTRASONOGRAPHY

(I) Real-time sonography:

It can be used for detection of :

1. Gestational age: by measurement of gestational sac, crown rump length, biparietal diameter or femur length.
2. Viability of the foetus: by foetal heart movement or foetal movement.
3. Foetal weight.
4. Amniotic fluid volume.
5. Foetal breathing movement. 6-Foetal activity.
7. Placenta: location , size and maturity.
8. Congenital anomalies.

(II) Doppler ultrasound:

Principle:

It depends upon the reflection of the ultrasound waves on the RBCs inside the blood vessels, so the blood velocity and flow through these vessels can be calculated.

Application:

1. Detection of foetal heart rate as early as 10-12 weeks.
2. Assessment of foetal cardiac function.
3. Measurement of blood flow in high risk cases as IUGR, post-term pregnancy and pregnancy induced hypertension.

DAILY FOETAL MOVEMENT COUNT (DFMC)

Procedure:

- The test is valid after 30 weeks of pregnancy.

- The mother counts the foetal movements she feels in 3 hours during the period of 12 hours e.g. from 9 a.m to 9 p.m , one hour at the beginning, one hour at the middle and one hour at the end of this period.

- The count is multiplied by 4 to get the foetal movements in 12 hours. If it is less than 10 movements, this indicates that the foetus may be at risk and non-stress test is indicated.

- *Count-to -ten Cardiff system* : The mother counts the foetal movements from 9 a.m till she reaches 10 movements. No further count is needed unless she did not count 10 movements in up to 12 hours.

- It was found that there is a reduction or cessation of the foetal movement 12-24 hours before stoppage of the heart " movement alarm signal".

Advantages:

1- Informative and non-invasive.

2- Pregnant woman can monitor herself.

3- No cost.

4- Accurate gestational age not required.

Drawbacks:

1. Awareness of the foetal movement is differ from a mother to another.
2. Cessation of foetal movement may occur due to intrauterine sleep.
3. Sedation of the foetus occurs if the mother is taking sedatives.
4. Sudden death of the foetus may occur without preceding slowing of the foetal movement as in abruptio placentae or it may be preceded by increased flurry movements.

ANTENATAL CARDIOTOCOGRAPHY

1. (I) Non-stress Test:

Indications:

1. Decrease foetal movement(<10/12 hours) or its cessation.
2. Intrauterine growth retardation especially with a major cause as pre-eclampsia.
3. Foetal danger as in antepartum haemorrhage.
4. Biochemical evidence of placental insufficiency.

Procedure:

- It is done starting from the 30 weeks of pregnancy.

- The electronic foetal monitor is used during pregnancy to record the pattern of foetal heart rate (FHR) and its response to the foetal movements reported by the mother by pressing a button in her hand.

- The test is carried out for 20 minutes. If foetal movement did not occur the test is extended for another 20 minutes during which the foetus is stimulated mechanically by the 1st pelvic grip or by acoustic stimulation using an artificial larynx placed against the maternal abdomen to " awaken the foetus" .

Results:

1. *Reactive test:* 2 or more foetal movements are accompanied by acceleration of FHR of 15 beats/ minute for at least 15 seconds' duration. Reactive test means that the foetus can survive for one week, so the test should be repeated weekly.

2. *Non -reactive test:* no FHR acceleration in response to foetal movements so contraction stress test is indicated.

(II) Contraction Stress Test (Oxytocin Challenge Test):

Procedure:

- It is done after 32 weeks of pregnancy.

- Two transducers are applied to the mother's abdomen; one to record the FHR pattern and the other to record the uterine activity.

- Three uterine contractions per 10 minutes are induced by one of the following :

i) IV oxytocin drip starting with 0.5mU/ minute and doubled gradually or

ii) tactile stimulation of the nipple.

Results:

1. *Positive test:* consistent and persistent late deceleration of FHR,so placental insufficiency is diagnosed and delivery by caesarean section is indicated.

2. *Negative test:* late deceleration does not occur with uterine contractions. It denotes that the foetus can survive safely for one week when it should be repeated.

Contraindications:

1- Threatened preterm labour.

2- Placenta praevia.

3- Rupture of membranes.

4- Previous classical C.S.

5- Multiple pregnancy.

BIOPHYSICAL PROFILE

Variable	Score 2	Score 0
Foetal breathing movements	Last for 30 seconds in 30 minutes of observation.	Less than 30 seconds in 30 minutes of observation.
Foetal movements	3 or more discrete body or limb movements within 30 minutes.	Less than 3 movements.
Foetal tone	One or more episodes of limb extension with return to flexion within 30 minutes.	Not observed.
Non-stress test	Reactive.	Non-reactive.
Amniotic fluid volume	One or more amniotic fluid pockets measures 1 cm or larger in 2 perpendicular planes.	Largest pocket measures less than 1 cm in 2 perpendicular planes.

Maximum score 10 Minimum score 0

- *A score of 8-10* is normal.
- *A score of 4-6* → deliver if lung is mature otherwise corticosteroids are given for 48 hours before delivery.
- *A score of < 4* is abnormal → evaluate for immediate delivery.

AMNIOTIC FLUID STUDY

Procedure of amniocentesis: (see later).

(I) Detection of Foetal Maturity:

(1) Lung maturity:

a- Lecithin/ sphingomyelin (L /S) ratio:

Before 34 weeks of gestation, lecithin and sphingomyelin are present in the amniotic fluid in equal concentrations (1/1) . At about 35 weeks , the lecithin concentration rises so the ratio of L/S is 2/1 or more with this ratio the risk of respiratory distress is minimal.

b- Phosphatidyl glycerol:

Its detection in the amniotic fluid indicates lung maturity. It is more reliable than L/S ratio as it is not detected in blood, meconium or vaginal discharge so the contamination of the sample with any of these does not confuse the interpretation .

C- Foam stability (shake) test:

- It is a rapid test for detection of foetal lung maturity.

- The test depends upon the ability of the surfactant in the amniotic fluid, when mixed with 95% ethanol in a glass tube and shacked well, to generate a ring of foam at the air-liquid interface that persists for at least 15 minutes.

(2) Kidney maturity:

Amniotic fluid creatinine level of 2 mg/ dl or more indicates foetal kidney maturity providing that maternal serum creatinine is normal .

(3) Liver maturity :

In absence of abnormal haemolysis, it is 0.01 -0.06 Δ OD at 34-36 weeks and continue to decrease up to term.

(4) Skin maturity:

The sebaceous glands of the foetus produce cells containing lipid so stained orange with Nile blue sulphate . If 50% or more of the cells in the amniotic fluid are of these type the foetus is mature.

(II) Detection of Foetal Abnormalities:

(1) Chromosomal abnormalities:

such as Down's syndrome (trisomy 21) can be diagnosed by examination of the desquamated foetal cells in the amniotic fluid.

Chromosomal study is indicated in the following conditions:

1. Pregnant women of 35 years old or more as the incidence of Down's syndrome is increased to reach 1:50 when the mother is 40 years old or more.
2. A previous chromosomally abnormal offspring.
3. Chromosomal abnormality in either parents.
4. Ultrasonographic markers of chromosomal anomalies as: cardiac defects , duodenal atresi, omphalocoele and hands or feet anomalies. Such markers are present in about 85% of foetuses with Down's syndrome.

(2) Neural tube defects:

as anencephaly and open spina bifida produce increased level of alpha fetoprotein into the amniotic fluid.

(3) Inborn metabolic errors:

1. Amino -acid metabolism : e.g. cystinuria and histidinaemia.
2. Carbohydrate metabolism: e.g. glactossaemia and glucose 6-phosphate dehydrogenase deficiency.
3. Lipid metabolism: e.g. Tay-saachs disease, Niemann-Pick disease and Gaucher's disease.
4. Miscellaneous disorders: e.g. congenital adrenal hyperplasia and congenital nephrotic syndrome.

(4) X- linked recessive disorders:

e.g. Duchenne muscular dystrophy and haemophilia.

(III) Rh-isoimmunization:

follow up of such patients by determination of the bilirubin level in the amniotic fluid.

HORMONAL STUDIES

(1) Oestriol :

- Maternal urinary and serum oestriol level is an important index for the integrity of the foetal adrenal and liver as well as the placenta.

- Urinary oestriol increases as pregnancy advances to reach about 35-40 mg/ 24 hours at full term. Progressive fall in urinary oestriol by serial measurement indicates that the foetus is jeopardous.

(2) Progesterone:

- Progesterone level can be detected in the serum and saliva of the pregnant mother and its end product pregnandiol in 24 hours collection of urine.

- It is of little practical value in comparison to urinary oestriol detection as the foetus is not sharing in its synthesis.

(3) Human Placental Lactogen(hPL):

- Although it was found that hPL falls before foetal death, it may be within normal range until after foetal death.

- A single value of < 4 μ g/ ml after 36 weeks is associated with 30% incidence of foetal distress.

(4) Human Chorionic Gonadotrophin (hCG):

It has no practical value as it can be detected up to few weeks after foetal death or delivery.

VAGINAL SMEAR

1. *In good pregnancy :* 95% of the cells in the smear are of the intermediate type (navicular cells) that have folded edges and present in clusters. About 5% of the cells are of the superficial type.
2. *In bad pregnancy:* e.g. progesterone deficiency and placental insufficiency more than 10% of the cells are of the superficial type.
3. *In inevitable abortion*: trophoblastic cells may appear in the smear.
4. *In intrauterine foetal death* : parabasal cells appear in the smear.
5. *In antepartum rupture of membranes:* foetal cells appear in the smear.
6. *At full term:* 10% of the cells are of superficial type, clumping and folding of the intermediate cells become less evident due to decreasing progesterone level.

AMNIOSCOPY

Inroduced through the cervix without rupturing the membranes. It may reveal meconium stained liquor indicating placental insufficiency.

FOETOSCOPY

Direct visualisation of the foetus by fibroptic telescope introduced through the abdominal and uterine walls.

Benefits:

(1) Direct visualisation of congenital anomalies : e.g.

– Polydactyly.

– Limb reductions.

– Cranial and facial anomalies.

– Neural tube defects.

– Exomphalos.

(2) Foetal blood sampling for prenatal diagnosis of :

– Haemoglobinopathies.

– Haemophilia.

– Galactosaemia.

– Duchenne muscular dystrophy.

– Genetic diagnosis.

(3) Foetal skin biopsy for diagnosis of e.g.

– Epidermolysis bullosa.

– Detailed cytogenetic pattern.

CHORIONIC VILLUS BIOPSY

Transcervical or transabdominal sampling of chorionic (placental) tissue from the interior of the first trimester pregnant uterus for prenatal diagnosis of:

- Chromosomal anomalies.

- X-linked anomalies.

- Metabolic inborn errors.

- Haemoglobinopathies.

- Transplacental infections as rubella, toxoplasma and cytomegalovirus.

RADIOLOGICAL METHODS

Amniography:

Injection of water soluble radiopaque material as urographin into the amniotic fluid to outline the foetus during X-ray radiography.

Foetography:

Injection of oil-soluble radiopaque material as Ethiodol into the amniotic fluid to outline the foetus as it has a strong affinity to vernix caseosa giving a clearer view in X-ray radiography.

Radiological methods are abandoned since the development of sonography as these have the following hazards:

1. Hazards of radiation and radiopaque materials.
2. Injury to the foetus.
3. Infection.
4. Less obtained data than sonography.

MONITORING OF FOETAL HEART RATE

(A)Intermittent Auscultation:

by: – Pinard's stethoscope, or – Doptone (sonocaid).

(B) Electronic Monitoring:

(I) Foetal electrocardiography (ECG):

1. *External:* by external electrodes applied to the mother's abdomen.
2. *Internal:* - by an internal electrode applied to the foetal scalp after rupture of the membranes while the cervix should be one or more cm dilated.

   - The electrode is held manually or fixed with clip or screw. A second electrode lies in contact with the vagina or cervix.

   - The signal is transmitted by wire to an amplifier or paper strip record.

(II) Phonocardiography:

A sensitive microphone amplifier is used to amplify the foetal heart sounds auscultated through the maternal abdominal wall.

(III) Doppler ultrasound cardiography:

- An external transducer applied to the mother's abdomen is used to detect the blood flow in the umbilical cord and great vessels .

- If it is associated with recording of uterine contractions, it is called cardiotocography (CTG).

Interpretation of FHR:

(A)Baseline FHR changes:The pattern between uterine contractions.

i- Baseline tachycardia:

- Mild: 160-180 beats/min. - Severe: > 180 beats / min.

ii- Baseline bradycardia:

- Mild : 100-120 beats/min. - Severe: <100 beats/ min.

iii- Loss of beat - to - beat variation:

Normally there is a change of 5-10 beats/ minute every minute in FHR. Absence of this beat -to - beat variation indicates foetal compromise.

(B) Periodic FHR changes: The pattern with uterine contractions.

i- Early deceleration:

- Decrease in the FHR with the onset of the uterine contraction and return to the baseline with the end of the contraction.

- This is usually due to compression of the foetal head with vagal stimulation.

ii- Late deceleration:

- Decrease in the FHR starts after a lag time from the onset of contraction and ends after a lag time from its end.

- It denotes uteroplacental insufficiency.

iii- Variable deceleration:

- of different intensity, pattern, time of onset and offset.

- It usually denotes cord compression.

MONITRORING OF UTERINE CONTRACTIONS

(TOCOGRAPHY)

(I) External (CTG):

An external transducer is applied to the mother's abdomen close to the fundus transmitting the strength, frequency and duration of uterine contractions onto a paper strip record.

(II) Internal

A fluid-filled catheter is introduced into the uterus after rupturing the membranes. The intrauterine pressure is transmitted to the catheter then to a transducer giving electrical signals expressing the exact pressure in mmHg.

FOETAL BLOOD SAMPLING

(I) Cordocentesis:

Transabdominal passage of a needle into the umbilical vessels for blood sampling or administration of therapy which may be hysteroscopic or ultrasonographic guided.

Indications:

(A) Diagnostic for:

1- Hereditary disorders.

2- Foetal hypoxia.

3- Genetic disorders and karyotyping: replaced by chorionic villus biopsy.

(B) Therapeutic for:

Foetal anaemia particularly due to Rh-isoimmunization.

(II) Foetal Scalp Blood Sampling:

After rupturing the membrane, a special guarded needle is introduced through an amnioscope to take a drop of scalp blood for detection of its pH.

- *pH of 7.25 or more* is normal,

- *pH of 7.20 or less* denotes acidosis,

values inbetween denotes pre-acidotic range and repeated estimation is indicated.

PARTOGRAM

see before.

RECENT ADVANCES IN INTRANATAL MONITORING

(1) Telemetry: radiotelemetry of the FHR and uterine contractions pattern to a 50-100 meters distant monitor.

(2) Computerised data analysis: Analysis of the various parameters including FHR and uterine activity. A computerised prognostic comment is also developed.

(3) Foetal electroencephalography (EEG).

(4) Continuous foetal tissue pH or PO_2 measurement.

(5) Maternal and foetal blood lactate measurement.

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Obstetrics Simplified

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Intrauterine Growth Retardation (IUGR)

(Dysmaturity or Small-for-Date)

Definition:

Infant's weight less than the tenth percentile of its gestational age.

Aetiology:

(I) Chromosomal and genetic disorders: e.g.

1- Down's syndrome.

2- Turner's syndrome.

3- Renal agenesis.

(II) Intrauterine infections: e.g.

1- Cytomegalovirus.

2- Rubella.

3- Syphilis.

(III) Maternal factors:

(a) Maternal malnutrition : due to,

1-Chronic infections.

2- Worm infestations.

3- Malabsorption syndrome.

4- Wasting diseases.

(b) Narcotic drug addiction.

(c) Cigarette smoking.

(d) Exposure to ionising radiation .

(e) Maternal anaemia.

(f) Rh -isoimmunization.

(IV) Uteroplacental vascular insufficiency : due to

1- Maternal hypertension.

2- Maternal diabetes.

3- Chronic renal disorders.

4- Partial abruptio placentae.

5- Multiple pregnancy.

6- Post-term pregnancy.

Types:

(I) Symmetric IUGR:

- Early stage of IUGR.

- The growth impairment involves all body structures including the internal organs.

- It is usually due to chromosomal, genetic or infective causes.

(II) Asymmetric IUGR:

- Late stage of IUGR.

- The growth impairment involves the body but not the brain tissues " *sparing effect*" , so the head is big in comparison to the body.

- It is usually due to chronic malnutrition and uteroplacental insufficiency.

Diagnosis:

(A) History:

of any of the aetiological factor.

(B) Examination may reveal:

1. Poor maternal weight gain or even weight loss during pregnancy.
2. Fundal level is lower than that corresponds to the period of amenorrhoea.
3. Oligohydramnios.
4. Underlying cause may be detected.
5. The neonate shows signs of dysmaturity as:

   - underweight,

   - dry wrinkled skin,

   - meconium stains the foetus, placenta umbilical cord as well as the amniotic fluid.

(C) Investigations:

(1) Ultrasonography : may show;

- Smaller biparietal diameter in serial measurements.

- Smaller abdominal circumference (measured at the level of bifurcation of the portal vein in the liver).

- Large head/abdominal circumference ratio in case of asymmetric IUGR.

- Congenital anomalies.

- Oligohydramnios.

- Doppler ultrasound: shows increased systolic / diastolic velocity ratio in the umbilical artery due to high resistance in the distal vascular bed in the placenta.

(2) Daily foetal movement count:

Less than 10 movements / 12 hours.

(3) Antenatal cardiotocography:

- Non -stress test : non -reactive.
- Stress test : late deceleration.

(4) Biophysical profile: see before.

(5) Hormonal study: see before.

(6) Amnioscopy: meconium stained liquor.

Management :

(A) Antenatal :

1. Rest in bed in lateral position (better the left) to prevent IVC compression . This increases the placental blood flow by 25%.
2. Smoking should be discouraged.
3. Treatment of the underlying cause.
4. Monitoring of foetal wellbeing.
5. Termination of pregnancy according to the balance between risk of intrauterine asphyxia against those of prematurity.

(B) Intranatal:

1- Mode of delivery is influenced by :

- gestational age, - result of the stress test,

- associated factors as malpresentations, antepartum haemorrhage, previous caesarean section ...etc.

- Caesarean section is more liberally indicated especially if there are associated adverse factors as the foetus does not tolerate the reduced oxygen supply and birth trauma encountered during vaginal delivery.

2- Continuous intranatal monitoring.

(C) Postnatal:

Identification and management of problems of dysmaturity as:

1. *Hypothermia:* due to relatively large surface area and lack of insulating fat layer
2. *Asphyxia neonatorum:* as an extension to the intrauterine asphyxia or due to meconium aspiration.
3. *Hypoglycaemia:* due to increased metabolic demands, especially in presence of chilling and poor glycogen reserves.
4. *Hypocalcaemia:* manifested by clonus, tremors or convulsions.
5. *Haemorrhagic tendency:* may cause pulmonary haemorrhage and death.
6. *Stunted growth and mental retardation* : more liable to occur in the future.

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Obstetrics Simplified

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Placental Insufficiency

Definition:

It is a reduction in the placental functions.

Effects:

1. *In acute and /or severe cases :* it leads to intrauterine foetal death.
2. *In chronic and /or mild cases* : it leads to intrauterine growth retardation.

Aetiology

(I) Acute causes :

1. Tonically contracted uterus.
2. Placental separation.
3. Placental infarcts.

(II) Chronic causes:

Causes of IUGR (see before).

Diagnosis and Management:

See IUGR.

PERINATAL MORTALITY

It includes.

1- Stillbirth.

2-Early neonatal death (during the 1st week).

STILLBIRTH

Definition:

It is a dead foetus delivered after 28 weeks of pregnancy or weighing 500 gm or more.

The American College of Obstetricians and Gynaecologists suggested a gestational age more than 20 weeks WHO suggested a gestational age more than 24 weeks.

This may be the result of :

(I) Intrauterine foetal death: before the onset of labour.

(II) Intranatal foetal death: during the course of labour.

(I) Intrauterine Foetal Death (IUFD)

Aetiology :

(I) Maternal causes:

1. Hypertensive disorders with pregnancy.
2. Diabetes mellitus.
3. Infections e.g. - Syphilis. - Rubella. - Smallpox.

   - Mumps. - Cytomegalovirus. - Measles. - Poliovirus. - Any acute infection.

4. Chemical poisoning: e.g. chronic lead poisoning.

(II) Placental causes:

Placental insufficiency especially for acute causes as placental separation and infarcts.

(III) Umbilical cord:

True knots.

(IV) Foetal causes:

1- Rh-isoimmunization.

2- Congenital anomalies.

(V) Idiopathic.

Diagnosis:

(A) Symptoms:

1. Cessation of foetal movements.
2. Regression of breast changes and milk secretion may be initiated.
3. The abdomen is not enlarging or even get smaller.
4. Dark brown vaginal discharge may be present.

(B) Signs:

1. Uterus is smaller than the period of amenorrhoea and does not enlarge with repeated examination.
2. Foetal heart sounds are inaudible.
3. Foetus is felt like a soft homogenous mass with undistinguished foetal parts.

4. Maceration of the foetal skin starts 12 hours after death which can be detected after its birth.

(C) Investigations:

1. Ultrasound: the most accurate and rapid method which shows:

i- absent foetal movements,

ii- absent foetal heart movement,

iii- ***Spalding sign:*** overriding of the skull bones due to softening of the brain and absorption of C.S.F.

iv- Hyperflexion or angulation of the spines.

v- Collapse of the thorax.

vi- Causative factors as congenital anomalies.

2. ***Pregnancy test:*** becomes negative within 2 weeks but may remain positive as long as there is living chorionic tissues.

3. ***X-ray*** may show:

i- Spalding sign.

ii- Hyperflexion of the spines.

iii- Collapse of the thorax.

iv- Rarefaction of the foetal bones.

v- Gases in the foetal circulation.

iv- Causative factor as anencephaly and hydrops foetalis may be detected.

Complications:

1. Intrauterine infection.
2. Disseminated intravascular coagulation if the foetus is retained more than 4 weeks.

Management:

1. ***A wait for 2-3 weeks :*** Spontaneous expulsion usually occurs.
2. ***Induction of labour*** by prostaglandins and/or oxytocin is indicated in :

i- No expulsion after 3 weeks.

ii- Development of infection.

iii- Development of DIC.

iv- Anxiety of the mother.

3. Surgical evacuation of the uterus abdominally: may be indicated in failure of prostaglandins.

N.B. Amniotomy is not used for induction of labour as it may predispose to infection .

(II) Intranatal Death

Aetiology:

1. Intrauterine asphyxia.
2. Intracranial haemorrhage.
3. Intranatal (congenital) pneumonia due to premature rupture of membranes.
4. Foetal birth injuries as fracture dislocation of cervical spines and rupture spleen.

NEONATAL DEATH

Definition :

It is death of a liveborn infant in the first month after delivery.

Causes:

(I) During the 1st week (more common):

1- Prematurity.

2- Asphyxia neonatorum.

3- Congenital anomalies.

4- Birth trauma.

5- Respiratory distress syndrome.

6- Haemorrhagic and haemolytic diseases of the newborn.

(II) After the 1st week (less common):

mainly due to infections.

Prevention:

1. Proper antenatal care.
2. Antenatal treatment of maternal infections e.g.

   - Syphilis. - Toxoplasmosis. - Genital tract infections.
3. Antenatal treatment of maternal risk factors e.g.

   - Diabetes. - Hypertension. - Anaemia.
4. Tetanus toxoid vaccination to the mother to protect the foetus from tetanus neonatorum.

5. Proper management of preterm labour and care of prematures.
6. Proper intranatal protection against birth trauma and infections .

Dangerous Signs in The Newborn:

1. Birth injuries.
2. Asphyxia neonatorum.
3. Prematurity.
4. Dysmaturity.
5. Congenital anomalies.
6. Petichiae (haemorrhagic disorders).
7. Jaundice (haemolytic disorders) .
8. Vomiting.
9. Diarrhoea.
10. Abdominal distension.
11. Fever or hypothermia.
12. Cyanosis.
13. Dyspnoea.
14. Bleeding or infection at the umbilical stump.
15. No meconium for 48 hours.
16. No urine for 24 hours.

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Obstetrics Simplified

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Foetal Asphyxia

It is a state of inadequate oxygenation and inadequate elimination of carbon dioxide.

(I) Intrauterine Asphyxia

Aetiology:

(I) Maternal causes:

Anoxia due to:

1- Cardiac failure.

2- Pulmonary diseases.

3- Anaesthetic agents causing hypotension.

4- Severe anaemia.

5- Eclamptic fit.

(II) Placental causes:

(1) Placental compression as in :

- Tonically contracted uterus.
- Prolonged labour after rupture of membranes.
- The old method to control bleeding from a placenta praevia.

(2) Placental insufficiency : due to acute causes as separation or infarcts.

(III) Umbilical cord:

1- True knots.

2- Tight coils around the neck.

3- Prolapsed cord leading to its compression and vasospasm of its vessels.

4- Compression by the forceps' blades.

5- Rupture of vasa praevia.

6- Haematoma of the cord.

7- Avulsion of the cord.

(IV) Foetal causes:

Cerebral oedema and ischaemia leading to decreased blood supply to the respiratory centre in the medulla. This may result from :

1- Intracranial haemorrhage.

2- Depressed skull fracture.

Diagnosis = Signs of Foetal Distress:

(1) Foetal heart rate changes : in the form of;

i) Tachycardia : > 160 beats / min. due to sympathetic stimulation caused by mild hypoxia.

ii) Bradycardia: < 100 beats / min due to vagal stimulation caused by moderate hypoxia.

iii) Cardiac arrhythmia (irregular FHR) : due to severe hypoxia. It is the most dangerous one.

iv) Late deceleration.

v) Loss of beat - to - beat variation.

(2) Meconium stained amniotic fluid:

Asphyxia causes increased intestinal movement and relaxation of the foetal anal sphincter with passage of the intestinal contents

Grades of meconium and its management:

Grade	Description	Management
I	A good volume of liquor, lightly stained with meconium.	Review the clinical presentation e.g. FHR. Stop oxytocin + left lateral position.
II	A reasonable volume of liquor with a heavy suspension of meconium.	Foetal blood sample is indicated.
III	Thick undiluted meconium resembles sieved spinach.	Caesarean section unless easy vaginal delivery is imminent.

N.B. The fresh thick dark brown meconium that is seen on the examining fingers in breech presentation is not an indicator of foetal distress.

(3) Foetal acidosis : scalp blood pH < 7.2.

(4) Foetal movements: increased in early distress.

(5) Cord pulsation : is weak , if cord is prolapsed**.**

Management:

(I) Conservative:

1. *Stop oxytocin drip*: if it is in use.
2. *Left lateral position of the mother :* to relieve aorto -caval compression ---- improves venous return ----- improves cardiac output -------- improves uteroplacental blood flow.
3. *Oxygen* : is given by mask to the mother in a rate of 6 litres / min. increases the O_2 supply to the foetus.

(II) Immediate delivery:

is indicated if the foetal distress is not improved by the conservative methods. This is achieved by:

1. *Vacuum extraction , forceps delivery or breech extraction*: if the cervix is fully dilated and vaginal delivery is amenable.
2. *Caesarean section* : if rapid vaginal delivery is not amenable.

(II) Asphyxia Neonatorum

Aetiology:

(I) Causes in the respiratory centre:

1. *Paralysis :* due to cerebral haemorrhage.
2. *Depression :* by drugs as morphine, pethidine or anaesthesia.

(II) Causes in the lungs:

1. *Congenital atelectasis.*
2. *Respiratory distress syndrome* : due to deficient lung surfactant.

(III) Causes in the respiratory passages:

Obstruction by: – meconium, – liquor, – blood, – mucus.

(IV) Causes in the respiratory muscles:

1. Congenital debility.
2. Weakness in prematures.

Diagnosis:

(A) Clinical features:

It depends upon the type (stage) of asphyxia:

	ASPHYXIA LIVIDA	ASPHYXIA PALLIDA
Degree	Mild (early stage)	Severe (late stage)
Colour of skin	Blue	Pale white
Respiratory efforts	May be present	Absent
Heart beats	Strong, 80-120/ min	Weak, <80 /min
Eyes	Reactive pupils	Dilated pupils
Muscle tone	A degree of muscle tone	Flaccid
Reflexes	Present	Absent
Prognosis	Good, easy resuscitation	Bad, difficult resuscitation.

(B) Apgar score:

It is a clinical assessment of the newborn's condition, its need for resuscitation and the response to it. It is done at 1 and 5 minutes from delivery.

Sign	0	1	2
Heart rate	Absent	<100	>100
Respiratory effort	Absent	Slow, irregular	Good, crying
Muscle tone	Flaccid	Some limb flexion	Active movement
Reflex (Response to nasal catheter)	No response	Grimace	Cough or sneeze
Colour	Blue or pale	Body pink, limbs blue	Completely pink

The score at 1 minute determine the need for resuscitation:

Score	Condition	Resuscitation
7-10	Good.	Only nasopharyngeal aspiration.
4-6	Moderate asphyxia	Position the baby + O_2 mask.
0-3	Severe asphyxia	Endotracheal intubation + cardiac massage + drugs.

The 5 minutes-score is an indicator of future CNS efficiency.

Prophylaxis of Asphyxia Neonatorum:

1. Proper antenatal care.
2. Proper intranatal monitoring.
3. No morphia 4 hours or pethidine 2 hours before delivery.
4. Minimise the foetal exposure to anaesthesia during labour and ensure adequate oxygenation with it.
5. Episiotomy in proper time.
6. Avoid birth trauma.
7. Vitamin K 10 mg to the mother during labour.
8. Clear the air passages of the foetus immediately after delivery.

Treatment :

is remembered by ABCD arrangement:

(A) Air passages suction:

immediately after birth by suction of mouth, pharynx and nose with the head 15º lower down.

(B) Breathing :

- is stimulated by slapping the soles of the foetus, flexion and extension of the legs and rubbing the back.
- *Mouth to mouth breathing :* A one layer piece of gauze is placed on the infant's mouth close its nose with the fingers and expire gently into the mouth. The expired O_2 and CO_2 will stimulate the respiratory centre.
- *Oxygen mask.*
- *Endotracheal intubation and intermittent positive pressure ventilation* not exceeding 20 cm water.

(C) Cardiac massage.

If the heart rate is below 60 beats/ min. the thumb is pressed at the junction of the middle and lower third of the sternum in a rate of 120/min.

(D) Drugs:

1. *Sodium bicarbonate :* 1 mEq/kg is given IV to correct acidosis.
2. *Naloxone:* 10 m g/kg is given IV as an antidote to morphine or pithidine
3. *Epinephrine :* 0.1 ml/kg of 1:10.000 dilution is injected into the umbilical vein or intracardiac.
4. *Antibiotics:* to guard against pneumonia which is liable to develop after prolonged resuscitation.

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Obstetrics Simplified

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Congenital Anomalies

Incidence:

2-3 % of all newborns.

Aetiology:

1. **Hereditary and genetic.**
2. **Ionising irradiation:**

   < 5-10 rads → no adverse effects.

   10-25 rads → possible adverse effects.

   > 25 rads → documented adverse effects as foetal death , multiple malformations, intrauterine growth retardation, or leukaemia.

3. **Infections :** e.g.

   - Rubella.
   - Cytomegalovirus
   - Herpes simplex virus.
   - Chickenpox virus.
   - Mumps.
   - Smallpox virus.
   - Poliovirus.
   - Toxoplasmosis.
   - Syphilis.

4. **Maternal diseases** : e.g.

   - Diabetes mellitus.
   - Maternal anoxia.
   - Phenylketonuria.

5. **Drugs :** The most well documented are:

Drug	Effect
I- Antibiotics	
Streptomycin	Nerve deafness.
Tetracycline	Dental discoloration.
Chloramphenicol	Gray syndrome.
Sulphonamides	Jaundice and Kernicterus.
Aminoglucosides (e.g. gentamycin, kanamycin)	Nephrotoxic.
II- Hormones	
Diethylstilbestrol	Vaginal adenosis and adenocarcinoma.
Androgens	Virilization of female foetus.
Contraceptive pills	VACTREL syndrome = Vertebral, Anorectal , Cardiac, Tracheal, Renal, Oesophageal and Limb abnormalities.
Corticosteroids	Rarely, cleft palate.
III-Oral anticoagulant	
Coumarins (e.g. Warfarin)	Chondrodysplasia punctata (saddle nose, frontal posing, mental retardation, cataract) and foetal haemorrhage.
IV- Cytotoxic drugs	Abortion and multiple anomalies.
V- Antithyroid	Goitre and mental retardation.
VII- Salicylate	Foetal haemorrhages.
VIII - Antihistaminics - ***Antiepileptics*** - ***Oral hypoglycaemics***	may be teratogenic.

Common Congenital Anomalies:

(I) Chromosomal abnormalities:

- Trisomy 21 (Down's syndrome).

- Trisomy 13,15.

- Trisomy 18.

- Turner's syndrome(45 XO).

- Klinefelter syndrome (47 XXY).

(II) Central nervous system: e.g.

1- Anencephaly (absent vault of the skull).

2- Enencephaly (hyperextended head with fusion of the tissues over the occiput and sacrum).

3- Hydrocephalus.

4- Spina bifida.

5- Meningocele.

6- Encephalocele.

7- Mental retardation.

(III) Gastrointestinal system:

1- Hare lip and cleft palate.

2- Oesophageal atresia.

3- Tracheo-oesophageal fistula.

4- Anal atresia.

5- Diaphragmatic hernia.

6- Exomphalos (protrusion of abdominal contents through the umbilical ring covered with transparent sac).

7- Gastroschisis (protrusion of the bowel through an abdominal wall defect but the umbilical cord is not involved)

(IV) Genito - urinary anomalies:

1- Renal agenesis.

2- Horse shoe kidney.

3- Ectopia vesica.

4- Hydronephrosis.

5- Hypospadius.

6- Undescended testis.

7- Ambiguous genitalia.

(V) Cardiovascular:

1. Patent ductus arteriosus.
2. Vulvular affection.
3. Coarctation of the aorta.
4. Septal defects.

(VI) Limbs anomalies.

(VII) Eyes or ears anomalies.

Diagnosis:

(I) Antenatal alerting signs:

1- Family history.

2- Positive consanguinity.

3- Old mothers (>40 years).

4- Oligohydramnios and polyhydramnios.

5- Malpresentations or malpositions as it may be the result of congenital anomalies as hydrocephalus, anencephaly or goitre.

6- Intrauterine growth retardation which may be associated with microcephalic dwarfism or teratogenic infections as rubella, toxoplasmosis and chickenpox.

7- Abnormal antenatal cardiotocography may be the sign of congenital heart disease.

(II) Investigations : (see foetal wellbeing).

1- Chorionic villus biopsy.

2- Amniocentesis.

3- Cordocentesis.

4- Ultrasound.

5- Magnetic Resonance imaging (MRI).

6- Fetoscopy.

7- Maternal serum alpha fetoprotein.

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Obstetrics Simplified

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Foetal Birth Trauma

(I) HEAD INJURIES

(A) Fracture Skull:

usually occurs due to difficult forceps delivery. It may be:

(1) Vault fracture:

- usually affecting the frontal or parietal bone.
- It may be linear or depressed fracture.
- It needs no treatment unless there is intracranial haemorrhage.

(2) Fracture base:

usually associated with intracranial haemorrhage.

(B) Cephalhaematoma:

- It is a subperiosteal haematoma most commonly lies over one parietal bone.
- It may result from difficult vacuum or forceps extraction .

Diagnosis and Differential Diagnosis:

Cephalhaematoma	*Caput Succedaneum*
Develops hours or days after birth.	Present at birth.
Localised haematoma to one bone limited by sutures at its edges.	Diffuse tissue oedema overlying more than one bone.
Well-defined edges.	Ill-defined edges.
Elastic, does not pit on pressure.	Soft , pits on pressure.
Disappears within few weeks.	Disappears within 1-2 days.

Management:

- It usually resolves spontaneously.

- Vitamin K 1 mg IM is given.

(C) Intracranial Haemorrhage:

Causes:

1. Sudden compression and decompression of the head as in breech and precipitate labour.
2. Marked compression by forceps or in cephalopelvic disproportion.
3. Fracture skull.

Predisposing factors:

1. Prematurity due to physiological hypoprothrombinaemia, fragile blood vessels and liability to trauma.
2. Asphyxia due to anoxia of the vascular wall .
3. Blood diseases.

Sites:

1. *Subdural :* results from damage to the superficial veins where the vein of Galen and inferior sagittal sinus combine to form the straight sinus.
2. *Subarachnoid:* The vein of Galen is damaged due to tear in the dura at the junction of the falx cerebri and tentorium cerebelli.
3. *Intraventricular :*into the brain ventricles.
4. *Intracerebral* : into the brain tissues .

In (1) and (2) it is usually due to birth trauma, in (3) and (4) the foetus is usually a premature exposed to hypoxia.

Clinical picture:

1- Altered consciousness.

2- Flaccidity.

3- Breathing is absent, irregular and periodic or gasping.

4- Eyes: no movement, pupils may be fixed and dilated.

5- Opisthotonus, rigidity, twitches and convulsions.

6- Vomiting .

7- High pitched cry.

8- Anterior fontanelle is tense and bulging.

9- Lumbar puncture reveals bloody C.S.F.

Investigations:

1. *Ultrasound* is of value.
2. *CT scan* is the most reliable.

Prophylaxis:

1. *Vitamin K:* 10 mg IM to the mother in late pregnancy or early in labour.
2. *Episiotomy:* especially in prematures and breech delivery.
3. *Forceps delivery:* carried out by an experienced obstetrician respecting the instructions for its use.

Treatment:

1. *Minimal handling, warmth and oxygen* to the baby.
2. *No oral feeding for 72 hours.*
3. *IV fluids.*
4. *Vitamin K 1mg IM.*

5. *Lumbar puncture:* is diagnostic and therapeutic to relieve the intracranial tension if the anterior fontanelle is bulging.
6. *Sedatives* for convulsions.
7. *60 cc. of 10% sodium chloride* per rectum to relieve brain oedema.
8. *1 cc of 50% magnesium* sulphate IM to relieve brain oedema and convulsions.
9. *Antibiotics :* to guard against infections particularly pulmonary.

(II) BONE INJURIES

These usually occur during difficult breech delivery.

(A) Vertebral Column Injuries:

These are fatal if associated with spinal cord transection above C_4 due to diaphragmatic paralysis.

(B) Femur, Humerus and Clavicle:

Managed by splint to the long bone and a sling for clavicular fracture.

(III) NERVE INJURIES

(A) Facial Palsy (Bell's palsy):

- It is usually due to pressure by the forceps blade on the facial nerve at its exit from the stylomastoid foramen or in its course over the mandibular ramus.

- It appears within 1-2 days after delivery due to resultant oedema and haemorrhage around the nerve.

- *Manifestations:* There is paresis of the facial muscles on the affected side with partially opened eye and flattening of the nasolabial fold. The mouth angle is deviated towards the healthy side.

- Spontaneous recovery usually occurs within 14 days.

(B) Brachial Plexus Palsy:

It is due to over traction on the neck as in:

- Shoulder dystocia.

- After-coming head in breech delivery.

(1) Erb's palsy:

- It is the common, due to injury to C_5 and C_6 roots.

- The upper limb drops beside the trunk, internally rotated with flexed wrist (policeman's or waiter's tip hand).

(2) Klumpke's palsy:

- It is less common,due to injury to C_7 and C_8 and 1st thoracic roots.

- It leads to paralysis of the muscles of the hand and weakness of the wrist and fingers' flexors.

Treatment

1. *Support* to prevent stretching of the paralysed muscles.
2. *Physiotherapy:* massage, exercise and faradic stimulation.

(IV) MUSCLE INJURIES

Strenomastoid injury due to exaggerated lateral flexion of the neck leading to torticollis and swelling in the muscle. It is usually improved within 2 weeks but permanent torticollis may continue.

(V) VISCERAL INJURIES

Liver, spleen and kidney may be injured in breech delivery which should be avoided by holding the foetus from its hips.

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Obstetrics Simplified

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Relief of Pain in Labour

Pain Transmission :

(I) During first stage: pain arises from the uterus, cervix and upper vagina passes through the Frankenhäuser's ganglion to the hypogastric and then the pre-aortic plexuses to enter the spinal cord at T_{10-12} and L_1. The pain is due to increased intrauterine pressure with each contraction to 25 mmHg or more and due to cervical dilatation. The highest degree of pain felt during the transitional period between the first and second stage.

(II) During second stage: pain arises from the vagina and perineum is transmitted through the pudendal nerves to enter the spinal cord at S_{2-4}.

Methods:

(A) Non - pharmacological methods:

These are safe for the mother and foetus but it needs long time to be effective and of varying degrees.

1. **Breathing and relaxation exercises:** increases the oxygen supply to the contracting myometium so ischaemia is reduced and pain is minimised.
2. **Acupuncture.**

(B) Pharmacological methods:

(I) Tranquillisers:

1. *Diazepam:* 5-10 mg IM / 4 hours during the first stage. *Complications*: it may cause neonatal hypothermia, hypotonia and respiratory depression.

2. *Promazine HCL (Sparine):* 50 mg IM potentiate the analgesic effect of pethidine and has a good antiemetic action.

(II) Analgesics:

(1) *Narcotic analgesics* : given during the active phase of cervical dilatation and postpartum after caesarean section.

1. *Pethidine:* 50-150 mg IM. Maximum analgesic effect is achieved after 45 minutes and lasts for 3-4 hours. It has sedative, analgesic and antispasmodic effect. It should not be given 2 hours before delivery to avoid foetal respiratory depression.

2. *Morphine.* 10-15 mg IM. It has more potent analgesic effect but more depression to the foetal respiratory centre so it should not be given 4 hours before delivery.

The antidote of narcotic analgesics is Naloxone 5 μ g/ kg body weight into the umbilical vein.

(2) *Inhalational analgesics*:

Inhaled during contractions by the mother herself so when she becomes drowsy her hand catching the inhaled analgesic falls away and she recovers immediately.

1. *Nitrous oxide (50%) + Oxygen (50%)* (Entonox).

2. *Trichloroethylene (Trilene 0.5% in air):* inhaled through Cyprane apparatus.

3. *Methoxyflurane (Penthrane 0.35% in air):inhaled through Cardiff apparatus.*

(III) Anaesthetics:

(A) General anaesthesia:

(1) Injectable agents:

i) Thiopentone (Intraval 0.5 -1gm): IV induces short acting general anaesthesia suitable for instrumental vaginal delivery and repair of episiotomy or perineal tear.

ii) Ketamine (Ketalar): 2 mg/kg body weight IV. Its action lasts 5-10 minutes, indicated as thiopentone. Hallucination and unpleasant dreams may occur.

(2) Inhalation agent:

i- Nitrous oxide (80%) + Oxygen (20%):

It is safe.

ii- Ether:

It is of benefit in shocked patient as it does not lower the blood pressure but it is inflammable.

iii-Halothane (Fluothane 0.5%):

It produces muscle relaxation suitable for intrauterine manipulations as internal podalic version but it may lead to atonic postpartum haemorrhage.

(B) Regional and Local Anaesthesia:

(1) Epidural block:

Indications:

i) Relief of pain in the first stage .

ii) Extension of analgesia to the lower birth canal during the second stage .

iii) Caesarean section.

(I) Lumbar block:

Using the Tuohy needle with catheter the lignocaine (Xylocaine) 1% or bupivacaine (Marcaine) 0.5% is injected into the extradural space between L_3 and L_4 vertebrae.

(II) Sacral (caudal) block:

The anaesthetic agent is injected through the sacral hiatus. It abolishes the perineal reflex leading to prolonged second stage and hence increased incidence of instrumental delivery.

(2) Spinal block:

- Lignocaine 1% or bupivacaine 0.5% is injected into the subarachnoid space.

- It is useful for vaginal operative procedures and caesarean section but never as a long term analgesia during labour.

- Advantage over epidural anaesthesia is that procedure is easier and blockade can be rapidly achieved with a smaller dose of local anaesthetic.

(3) Paracervical block:

- Lignocaine 1% is injected into the paracervical tissues through the lateral vaginal fornices.

- Its action lasts for about 2 hours.

- It is effective in relieving pain during the first stage of labour but foetal bradycardia is a common complication.

(4) Pudendal nerve block:

- 10 ml of lignocaine 1% is injected in the region of the ischial spine on each side either from inside through the vaginal mucosa or from outside through the perineal skin with a guiding finger in the vagina in both procedures.

- It may be supplemented by local infiltration anaesthesia into the fourchette, perineum and adjacent vagina.

- It is safe, simple and can be used for spontaneous and instrumental delivery and repair of episiotomy.

(5) Local (perineal) infiltration anaesthesia:

- 10 ml of lignocaine 1% is injected into the episiotomy line including the lower vagina, fourchette, perineal muscles and skin.

- It is suitable for episiotomy incision and repair as well as repair of perineal lacerations by injection around it .

- It is the safest and simplest technique but time should be allowed to establish analgesia.

Complications of General Anaesthesia:

(I) Foetal :

Depression of the respiratory centre and asphyxia.

(II) Maternal:

1. *Uterine atony* leading to postpartum haemorrhage.
2. *Respiratory complications*:

a- Pulmonary collapse.

b- Mendelson's syndrome:

- It is inhalation of the acidic gastric juice during anaesthesia.
- Manifestations may appear immediately or after 1-3 hours in the form of :

  - initial bronchospasm,
  - dyspnoea,
  - cyanosis,
  - tachycardia,
  - systemic hypotension,
  - pulmonary hypertension,
  - death supervenes within very short time.

- Prophylaxis:

  a.The patient should be fasting at least 6 hours before anaesthesia.

b. Preoperative oral antacids e.g. magnesium trisilicate 15 ml / 3hours.

c. Preoperative histamine-2 antagonist e.g. cimetidine or raniditine injection.

d. During induction: occlude the oesophagus by cricoid pressure and guard the trachea by cuffed endotracheal tube.

e. During recovery: remove the tube in lateral position with the head lower down and only when the patient is conscious.

- Treatment:

  i- Endotracheal intubation.

  ii- Upper airway aspiration.

  iii- Oxygen under positive pressure.

  iv-hydrocortisone 200 mg IV to minimise the inflammatory reaction.

  v- Antibiotics.

  vi- Tracheostomy may be considered in severe cases.

Complications of Epidural Anaesthesia:

1. **Hypotension:** because block of the sympathetic nerve supply to the lower part of the body leads to peripheral vasodilatation.
2. **Accidental dural puncture:** There is a 50% possibility of a low pressure headache which lasts for few days from leakage of cerebrospinal fluid into the epidural space.

   Treatment:

i) Ringer - lactate solution infused into the epidural space.

ii) Bed rest for 4 days.

iii) Analgesics.

vi) Blood patch: if the previous methods failed, 10-20 ml from patient's own blood is injected into her epidural space.

3- Subarachnoid injection:

The usual dose needed for spinal (subarachnoid) block is far less than that required for epidural block so if accidentally injected into the subarachnoid space it may result in paralysis of the respiratory muscles.

Treatment:

i) Endotracheal intubation + oxygen.

ii) Rapid fluid infusion to combat hypotension.

iii) Ephedrine hydrochloride 5-10 mg for hypotension.

vi) Artificial ventilation is continued with nitrous oxide 50% +oxygen 50%.

4- Increased incidence of forceps delivery: as the maternal perineal reflex and urge to push is blocked leading to prolonged second stage.

5- Neurological complications:

Patches of numbness on the outer side of the thighs or legs for few days.

6- Fracture of the catheter:

Fragments are left in situ as it cause no problems.

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Ecbolics (Uterine Stimulants)

Definition:

These are agents that induce and/ or maintain uterine contractions.

The commonest of them in current use are:

1- Oxytocics.

2- Prostaglandins.

3- Ergot alkaloids.

OXYTOCICS

Types:

1-Posterior pituitary extract: which is composed of;

i) oxytocin or pitocin and

ii) vasopressin which has vasopressor and antidiuretic action. It is not used in obstetrics as it may cause coronary spasm.

2-Synthetic oxytocics:

i) Oxytocin (Pitocin): a purified posterior pituitary extract.

ii) Syntocinon: synthetic oxytocin.

Mode of Action:

Oxytocics act on the pregnant uterus within 1 minute if injected IV, within 2 minutes if injected IM and its action lasts for 30 minutes. These cause initiation and increase in frequency, strength and duration of uterine contractions. These are more effective with the advancement of pregnancy.

Routes of Administration:

1. **IV drip** is the most common use.
2. **IV pump** using an electronic pump: is the most accurate for calculation of the infused dosage.
3. **IM and IV bolus** may be given postpartum.
4. **Direct intramyometrial**: during caesarean section.
5. **Nasal spray**: to help evacuation of the engorged breasts.

Indications:

1- Inevitable , incomplete and missed abortions.

2- Induction of labour.

3- Augmentation of labour.

4- Evacuation of vesicular mole.

5- Prophylaxis and treatment of postpartum haemorrhage.

6- Oxytocin challenge test.

Contraindications:

1- Previous uterine scar as C.S, hysterotomy or open uterus metroplasty.

2- Some malpresentations as shoulder and brow presentations.

3- Foetal distress and placental insufficiency.

4- Contracted pelvis.

5- Grand multipara. 6-Incoordinate uterine actions.

Complications:

1- Rupture uterus.

2- Foetal distress and asphyxia.

3- Constriction ring and hypertonic inertia.

4- Amniotic fluid embolism.

5- Water intoxication due to its antidiuretic effect and the large amount of IV fluids when given as a drip.

6- Coronary spasm if the crude posterior pituitary extract was used.

PROSTAGLANDINS (PG)

Nature:

- PGs are naturally occurring unsaturated fatty acids present in different body fluids and tissues as the seminal fluid, endometrium, amniotic fluid, lungs and brain.
- PGs are resulted from the action of PG synthetase enzyme on arachidonic acid.

Obstetric Actions:

1. *Ripening of the cervix:* Natural and synthetic PGs can ripen the cervix at any stage in pregnancy by inducing collagen breakdown and tissue hydration.
2. *Initiation and/or stimulation of uterine contractions:* at any stage of pregnancy.

Obstetric Indications:

1- Induction of abortion.

2- Induction of labour.

3- Treatment of postpartum haemorrhage.

Routes of Administration:

1. *Intramuscular :* $PGF_{2\alpha}$ 15-methyl (Prostin 15 M) 250µ g/2 hours.
2. *Intravenous:* $PGF_{2\alpha}$ 0.25µ g / minute.
3. *Oral :* $PGF_{2\alpha}$ (Prostin tablets 0.5 mg) 0.5-1 mg/ hour.

4. *Vaginal tablets:* PGE_2 3 mg.
5. *Vaginal gel* : PGE_2 1-2 mg.
6. *Endocervical gel:* PGE_2 0.5 mg.
7. *Extra-amniotic gel* : PGE_2 400-500μ g.
8. *Intramyometrial* : PGF2α 1 mg.
9. *Intra-amniotic and extra-amniotic* $PGF_{2\alpha}$*:* see induction of abortion.

Complications:

1- Nausea.

2- Vomiting.

3- Diarrhoea.

4- Flushing.

5- Tachycardia.

6- Pyrexia.

ERGOT ALKALOID

Ergometrine = Methergin

Action:

It induces sustained uterine contraction lasts for 3-4 hours.

Routes of Administration:

Route	Dose	Onset of action
Oral	1mg	7 minutes
IM	0.5 mg	4 minutes
IV	0.25 mg	1 minute

Indications:

1. Inevitable and incomplete abortions.
2. Prophylaxis and treatment of postpartum haemorrhage.
3. Subinvolution of the uterus.

Contraindications:

1. Before delivery of the foetus as it will cause foetal asphyxia and rupture uterus.
2. Cardiac disease.
3. Hypertension.

Complications: In misuse only;

1- Rupture uterus.

2- Constriction ring.

3- Foetal asphyxia.

4- Hypertension.

5- Retained placenta.

Syntometrine

is a combination of 5U syntocinone and 0.25 mg methergin given only IM.

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Obstetrics Simplified

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Maternal Mortality

Maternal Mortality Rate (MMR):

The number of maternal deaths per 100.000 live births which is related to pregnancy , labour or puerperium.

Incidence : 1: 100.000 in UK.

Classification:

1. *Direct obstetric deaths*: resulting from obstetric complications of pregnancy, labour or puerperium and from interventions, omissions and/or incorrect treatment e.g. rupture uterus.

2. *Indirect obstetric deaths:* resulting from previously existing disease or a disease that developed during pregnancy, labour or puerperium e.g. cardiac diseases.

3. *Accidental deaths:* not related to pregnancy, labour or puerperium itself but happened during it e.g. automobile accident.

   Only direct and indirect obstetric deaths constitute the maternal mortality rate.

Risk Factors:

1. **Maternal age:** The golden age for fertility and childbearing is between 18 and 35 years, the risk is more both to the mother and foetus with more deviation below or above this range.

2. **Parity:** The risk is more in primigravidae and grand multiparae (5 or more).

3. **Bad obstetric history** as difficult labour ended by stillbirth or neonatal death.
4. **History of previous uterine surgery** e.g. C.S or hysterotomy.
5. **History of medical disorders** e.g. cardiac disease and hypertension.
6. **Malpresentations and malpositions**.
7. **Multiple pregnancy**.
8. **Antepartum haemorrhage.**
9. **Neglected antenatal care.**
10. **. Socio - economic standard** : MMR is higher in low standard society, distant areas and developing countries.

Causes:

1-Haemorrhage which may be due to:

i- Abortion. ii-Ectopic pregnancy. iii- Gestational trophoblastic diseases.

iv- Antepartum haemorrhage. v- Postpartum haemorrhage.

2-Infection as in :

i- Septic abortion. ii- Chorioamnionitis. iii- Puerperal sepsis.

3-Medical disorders as :

i- Hypertensive disorders with pregnancy.

ii- Diabetes mellitus.

iii- Cardiac diseases.

iv- Renal disorders.

v- Thrombo-embolic disorders.

vi- Amniotic fluid embolism.

4-Surgical disorders as:

Rupture uterus.

5-Anaesthetic complications as:

i- Pulmonary collapse.

ii- Mendelson's syndrome.

Prevention:

I- Proper antenatal care (see antenatal care).

II- Proper Intranatal care:

1. Hospital delivery is safer.
2. Well equipped delivery room.
3. Availability of blood transfusion.
4. Available anaesthetist.
5. Replacement of general by regional anaesthesia whenever possible.
6. Nothing by mouth in the first stage except sips of water and antacid.
7. Aseptic and antiseptic measures.
8. Senior experienced obstetrician to manage complicated cases.
9. Proper intranatal monitoring by clinical observation , cardiotocography and partogram.

III- Proper postnatal care:

1- Observation for :-

- Pulse.
- Temperature.
- Blood pressure.
- Vaginal bleeding.
- Uterine tone and fundal level.
- Level of maternal consciousness.

2- Aseptic and antiseptic measures.

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Induction of Labour

Definition:

It is artificial initiation of labour after viability of the foetus i.e. after 28 weeks.

Indications:

(I) Maternal:

(1) Hypertensive disorders with pregnancy:

i- Severe pre-eclampsia.

ii- Imminent eclampsia.

iii- Eclampsia.

iv- Essential hypertension.

v- Chronic nephritis.

For indication and time of termination (see before).

(2) Antepartum haemorrhage:

i- Placenta praevia type I&II.

ii- Accidental haemorrhage.

(3) Diabetes mellitus:

To avoid intrauterine foetal death and dystocia due to macrosomia.

(II) Foetal:

1. *Post-term pregnancy.*
2. *Intrauterine growth retardation.*
3. *Intrauterine foetal death.*
4. *Rh- isoimmunization.*
5. *Gross congenital anomalies.*

Modified Bishop Score:

This score is predicting for the succession of induction of labour. The total score is in the range of 0-13 , a score of 9 or more is favourable for successful induction.

	0	**1**	**2**	**3**
Dilatation of cervix (cm)	0	1-2	3-4	≥ 5
Consistency of cervix	Firm	Medium	Soft	
Length of cervical canal (cm)	>2	2-1	1-0.5	<0.5
Position of cervix	Posterior	Central	Anterior	
Station (cm above ischial spines)	3	2	1or 0	Below

Methods of Induction:

(I) Conservative method:

It is suitable to begin with it the trials for induction of labour and consists of :

(1) Stripping of the membranes:

by introducing the index or the middle finger into the cervical canal to separate the membranes from the lower uterine segment all around as much as possible. This stimulates natural prostaglandin production.

(2) Caster oil every 12 hours.

(3) Enema with warm water every 6 hours.

(4) Intercourse with internal ejaculation while the patient is in the dorsal position and her pelvis is kept slightly raised for at least one hour to give more chance for absorption of the natural prostaglandins in the husband's semen.

In most of the cases with favourable bishope score labour is commenced within 24 hours.

Advantages:

1. Minimal cost.

2. No side effects, complications or contraindications as regard the mother or the foetus.
3. Spontaneous uterine contractions start without medication or surgical interference.
4. No rupture of the membranes so infection is minimised.
5. The procedure can be repeated for unlimited times and caesarean section must not be the alternative if it fails.

(II) Prostaglandins:

These induce ripening of the cervix and uterine contractions.

These can be administered via many routes (see ecbolics) but the commonest are:

(A) In living foetus:

- Prostaglandin E_2 vaginal tablet 3 mg (Prostin) is applied deep in the posterior fornix. A second tablet is applied 6-8 hours later if labour is not commenced. The maximum dose is 6 mg.
- Vaginal gel (PGE_2 1-2 mg) may be more reliable.

(B) In dead foetus:

Extra-amniotic and intra-amniotic prostaglandin $F_{2\alpha}$.

(III) Extra-amniotic normal saline:

A Foley's catheter is passed extra-amnioticaly through the cervix and inflated with 10 ml of distilled water to be self retained . A drip of normal saline is connected to it to pass extra-amniotic in a rate of
1 ml / minute.

(IV) Artificial rupture of membranes (amniotomy):

Mode of action:-

i) Release of prostaglandins.

ii) Bringing the presenting part closer to the lower uterine segment so the uterine activity will be reflexly encouraged.

Methods:

1. *Forewater (low) amniotomy:* Stripping of the membranes is done first, then the forewater is ruptured by amnihook, toothed forceps or kocker's forceps.

2. *Hindwater (high) amniotomy:* The Drew-Smythe catheter is introduced between the membranes and uterine wall to a point above the presenting part.

Disadvantages:

i) Less efficient in inducing labour.

ii) More incidence of uterine trauma.

iii) Separation of a posteriorly situated placenta.

vi) Higher incidence of infection.

- Amniotomy alone results in delivery within 24 hours in about two-thirds of cases.
- It is now a common practice to administer oxytocics at the time of or soon after, amniotomy to shorten the latent phase. The majority of deliveries then occur within 12 hours.

(V) Oxytocin:

Mode of action: It depolarises cell membrane potential and alter permeability to sodium. The maximal sensitivity to oxytocin is achieved by 34-36 weeks' gestation.

Method of administration : The initial rate of administration is 6 m units/ minute, increased by 6 m units/ minute every 15 minutes up to a maximum of 36 m units/minute or until 3 contractions/ 10 minutes are achieved.

Practically, this is done by putting 5 units of syntocinone in 500 ml of 5% glucose and start the IV drip by 10 drops/min. to be increased by 10 drops/ min. every 15 min. up to a maximum of 60 drops/min.

- The oxytocin drip is continued through out the second, third and fourth stage of labour to guard against postpartum haemorrhage.

Hazards of oxytocin: (see ecbolics).

Failed induction of labour → caesarean section.

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Obstetrics Simplified

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Ultrasonography in Obstetrics

Physics:

The highest audible sound waves ranges between 18.000-20.000 hertz (18-20 KHz) where the hertz is one cycle or wave per second. Ultrasound is sound waves above this audible range and for diagnostic purposes it ranges between 2.25 and 7.5 megahertz (usually 3.5 MHz is used).

The transducer of the ultrasound machine contains piezoelectric crystals previously were made of quartz but now these are synthetic crystals. These crystals have the property of changing the electric to sound waves and vice versa.

The electric current supplied to the machine generates ultrasound waves from these crystals to be reflected from tissue interfaces at various depths and by different echoes according to the nature of the medium i.e. fluid, tissue or bone.

The reflected sound waves is re-transformed again into electric waves presented as dotes or lines on the ultrasound screen.

The ultrasound waves can pass through fluid and solid media but not effectively through gases,so a gel should be applied between the transducer and skin.

In abdominal ultrasonography, the full bladder is essential for effective transmission of the waves and delineation of the pelvic organs in gynaecological and first trimester obstetric diagnosis. There is no need for full bladder if a vaginal probe is used.

Vaginal transducer of frequency 5.0-6.5 Mhz is more covenient for detection of tubal and ovarian masses and early pregnancy at least one week earlier than the abdominal ultrasound.

Modes:

(I) A (Amplitude) mode:

It is a unidimensional system used to measure the depth of structures not used in obstetrics.

(II) B(Brightness) mode:

It is two-dimensional system. Returning echoes are displayed as bright spots on the screen.

1. *Static:* rarely used.
2. *Real-time:* 40 images or more are obtained per second so that the movement of the structures is shown. This can be achieved by 3 different techniques:

   i- Linear : giving a rectangular image (more convenient for obstetric examination).

   ii- Sector: giving a wedge-shaped image (more convenient for gynaecological examination).

   iii- Convex: giving an image midway between linear and sector.

(III) T-M (Time -Motion) mode:

The static structure appears as a straight line and movement is represented by a wave giving a pattern similar to ECG of the foetal heart.

(IV) Three - dimensional mode:

The most recent one giving an image of 3 dimensions.

Indications: diagnosis of :

1- *Intrauterine pregnancy.*

2- *Ectopic pregnancy.*

3- *Gestational age as follow:*

- from 5-6 weeks by measurement of gestational sac,
- from 6-12 weeks by measurement of the crown- rump length (CRL),
- from 12-26 weeks by measurement of the biparietal diameter (BPD- most convenient at this time).
- > 26 weeks - BPD and/ or femur length (FL) measurement.

4. Foetal viability : by foetal heart movement and limb movement from 6 weeks.

5. Multiple pregnancy: may be detected in the early weeks but diagnosed reliably by 16 weeks.

6. Congenital major structural anomalies : can be detected by 16 weeks.

7. Placental site, size, maturity and separation in abruptio placentae.

8. Foetal wellbeing : (see before).

9. Different types of abortion including blighted ovum, threatened, inevitable, incomplete, complete and missed abortions.

10. Vesicular mole.

11. Intrauterine growth retardation

12. Intrauterine foetal death.

13. Amount of liquor amnii.

14. Foetal presentation and position.

15. Retained products in case of postabortive or postpartum haemorrhage.

16. An aid for invasive procedures as :

– Amniocentesis.

– Chorionic villus biopsy.

– Curdocentesis.

– Intrauterine foetal therapy.

Doppler ultrasound:

If the ultrasound waves are directed to the moving RBCs in a blood vessel , the returning echo has a frequency related to the velocity of the RBCs and the obtained waveforms can be displayed on a screen.

Hazards of Ultrasound:

Up till now, there is no data about any deleterious effects on the foetus or the mother.

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Obstetrics Simplified

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Radiology in Obstetrics

Uses:

1. Diagnosis of pregnancy after 16 weeks (formation of the skeleton).
2. Multiple pregnancy.
3. Presentation and position.
4. Vesicular mole (no foetal shadow).
5. Gross congenital anomalies as hydrocephalus and anencephaly.
6. Localisation of placental site (the old methods of head displacement from the symphysis pubis or placentography).
7. Intrauterine foetal death.
8. Pelvimetry and cephalometry.
9. Diagnosis of maturity:

    a- Distal femoral epiphysis appears at 36 weeks.

    b- Upper tibial epiphysis appears at 38 weeks.

    c- Measurement of foetal lumbar vertebrae.

All these indications are now covered by ultrasound and radiodiagnosis is nearly out of modern obstetrics due to its hazards.

Hazards:

1. Death of the embryo or teratogenicity particularly if used in the first trimester.
2. Gene mutation of the foetus or mother.
3. Leukaemia of the newborn.

Obstetric Diagnosis

The diagnosis in medicine depends upon the triad of history, examination and investigations.

(A) HISTORY

(I) Personal History:

Name:

– Essential for hospital and clinic records.

– To be familiar to the patient.

Age:

– Elderly primigravida has her own risk.

– Detection of future fertile years approximately.

Occupation:

– Certain occupations are carrying the risk of teratogenicity as radiation technicians.

Residence:

– Some diseases are common or endemic in certain areas as rheumatic heart in dark humid areas.

Marital state:

– Virgin, – Married, – Widow or – Divorced.

Special habits: as smoking , alcohol , heroin....etc.

(II) Complaint:

- In patient's own words.

- Arranged according to its importance and order of events.

- Amenorrhoea is the main complaint in a pregnant patient and may be the only one when she is coming for routine antenatal care.

(III) Present History:

- It is the analysis of each complaint arranged according to events and include:

  - *Onset:* sudden or gradual.

  - *Duration.*

  - *Course :* progressive, stationary or regressive.

  - *Relation of each complaint to the others.*

  - *Medical or surgical intervention.*

  - *Factors improving or worsen the condition.*

- The already done investigations are mentioned.
- Any urinary symptoms.
- Any gastrointestinal symptoms.

(IV) Menstrual History:

- The first day of last normal menstrual period (LNMP).

- The regularity of menses before LNMP.

(V) Obstetric History:

- Gravidity.

- Parity.

In each pregnancy ask about:

i- duration of pregnancy,

ii- any complication during it,

iii- mode of termination,

iv- the offspring (male or female, alive or dead),

v- the puerperium or postabortive period,

vi- the time of last delivery or abortion.

(VI) Past History:

a. Medical diseases as hypertension, diabetes, cardiac, syphilis or T.B.

b. Operations especially the uterine as myomectomy.

c. Trauma to the pelvis , spines or lower limbs.

d. Induction of ovulation (in twin pregnancy).

e. Exposure to radiation.

(VII) Family History:

of diabetes, hypertension or T.B.

(B) EXAMINATION

The physician is standing on the right side of the patient.

(I) General Examination:

1- General condition.

2- Gait.

3- Body built.

4- Weight.

5- Length

6- Level of consciousness.

7- Hair distribution.

8- Vital sings: – pulse, – temperature, – blood pressure.

9- Face:

- *eyes:*

– *anaemia (pallor of the conjuctiva),*

– jaundice (yellowish conjuctiva),

– oedema of the eye lids.

- Nose:

– depressed nose (congenital syphilis),

– epistaxis (hypertension).

- Lips:

– anaemia,

– cyanosis.

- Teeth:

– septic focus.

10-*Neck*:

– thyroid ,

– lymph nodes,

– congested neck veins.

11- *Chest and heart.*

12- *Breasts :*

– signs of pregnancy,

– retracted nipple.

13- *Lower limbs:*

– oedema,

– dilated veins,

– tender calf muscles (deep vein thrombosis),

– deformities.

– manifestations of rickets.

14- *Back*: for deformities.

(II) Abdominal Examination:

(a) Inspection:

1. *Contour* : vertical in longitudinal lie and transverse in transverse lie.
2. *Pendulous abdomen*: detected in the standing position.
3. *Size:* oversized in multiple pregnancy and polyhydramnios.

4. *Foetal movement:* may be seen.
5. *Localised bulges or grooves.*
6. *Scars.*
7. *Site of the umbilicus.*
8. *Pigmentations.*
9. *Dilated veins.*
10. *Hernial orifices.*
11. *Pubic hair distribution.*

(b) Palpation:

of the nine areas of the abdomen (Rt. and Lt. hypochondrium , Rt. and Lt. lumber, Rt. and Lt. iliac fossae, epigastrium, umbilical and suprapubic).

- *Superficial :*

  – to get patient's confidence,

  – to detect rigidity or tenderness,

  – to detect superficial masses.

- *Deep for the* :

  – liver and spleen (starting from the right iliac fossa),

  – kidneys (in the renal angle between the last rib posteriorly and vertebral column),

  – other masses.

Obstetric palpation:

1. Fundal level *:* is detected by the ulnar border of the left hand starting from the xiphisternum downwards after centralising the uterus.

- In primigravida, the fundal level at 40 weeks is felt at the level of about 32 weeks due to engagement of the head.

- Differentiation between 32 and 40 weeks may be known by:

  i- LNMP,

  ii- date of quickening,

  iii- manifestations of lightening and pelvic pressure,

  iv- engagement of the head detected abdominally or vaginally,

  v- shelfing of the fundus in standing position,

  vi- the clinical assessment of the baby size,

  vii-ultrasound assessment of the gestational age.

2-Fundal grip*:* by the palms of both hands one of the following may be detected:

i- Breech (96% of cases) : large, soft, irregular, does not ballot and continuous with the back.

ii- Head (3.5% of cases): small, hard, globular, ballots with a groove between it and the back.

iii- Empty fundus (0.5% of cases): in transverse lie.

3-Umbilical (lateral) grip*:* by the palms of both hands placed on both sides of the umbilicus.

- The back of the foetus is identified being smooth, firm and convex while the limbs are knobby and mobile.

- In case of transverse lie, the head is felt on one side and the breech on the opposite side of the middle line.
- External ballotment can be done to assess the amount of liquor.

4- First pelvic grip: the right hand is used to grasp the presenting part while the left hand is applying gentle downward pressure at the fundus to steady the foetus. The presenting part cannot be well grasped if it is engaged.

5- Second pelvic grip*:* The physician faces the patient's feet and the 2 hands are placed in the iliac fossae and approximated to:

i- feel the engaged head.

ii- assess the degree of head flexion by identifying the relation of the occiput to the sinciput.

The consistency of the uterus is detected which may be:

i- Cystic : in polyhydramnios.

ii- Doughy : in vesicular mole.

iii- Hard or woody : in abruptio placentae and during contractions.

(C) Auscultation:

The FHS is heard as a tic-tac rhythm over the anterior shoulder.

- *In cephalic presentation*: it is heard below the level of the umbilicus.
- *In breech presentation:* it is heard above the level of the umbilicus.
- *In transverse lie:* it is heard on one side of the umbilicus.
- *In occipito-anterior position.* it is heard over the mid point of a line joining the anterior superior iliac spine with the umbilicus.

- *In occipito - posterior position* : it is heard away from the middle line near the flanks.
- *In mento- anterior position*. it is heard at the middle line through the foetal chest wall.

Differential diagnosis:

1. Uterine souffle: caused by rush of blood in the uterine vessels . It is soft, blowing and synchronous with maternal pulse.
2. Umbilical souffle: caused by rush of blood in the umbilical arteries. It is sharp, whistling and synchronous with FHS.
3. Aortic pulsation : synchronous with maternal pulse.
4. Intestinal movements.

(III) Vaginal Examination:

Indications:

1- To diagnose early pregnancy.

2- Complications as bleeding, pain or discharge.

3- At 37-38 weeks to;

- assess the pelvic capacity (see clinical pelvimetry),

- detect engagement of the presenting part,

- do cephalopelvic disproportion tests if the head is not engaged.

4- During labour.

(C) DIAGNOSIS

It should include:

1- *Gravidity:* total number of pregnancies including the current one e.g. primigravida, and 2nd gravida...etc.

2- *Parity:* Number of previous deliveries e.g nullipara, unipara, 2nd para...etc.

3- *Number of abortions.*

So G3 P1 +1 means 3 pregnancies, one delivery and one abortion

4- *Duration of present pregnancy* : in weeks.

5- *Lie, presentation and position.*

6- *Associated complications as :*

– Previous caesarean section.

– Hypertension.

– Diabetes.

– Cardiac disease.

– Antepartum haemorrhage.

– IUGR.

– IUFD....etc.

Full diagnosis may be like;

4th gravida, 2nd para + 1, pregnant ± 38 weeks, cephalic , L.O.A, previous C.S.

The four-digit code: e.g. para 4024 means 4 full term deliveries, no abortions, 2 preterm labours and 4 living children.

CALCULATION OF THE GESTATIONAL AGE AND EXPECTED DATE OF DELIVERY

(1) Menstruation - Labour Interval (Naegle's rule):

Expected date of delivery (EDD)=

1st day of the last menstrual period (LNMP + 7 days + 9 calendar months)or

1st day of LNMP + 7 days - 3 calendar months + one year or

1st day of LNMP + 15 days + 9 Arabic months or

1st day of LNMP +280 days (40 weeks).

Labour may occur one week before or after the calculated EDD.

Fallacies:

a. Pregnancy may occur during a period of amenorrhoea e.g. lactational amenorrhoea.

b. Bleeding at expected time of menstruation may occur in the first trimester but not after that due to obliteration of the decidual space.

c. Bleeding in early pregnancy e.g. threatened abortion may be mistaken with a menstruation.

d. This method is not so accurate if menses were irregular before pregnancy.

e. Patient may forget her LNMP.

(2) Date of Single Coitus:

- EDD is calculated by adding 266 days to it.
- This is easier to be applied in case of rape.

(3) Date of Quickening:

- EDD= date of quickening + 20 -22 weeks in primigravida and + 22 -24 weeks in multipara.

(4) Size of the Uterus (fundal level):

- During the first month, no clinically appreciable changes.
- At the end of 8th week, uterus is 5 cm in diameter.
- At the end of 12 th week, uterus is 10 cm in diameter, globular in shape, felt at symphysis pubis in primigravida and a little higher in multigravida.
- From the 16th week upwards it is pyriform in shape and felt at the levels shown in the figure.

Causes of over-sized and under-sized uterus: (see before).

(5) Symphysis - Fundal Length (Mc Donald Formula):

After 24 th weeks, the distance from the symphysis to the fundus in cms. multiplied by 8/7 gives the duration of pregnancy in weeks e.g. at full term distance = $35 \times 8/7 = 40$ weeks.

(6) Abdominal Girth:

measured at the lower border of the umbilicus;

- at 36 weeks it is about 36 inches,

- at 40 weeks it is about 40 inches.

This gives a high false results due to interfering factors as maternal obesity, ascitis, polyhydramnios, multiple pregnancy...etc.

(7) Radiology:

a- Cephalometry: BPD is 7.5 cm at 32 weeks, 8.5 cm at 36 weeks and 9.5 cm at 40 weeks.

b- Ossification centres: Talus at 26 weeks, distal femoral epiphyses at 36-37 weeks proximal tibial epiphyses and fermoral head at 38-40 weeks.

(8) Ultrasound:

Detection of gestational age and hence EDD by measuring of ;

-Gestational sac diameter. -CRL. -BPD. -FL.

Practically speaking, the most useful ,safe and accurate methods used nowadays are:

1- LNMP (menstruation- labour interval). 2- Ultrasound.

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Obstetrics Simplified

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Forceps Delivery

Definition:

Obstetric forceps is a double-bladed metal instrument used for extraction of the foetal head.

Types:

(A) Long curved obstetric forceps:

It consists of 2 blades each of them is 15 inches (37.5 cm) long, crossing each other and lock at the site of crossing. Each is composed of :

(1) The blade proper (7.5 inches): has 2 curves*;*

i- pelvic curve adapted with the maternal pelvic axis,

ii- cephalic curve adapted to the foetal head.

- The blade is fenestrated to;

  - prevent compression of the head,

  - prevent its slippage as the parietal eminences are protruding through the fenestration.

  - make its weight lighter.

- The 2 blades are separated by one inch at the tip and 3.5 inches at the centre.

(2)The shank (2.5 inches):

It is the part between the blade proper and the handle giving a length for the forceps sufficient to be locked easily outside the vagina.

(3) Lock : there are 4 types of lock;

i- English type: double slot lock.

ii- French type: screw lock.

iii- German type ; combination of both .

iv- Sliding lock: present in kielland's and Barton's forceps.

(4) Handle (5 inches) : It may be serrated or smooth. A projecting shoulder may be present to facilitate traction.

(5) Axis traction piece.: In mid forceps delivery,a separate piece is attached to the forceps to direct the traction in the direction of pelvic axis i.e. downwards and backwards till the perineum.

There are 2 common types of axis traction piece:-

i- Neville - Simpson - Barnes: is the commoner one composed of a single bar attached to the handle just behind the lock.

ii- Milne - Murray's : It is composed of 2 bars and a handle to be attached to the blade proper.

Pajot's manoeuvre: is an alternative to the use of axis traction piece. Traction on the handle is made by the right hand while the left hand pulls downward on the shank or pushes on the shank from above (Modified Pajot's manoeuvre).

(B) Wrigley's forceps:

It is a short curved forceps of 11 inches length and used for low and outlet forceps delivery.

(C)Kielland's forceps:

It is a long forceps characterised by:

1. *Minimal pelvic curve* which is again nullified by a slight bend between the blade proper and the shank so it is nearly a straight forceps allowing rotation and extraction of the head by a single application.
2. *A sliding lock* : to allow application on asynclitic head.
3. *Knobs on the handle*: on the side of the minimal pelvic curve and should be directed toward the foetal occiput during application.
4. *Bevelled inner surface of the blades*: to minimise foetal head injury.
5. *Light in weight.*

(D) Piper's forceps:

It has a perineal curve to allow application to the after-coming head in breech delivery.

(E) Barton's forceps:

A long forceps characterised by :

- The blade of the posterior branch joins the shank at an obtuse angle corresponding to that between the inlet and outlet pelvic planes.

- A 90 degrees hinge joint between the blade and the shank of the anterior branch.

- A sliding lock.

- Indication : transverse arrest especially in a platypelloid pelvis with a flat sacrum.

Action of the Forceps:

1. **Traction :** is the main action.
2. **Rotation:** in deep transverse arrest, persistent occipito- posterior and mento- posterior.

Indications of Forceps Delivery:

(I) Prolonged 2nd stage:

It is prolongation for more than 1 hour in primigravidae or 30 minutes in multiparae. This may be due to :

1- Inertia and poor voluntary bearing down.

2- Large foetus.

3- Rigid perineum.

4- Malpositions: persistent occipito-posterior and deep transverse arrest.

5- Malpresentations: Face and brow presentations.

(II) Maternal indications:

(1)Maternal distress manifested by *:*

- Exhaustion.

- Pulse >100 beats / min.

- Temperature >38ºC .

- Signs of dehydration.

(2) Maternal diseases as:

- Heart disease.

- Pulmonary T.B.

- Pre-eclampsia and eclampsia.

(III) Foetal indications:

1- Foetal distress.

2- Prolapsed pulsating cord.

3- Preterm delivery.

4- After-coming head in breech delivery.

(IV) During caesarean section :

One (used as a lever) or the two blades may be used to extract the head through the uterine incision.

Classification of Forceps Delivery:

ACOG (1991) Classification:

Type	Description
Outlet forceps	1. The foetal head is at the perineum. 2. The scalp is visible at the introitus without separating the labia. 3. Sagital suture is in anteroposterior diameter, right or left occipito-anterior or posterior. 4. Rotation does not exceed 45 º.
Low forceps	The leading point of the skull is at station +2 or more and divided into: i-Rotation ≤ 45 º. ii-Rotation > 45º.

Mid forceps	The head is engaged, but the leading point is above station +2.
High forceps	Not included in the classification. It is abandoned in favour of caesarean section.

Pre-requisites for Forceps Application:

1. **A***naesthesia*: general, epidural, spinal or pudendal block.
2. **A***dequate pelvic outlet*.
3. **A***septic measures*.
4. **B***ladder and* **B***owel evacuation*.
5. **C***ontractions of the uterus* should be present.
6. **D***ilatation of the cervix* should be fully.
7. **E***ngaged head*.
8. **F***orewater rupture.*
9. **F***avourable position and presentation:*

   - Occipito -anterior. - Occipito-posterior.

   - Face presentation. - After -coming head in breech.

Types of Forceps Application:

1. **Cephalic application:** the forceps is applied on the sides of the foetal head in the mento-vertical diameter so injury of the foetal face, eyes and facial nerve is avoided .
2. **Pelvic application:** The forceps is applied along the maternal pelvic wall irrespective to the position of the head. It is easier for application but carries a great risk of foetal injuries.
3. **Cephalo-pelvic application :** It is the ideal application and possible when the occiput is directly anterior or posterior or in direct mento-anterior position.

How to know Right and Left Blades:

Putting in consideration that the mother is in the lithotomy position, the blade will be applied with the pelvic curve directed anteriorly and the cephalic curve directed medially. If the blade will be applied to the left maternal side it is a left blade and vice versa.

Technique of Forceps Delivery:

(A) In occipito- anterior position:

- The left blade is applied first. It is held by its handle between the thumb and fingers of the left hand almost parallel with the right inguinal ligament and passed along the left side of the maternal pelvis between the guiding palm of the right hand and foetal head.

- As the blade passes into the birth canal the handle is carried backwards and towards the midline. It is now the lower blade.
- The fingers of the left hand are introduced along the right side of the pelvis and the right blade is held and passed in the same manner. It is now the upper blade.
- The 2 blades should be locked easily, if not this means that they were not correctly applied and should be removed and re-assess the position of the head.

Clinical checks for correct forceps application:

1. The sagittal suture lies in the midline of the shanks.
2. The operator cannot place more than a finger tip between the fenestration of the blade and the foetal head.
3. The posterior fontanelle is not more than one finger- breadth above the plane of the shanks.

Traction should be:

- gentle by the force of the arm only,

- intermittent with uterine contractions only,

- in correct direction i.e. downwards and backwards till the occiput appears at the vulva, then downwards and forwards.

- The 2 blades are unlocked between contractions to minimise the period of head compression.

(B) Kielland forceps in deep transverse arrest:

- The forceps is locked outside with the knobs towards the occiput to know the anterior blade.
- The anterior blade is applied first by one of the following methods:

1. *The wandering method:* The anterior blade is guided into the lateral side of the pelvis with the cephalic curve facing the foetal head. It is then slid over the forehead to fit against the anterior parietal eminence.
2. *The direct method*: when the head is low down in the pelvis, the anterior blade is slid between the head and symphysis pubis with the cephalic curve facing the foetal head.
3. *The old (classical) method:* The anterior blade is applied with the cephalic curve towards the symphysis pubis then it is rotated 180º to fit with the head. This method is not recommended as the lower uterine segment and bladder may be injured.
    - The posterior blade is applied along the concavity of the sacrum.
    - The 2 blades are locked, head is rotated and extracted as occipito-anterior.

Complications of Forceps Delivery:

(A) Maternal complications:

1- Complications of anaesthesia.

2- Lacerations:

- Extension of the episiotomy.
- Perineal tear.
- Vaginal tears.
- Cervical lacerations.
- Bladder injury.
- Ureteric injury.
- Rupture uterus.

3- *Bone injuries*: to pelvic joints, coccyx or symphysis pubis.

4- *Pelvic nerve injuries.*

5- *Postpartum haemorrhage*: due to lacerations or atony.

6- *Puerperal infections*.

7- *Remote effects*: genital prolapse, stress incontinence, cervical incompetence and genito-urinary fistulas.

(B) Foetal complications:

1- Fracture of the skull.

2- Cephalohaematoma.

3- Intracranial haemorrhage.

4- Facial nerve palsy.

5- Trauma to the face, eyes or scalp.

6- Asphyxia due to :

i- intracranial haemorrhage or,

ii- cord compression between the head and the forceps.

FAILED FORCEPS

Failure to extract the foetus by the forceps which may be due to failure to apply the forceps or to deliver the head with it.

Causes:

1- Cephalo- pelvic disproportion.

2- Contracted outlet.

3- Incomplete cervical dilatation.

4- Constriction ring.

5- Head is not engaged.

6- Malpositions as persistent occipito-posterior.

7- Malpresentations as brow.

8- Foetal congenital anomalies as hydrocephalus, ascitis and conjoined twins.

Management:

1. **Reassessment:** The forceps is removed and the patient is re-examined to detect the cause and correct it if possible.
2. **Caesarean section:** is indicated in uncorrectable causes as cephalo-pelvic disproportion, and contracted outlet.
3. **Exploration of the birth canal**: for any injuries.

03.12.02

Obstetrics Simplified

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Vacuum Extraction (Ventouse)

It is traction of the foetal head by a created negative pressure through a cup applied to the head.

Description:

Vacuum extractor is composed of:

1. A specially designed cup with a diameter of 3,4,5 or 6 cm.
2. A rubber tube attaching the cup to a glass bottle with a screw in between to release the negative pressure.
3. A manometer fitted in the mouth of the glass bottle to declare the negative pressure.
4. Another rubber tube connecting the bottle to a suction piece which may be manual or electronic creating a negative pressure that should not exceed - 0.8 kgm per cm^2.

Types:

The main difference between vacuum extractors lies in the cup.

(I) Mälmstrom cup:

A metal cup to its centre attached a metal chain passed through the rubber tube. The other end of the chain is attached to a handle for traction.

(II) Bird's cup:

The suction rubber tube is attached to the periphery of the cup while the handle of traction is attached by a separate short metal chain to the centre of the cup.

(III) Soft cup:

It is a bell-shaped 6.5 cm diameter soft cup which is made of a firm but supple silastic material.

Advantage: It produces symmetric, less cosmetically alarming caput succadaneum and less scalp abrasions.

Disadvantage: It slips more than the metal cup but with less scalp injuries.

Indications:

1. **The same as forceps:** but it is not recommended in preterm babies and not used for the after-coming head in breech delivery.
2. **During the 1st stage:** The small cup 3 or 4 cm may be used in a soft, stretchable cervix of not less than 7 cm dilatation.
3. **During caesarean section:** It may be used to extract the foetal head through the uterine incision.

N.B. Vacuum is not an instrument for rotation of the head but it rotates spontaneously when meets the pelvic floor. Trial to rotate the head with the cup will cause it to slip.

Contraindications:

1. Moderate or severe cephalopelvic disproportion.
2. Other presentations than vertex.
3. Premature infants.
4. Intact membranes.

Procedure:

1. *Lithotomy position.*
2. *Antiseptic measures* for the vagina, vulva and perineum.
3. *Vaginal examination* to check pelvic capacity, cervical dilatation, presentation, position, station and degree of flexion of the head and that the membranes are ruptured.

4. *Application of the cup:* The largest cup that can easily passed is introduced sideways into the vagina by pressing it backwards against the perineum. It is then applied as near as possible to the posterior fontanelle over the mid sagittal line with its edge 3 cm from the anterior fontanelle. This position will promote flexion of the head and brings the smallest diameters of the foetal skull into the maternal passages. Be sure that there is no cervical or vaginal tissues nor the umbilical cord or a limb in complex presentation is included in the cup.

5. *Creating the negative pressure*: holding the cup in place, the negative pressure is gradually increased by 0.2 kg/cm^2 every 1 minute until - 0.8 kg/cm^2 is attained. This creates an artificial caput within the cup.

6. *Traction:* on the handle is made perpendicular to the cup and intermittently during uterine contractions, the direction of pull is changing as the head descends through the birth canal.

7. *Release of the cup:* when the head is delivered the vacuum is reduced as slowly as it was created using the screw as this diminishes the risk of scalp damage.

Bird's safety rules for vacuum extraction:

1. The head must be completely or partially delivered with no more than 3 pulls.
2. The head is at least begin to move with the first pull.
3. The cup must not be applied more than twice.
4. Application of the cup must not exceed 20 minutes.

Advantages of Vacuum Over Forceps:

1. Anaesthesia is not required so it is preferred in cardiac and pulmonary patient.
2. The ventouse is not occupying a space beside the head as forceps.

3. Less compression force (0.77 kg/cm^2) compared to forceps (1.3 kg/cm^2) so injuries to the head is less common.
4. Less genital tract lacerations.
5. Can be applied before full cervical dilatation.
6. It can be applied on non-engaged head.

Complications:

(I) Foetal :

1- Cephalohaematoma.

2- Scalp lacerations.

3- Rarely, intracranial haemorrhage.

(II) Maternal:

1. Vaginal and cervical lacerations.
2. Annular detachment of the cervix, cervical incompetence and may be future prolapse if used with incompletely dilated cervix.

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Obstetrics Simplified

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Caesarean Section (C.S)

An operative procedure to deliver a viable foetus or more (i.e. after 28 weeks or 20 weeks according to the ACOG) through an abdominal and uterine incisions.

Incidence:

increased from 5% in 1970 to 25% in 1990 due to:

1. Procedures as high forceps and difficult mid forceps are abandoned in favour of C.S.
2. Increased C.S delivery in breech presentation.
3. Destructive operations are abandoned in favour of C.S.
4. Decreased morbidity and mortality due to C.S encourages its use.
5. Increased repeated C.S due to increased primary C.S.

Indications:

(A) Maternal indications:

1. *Contracted pelvis and cephalopelvic disproportion* (see before).
2. *Pelvic tumours* especially if impacted in the pelvis or cancer cervix.
3. *Antepartum haemorrhage* (see before).
4. *Hypertensive disorders with pregnancy* (see before).
5. *Abnormal uterine action* (see before).

6. *Previous uterine scar* as hysterotomy or metroplasty.
7. *Previous successful repair of vesico-vaginal fistula.*
8. *Previous caesarean section* if,

   i- the cause of the previous section is permanent e.g. contracted pelvis.

   ii- previous section was upper segment.

   iii- suspected weak scar as evidenced by:

   - History of puerperal infection after the previous section.

   - Hysterosalpingography or hysteroscopy done after the previous section reveals a defect in the scar.

   - Vaginal bleeding during current labour.

   - Marked tenderness over the scar during current labour**.**

   iv- Associated conditions as antepartum haemorrhage or malpresentations.

(B) Foetal indications:

1. *Malpresentations and malposition* (see before).
2. *Prolapsed pulsating cord or foetal distress* before full cervical dilatation.
3. *Diabetes mellitus* (see before).
4. *Bad obstetric history* as recurrent intrauterine foetal death in last weeks of pregnancy or repeated intranatal foetal death.
5. *Post-mortem C.S.* done within 10 minutes of maternal death to save a living baby.

Contraindications:

1- Dead foetus: except in;

- Extreme degree of pelvic contraction.

- Neglected shoulder.

- Severe accidental haemorrhage.

2- Disseminated intravascular coagulation: to minimise blood loss.

3- Extensive scar or pyogenic infection in the abdominal wall e.g. in burns.

Types of Caesarean Section:

(A) According to timing:

1. *Elective caesarean section:* The operation is done at a pre-selected time before onset of labour, usually at completed 39 weeks.
2. *Selective caesarean section:* The operation is done after onset of labour.

(B) According to the site of uterine incision:

1. *Upper segment caesarean section (classical C.S.):* The incision is done in the upper uterine segment and it is always vertical.
2. *Lower segment caesarean section (LSCS)* : It is the commoner type. The incision is done in the lower uterine segment and may be transverse (the usual) or vertical in the following conditions:-

   i- Presence of lateral varicosities.

   ii- Constriction ring to cut through it.

   iii- Deeply engaged head.

(C) According to number of the operation:

1. *Primary caesarean section:* for the first time.
2. *Repeated caesarean section :* with previous caesarean section(s).

(D) According to opening the peritoneal cavity:

1. *Transperitoneal :* The ordinary operation where the peritoneal cavity is opened before incising the uterus.
2. *Extraperitoneal:* The peritoneal cavity is not opened and the lower uterine segment is reached either laterally or inferiorly by reflecting the peritoneum of the vesico-uterine pouch . It is indicated in case of infected uterine contents as chorioamnionitis.

Advantages of elective C.S:

1. Pre - operative good preparation as regard sterilisation and antiseptic measures, fasting and bowel preparation.
2. The risk of puerperal sepsis is minimised.
3. The operation is scheduled and working is in ease.

Disadvantages of elective C.S:

1. The risk of immaturity of the foetus or its lung is present.
2. Higher incidence of respiratory distress syndrome.
3. The lower segment may be not well formed.
4. Postpartum haemorrhage is more liable to occur.
5. Imperfect drainage of lochia as the cervix is closed so it should be dilated by the index finger introduced abdominally through the uterine incision.

Procedure of Lower Segment Caesarean Section:

- *Anaesthesia:* General inhalation anaesthesia with nitrous oxide + oxygen (the most commonly used) , epidural, spinal or rarely local infiltration anaesthesia.

- *Position :* Tilting the patient 15º to the left in the dorsal position minimise the aorto-caval compression.

- *Skin incision*: pfannenstiel (transverse suprapubic) incision is the most commonly used, but midline or paramedian vertical suprapubic incisions may be used. If the patient had a previous C.S incise in the same incision with trimming of the fibrosed edges of the wound to help good healing.

Pfannenstiel incision has a better cosmetic appearance, better healing and less incidence of incisional hernia but it is more time consuming associated with more blood loss and gives less exposure.

- *The subcutaneous fat* is incised.

- *The anterior rectus sheath* is incised transversely in case of pfannenstiel incision and longitudinally in case of vertical incisions.

- *The rectus muscles :* are separated in the midline in pfannenstiel incision or retracted laterally in case of vertical incisions.

- *The parietal peritoneum:* is opened vertically.

- *The uterus is* centralised, the bowel and omentum are packed off with moist laparotomy pads, however this is usually unnecessary.

- *The loose peritoneum over the lower uterine segment* is held and incised transversely, for about 10 cm in a semilunar fashion with its edges directed upwards.

- *The bladder is dissected downward* and is retained behind a Doyne retractor placed over the symphysis.

- *A stay suture may be taken* superficially in the lower segment below the assumed site of uterine incision to help in its identification after evacuation of the uterus.

- *The uterus is incised* : in the same semilunar fashion by one of the following methods:

    1. A semilunar mark is made by the scalpel cutting partially through the myometrium for 10 cm. A short (3cm) cut is made in the middle of this incision mark reaching up to but not through the membranes. The incision is completed by the 2 index fingers along the incision mark. If the lower uterine segment is very thin , injury of the foetus can be avoided by using the handle of the scalpel or a haemostat (an artery forceps) to open the uterus.

    2. The short (3cm) middle incision may be enlarged by a bandage scissors over 2 fingers introduced into the uterus to protect the foetus.

- *Membranes are ruptured* by toothed or Kocker's forceps.

- *The head is delivered by* :

    i- introducing the right hand gently below it and lifting it up helped by fundal pressure done by the assistant,

    ii- using one blade of the forceps or,

    iii- using Wrigley's forceps.

If the head is deep in the pelvis it can be pushed up vaginally by an assistant.

The Doyen's retractor is removed after the hand or forceps blade is applied and before head extraction.

- *Suction for the foetus* is carried out before delivery of the head.

- *In breech or transverse lie* the foetus is extracted as breech.

- *The placenta is removed.*

- *Closure of the uterine incision* is done in 3 layers.

  - The first is a continuous locking suture taking most of the myometrium but not passing through the decidua to guard against endometriosis and weakness of the scar.

  - The second is a continuous or interrupted one inverting the first layer.

  - The third is a continuous or interrupted layer to close the visceral peritoneum of the uterus. Closure of visceral and/or parietal peritoneum is omitted by some surgeons.

- *The abdomen is then closed in layers* .

Upper Segment Caesarean Section :

Indications:

1. Dense adhesions, extensive varicosity or myoma in the lower uterine segment making its exposure or incising through it difficult.
2. Impacted shoulder presentation.
3. Anterior placenta praevia.
4. Defective scar in the upper segment.
5. Cancer cervix.
6. Rapid delivery is indicated.
7. If a concomitant tubal sterilisation will be done.
8. Previous successful repair of high vesico-vaginal or cervico-vaginal fistula.
9. Post-mortem hysterectomy.

Procedure:

- *Abdominal incision*: is vertical.
- *Uterine incision* : 10 cm vertical incision is made in the midline of upper uterine segment without incising the peritoneal coat separately as it is adherent in the upper segment.
- *Extraction of the foetus:* as a breech in cephalic presentation.
- *The last layer of the uterine incision closure* includes the superficial part of the myometrium with the peritoneal covering.
- The remainder of the procedure is as lower segment C.S.

Special problems encountered during caesarean section:

(I) Anterior placenta praevia:

Try to pass beside the placenta to reach the foetus if this is impossible cut through it but severe bleeding will result which may affect the foetus.

(II) Narrow uterine incision:

Extension of the lower uterine segment incision may be done by:

a- *"J" shaped or hockey-stick incision :* i.e. extension of one end of the transverse semilunar incision upwards.

b- *"U"- shaped or trap-door incision:* i.e. extension of both ends upwards.

c- *An inverted T incision:* i.e. cutting upwards from the middle of the transverse incision. This is the worst choice because of its difficult repair and poor healing.

Advantages of the lower segment over the upper segment operation:

1. *Less blood loss:* due to less vascularity and the placental bed is away from the incision.
2. *Easier to repair.*

3. *The resultant uterine scar is stronger* due to:

   a- Better coaptation of the edges as the lower segment is thin.

   b- Better healing as the lower segment is more passive during puerperium.

   c- The scar is distant from the subsequent site of placental implantation which may penetrate it.

   So subsequent rupture uterus is less (0.2% versus 2% in upper segment).

4. *Less subsequent adhesions to the bowel and omentum.*

5. *Less liability to acute gastric dilatation and paralytic ileus.*

6. *Less liability to peritonitis due to better peritonization and healing.*

Mode of Delivery in Subsequent Pregnancies:

The rule that "caesarean always caesarean" had been replaced since a long time by "caesarean always hospital delivery". If the cause of the previous section is not permanent as contracted pelvis, vaginal delivery can be tried.

Caesarean Hysterectomy:

Hysterectomy is carried out after caesarean section in the same sitting for one of the following reasons:

1- Uncontrollable postpartum haemorrhage.

2- Unrepairable rupture uterus.

3- Operable cancer cervix.

4- Couvelaire’s uterus.

5- Placenta accreta cannot be separated.

6- Severe uterine infection particularly that caused by Cl. welchii.

7- Multiple uterine myomas in a woman not desiring future pregnancy although it is preferred to do it 3 months later.

Caesarean Sterilisation:

Tubal sterilisation is usually advised during the fourth caesarean section.

Complications of Caesarean Section:

(I) Operative:

1- *Primary maternal mortality is 4 times that of vaginal delivery* which may be due to:

i- shock .

ii- Anaesthetic complications particularly Mendelson's syndrome

iii- Haemorrhage usually due to extension of the uterine incision to the uterine vessels, atony of the uterus or DIC.

2- Injuries to the bladder or ureter.

3- Foetal injuries.

(II) Post-operative:

(A) Early:

1. *Thrombosis and pulmonary embolism.*
2. *Acute dilatation of the stomach and paralytic ileus.*
3. *Wound infection, puerperal sepsis and burst abdomen.*
4. *Chest infection.*

(B) Late :

1. *Rupture of the uterine scar.*

2. *Incisional hernia.*

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Obstetrics Simplified

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Version

Definition:

It is changing the transverse lie to a longitudinal one or replacement the presenting pole by the other. If the aim is to make the head the presenting part it is called cephalic version and if the breech will be the presenting part it is podalic version.

Types:

1. External version, usually cephalic.
2. Internal podalic version.
3. Bipolar podalic version.

External Cephalic Version

Indications:

1-Breech presentation.

2- Transverse or oblique lie.

Procedure:

- No anaesthesia as the pain is a safe guard against rough manipulations.
- The patient evacuates her bladder.
- She lies in a trendelenburg position with exposed vulva to detect any vaginal bleeding.

- The foetal position is determined and FHS is auscultated.
- One hand is applied externally to the foetal head and the other on its buttock, the two poles are approximated to flex the foetus and rotation is done by the two hands simultaneously to bring the head lower down.
- The FHS is auscultated again, if there is foetal distress lasting for more than 5 minutes, the foetus is returned back to its previous position as the cord might be coiled or entangled around the neck.
- If neither vaginal bleeding nor foetal distress results, an abdominal binder is applied to fix the new position and re-examined twice weekly. If the original presentation returned again, the procedure of version can be repeated.

Causes of Failure

Contraindications

See Breech Presentation

Complications

INTERNAL PODALIC VERSION

Indications:

1. Retained second twin in a transverse lie.
2. Some cases of shoulder presentation.

Prerequisites:

1. General anaesthesia to guard against pain and give uterine and pelvic relaxation.
2. Evacuation of the bladder.
3. Complete aseptic conditions.

4. Cervix is fully dilated.
5. Uterus is not tonically contracted.
6. No previous uterine scar.
7. Adequate liquor amnii (intact or recently ruptured membranes).
8. No obstruction to vaginal delivery whether maternal as contracted pelvis or foetal as hydrocephalus.

Procedure:

- Lithotomy position.
- Episiotomy in primigravida.
- The hand is introduced through the cervix into the uterus and grasp the lower foot if the back is anterior and the upper foot if the back is posterior ,so that the back is kept anterior during delivery.
- The other hand is pushing the head upwards while the foot is brought downwards.
- The other foot is brought down and breech extraction is done.
- The birth canal is explored after delivery for possible injuries.

Complications:

(A) Maternal :

1- Shock (in light anaesthesia) .

2- Premature separation of the placenta.

3- Rupture uterus.

4- Cervical lacerations.

5- Postpartum haemorrhage.

6- Puerperal sepsis.

(B) Foetal:

1. Asphyxia due to premature separation of the placenta or entangling of the cord.
2. Complications of breech delivery.

BIPOLAR PODALIC VERSION

It is outmoded of modern obstetrics.

Indications:

It was done in a partially dilated cervix for:

1. Correction of a transverse lie in a dead or markedly premature foetus.
2. Compression of placenta praevia.

Procedure:

Under general anaesthesia, 2 fingers are passed through the partially dilated cervix, the foot is grasped , as in internal podalic version, pulled through the cervix while the other hand is assisting the version externally.

Complications:

As internal podalic version but higher in incidence due to the partially dilated cervix and presence of the placenta lower down in case of placenta praevia.

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Episiotomy

Definition:

It is an intrapartum incision of the perineum to widen the introitus.

Benefits:

1. Prevention of perineal lacerations by anatomical incision and repair of the episiotomy.
2. Prevention of prolonged and overstretch of the perineum which predisposes to prolapse and stress incontinence.
3. Minimising compression and decompression of the head which causes intracranial haemorrhage.

Indications:

(A) Maternal:

1. Nearly in all primiparas.
2. Old perineal scar about to rupture.
3. Prolonged second stage due to rigid perineum.
4. Prior to most instrumental vaginal delivery as forceps and vacuum.
5. Vulval oedema.

(B) Foetal

1- Large sized baby.

2- Preterm baby.

3- Direct occipito-posterior.

4- Breech delivery.

Types:

(1) Median episiotomy:

A midline incision down to, but not, including the external anal sphincter.

Advantages:

1. It is the easiest to perform and to repair.
2. Associated with less blood loss.
3. Less pain and discomfort in the puerperium.
4. Less dyspareunia later on.
5. Better end-result cosmetic appearance.

Disadvantages:

Its inadvertent extension will injure the external anal sphincter and rectum. This can be prevented by extending the incision by the scissors in a J-shaped manner to avoid the external sphincter.

(2) Mediolateral episiotomy:

The incision extends from the midline of the forchette mediolaterally at 5 or 7 o'clock towards the direction of the ischial tuberosity.

Advantages:

Extension to the anal sphincter is less common so it is more suitable for instrumental delivery and in short perineum.

Disadvantages:

1. Difficult to perform and to repair.

2. More blood loss.
3. More pain and discomfort in the puerperium.
4. More dyspareunia later on.
5. Less end-result cosmetic appearance.

Procedure:

- *Anaesthesia:* Local infiltration, pudendal nerve block, epidural, spinal or general anaesthesia can be used.
- *Timing:* when the introitus is distended by the presenting part or the cup of the ventouse with a visible diameter not less than 3-4 cm, and done at the maximum of a uterine contraction. If forceps will be used episiotomy is done just before its application.
- *Incision:* The index and middle fingers of one hand is introduced between the presenting part and the proposed site of perineal incision to protect the presenting part and support the tissues that will be incised. The incision is usually 3-5 cm length. including the posterior vaginal wall, forchette, perineal muscles and perineal skin.
- *Repair:* Cut gut O, Dexon or vicryl 2/0 may be used to close the posterior vaginal wall by continuous sutures where the first stitch should be above the apex of the vaginal incision, then the muscles with interrupted sutures and lastly the skin with interrupted or subcuticular sutures.

Postnatal care:

1. A non- steroidal anti-inflammatory agent as diclofenac is used as an analgesic for the first 72 hours.
2. Local antiseptic lotion and antibiotic powder or spray is used for 7 days.

03.12.02

Obstetrics Simplified

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Symphysiotomy

Definitions:

Symphysiotomy: is division of the symphysis pubis with a scalpel.

Pubiotomy: is division of the pubic ramus half an inch from the symphysis pubis with a Gilgi saw to avoid injury to the urethra and bladder. It is out of modern obstetrics due to higher incidence of pubic pain and infection.

Indications:

It is particularly indicated in women living in distant areas where caesarean section cannot be done and even patient will be left with a caesarean scar is in a high risk of rupture in the next labour.

As symphysiotomy gives a permanent increase of the pelvic capacity, it can be an alternative to C.S and indicated in the following conditions:

1. Moderate cephalopelvic disproportion.
2. Contracted outlet in funnel shaped pelvis.
3. Retained aftercoming head in breech delivery failed to be delivered by other means.
4. Shoulder dystocia with a living foetus cannot be delivered by other means.

Procedure:

Subcutaneous symphysiotomy is the commonly done operation and done as follow:

1. *A firm catheter* is applied and the urethra is displaced to one side with two fingers in the vagina.
2. *A 1-2 cm vertical suprapubic incision* is made with a scalpel just above the symphysis.
3. *The scalpel is introduced* through the incision to the upper border of the symphysis with its sharp edge facing anteriorly i.e. towards the operator.
4. *The joint is gradually divided by a rocking motion*, checking with the vaginal fingers for posterior perforation of the joint capsule. Complete division is rarely, if ever ,required.
5. *The thighs are held* by assistants so that abduction and joint separation can be controlled.
6. *A large episiotomy* is required to minimise strain on the soft tissue anteriorly.
7. *Forceps or preferably, ventouse* is used to deliver the foetus.
8. *The skin incision is closed* by one or two sutures.

Postoperative:

1. *Rest* for 2 weeks.
2. *A tight binder* of " Elastoplast" is strapped around the pelvic girdle and hips.
3. *Bladder drainage* is continued for 3-4 days.
4. *A prophylactic antibiotic* may be given.

Complications:

1. *Haemorrhage*, compression for few minutes usually stop it.
2. *Injury to the urethra or bladder.*

3. *Vesico-vaginal or urethro-vaginal fistula.*
4. *Stress incontinence.*
5. *Sepsis.*
6. *Pelvic osteoarthropathy.*
7. *Difficulty of walking and unstable pelvis* usually improved by time.

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Obstetrics Simplified

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Destructive Operations (Embryotomy)

Definition:

These are a group of operations aims at reducing the size of the head , shoulder girdle or trunk of the dead foetus to allow its vaginal delivery. It has been abandoned from the modern obstetrics in favour of caesarean section which is safer to the mother.

Procedures:

1- Craniotomy.

2- Decapitation.

3- Cleidotomy.

4- Evisceration

5- Spondylotomy.

Contraindications:

1. *Living foetus* except in certain congenital anomalies incompatible with life as anencephaly which may be associated with large shoulder girdle. However, destruction of a living foetus for whatever the cause may not be accepted from the religious point of view.
2. *Extreme degree of contracted pelvis* i.e. true conjugate < 5.5 cm.
3. *Partially dilated cervix.*
4. *Rupture or impending rupture uterus*.

5. *Obstructing pelvic tumours.*
6. *Cancer cervix with pregnancy.*

Complications:

1. Rupture uterus.

2- Injuries to the genital tract.

CRANIOTOMY

Definitions:

Craniotomy: perforation of the foetal head (cranium).

Cranioclasm: crushing of the crainum.

Cephalotripsy: crushing of the whole head including the base of the skull.

Indications:

1. Hydrocephalus.
2. Retained after-coming head of a dead foetus.
3. Cephalopelvic disproportion with a dead foetus.
4. Impacted malpresented dead foetus as mento-posterior and brow presentation.

Sites of Perforation:

1. **Vertex presentation:** The anterior fontanelle or in the parietal bone as near as to it.
2. **After -coming head:**

- The roof of the mouth.

- The foramen magnum.

- The occipital bone behind the mastoid .

- Through the spina bifida if present by a stiff catheter passed up to the spinal canal .

3. **Face:** The orbit.

4. **Brow**: The frontal bone.

Procedure:

(I) Perforation:

- Under general anaesthesia the bladder is evacuated and head is steadied by an assistant.
- The Simpson's perforator is held closed in the operator's hand while its tip is protected by the fingers of the other hand which guide it through the birth canal up to the site of perforation and applied perpendicular to it.
- The tip is forced into the site of perforation up to shoulders of the perforator which is then opened to produce a linear incision in the skull bones.
- The perforator is closed, rotated 90º and re-opened again thus producing a cruciate incision. The resultant hole is enlarged by the closed perforator which is pushed to allow drainage of the CSF and brain matter.
- The closed perforator is withdrawn while its tip is protected by the fingers.

Alternative methods:

a. Needle aspiration vaginally: through the fontanelle or suture line after steadying the head with Jacob's tenaculum.

b. Trans - abdominal aspiration with a syringe or spinal needle.

(II) Extraction:

1. *Spontaneous delivery* can occur after reduction of the size of hydrocephalus.
2. *Two volsella or Willet's scalp forceps* may be applied for traction.
3. *Forceps* can be applied if there is no disproportion.
4. *The cranioclast (2 blades) or the combined cranioclast and cephalotribe (3 blades)* are used to crush and extract the head if there is disproportion.
5. *The after - coming head* is delivered as in breech delivery.

The birth canal should be explored after delivery.

DECAPITATION

Definition:

It is severing of the foetal head from the trunk.

Indication:

1. Neglected shoulder with a dead foetus.
2. Locked twins.
3. Double -headed monsters.

Procedure:

- Under general anaesthesia, the prolapsed arm is grasped to bring the neck within easier access.
- The decapitation hook, protected by the palm of the left hand, is passed up over the child's shoulder and turned over the neck.
- If the hook is sharp, the neck is severed by sawing movement and if it is blunt, rotate it to cause fracture dislocation of the cervical spines then the soft tissue is cut by an embryotomy scissors with a blunt tip.

- The trunk is delivered first by traction on the arm.
- The head is then delivered by hooking a finger into the mouth or with a forceps.
- Explore the birth canal.

CLEIDOTOMY

Definition:

It is division of one or both clavicles with an embryotomy scissors to reduce the biacromial diameter in shoulder dystocia with a dead foetus.

EVISCERATION

Definition:

It is incision of the abdomen and/ or thorax to evacuate its viscera so reducing its size and allowing its vaginal delivery.

Indications:

1. Foetal ascitis.
2. Thoracic or abdominal tumours.

Procedure:

Under general anaesthesia, a large incision is made in the foetal abdomen with an embryotomy scissors then the viscera are evacuated manually.

If the thorax has to be incised first the abdominal viscera can be reached via the diaphragm.

SPONDYLOTOMY

Definition:

It is division of the vertebral column.

Indications:

1. Transverse impaction of a dead foetus when the neck cannot be reached.
2. In addition to evisceration when the foetus is large or pelvis is deformed.

Procedure:

The vertebral column is divided by an embryotomy scissors. The foetus is delivered in 2 halves by traction on one arm to deliver a half and on a leg to deliver the other.

03.12.02

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