

Management of Pre term Rupture of Membranes (PROM)

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Introduction

This guideline is to provide recommendations to aid General Practitioners and Obstetricians in the management of **Preterm Rupture of Membranes (PROM)**. This treatment could be initiated in a primary care setting or in centres with advanced facilities. The objective of management of preterm rupture of membranes (PROM) is to make an early diagnosis, treat, prevent complications, and consequently to improve quality of life.

2.1 Scope of the guideline

The world literature records that the incidence of PROM is 4% - 7%. However the consequent problems associated are disproportionately high. Out of the total number of preterm deliveries 75% are spontaneous, of which 50% have no risk factors before pregnancy¹. Hence screening has very low specificity & sensitivity. The balance 25% of these mothers is induced for maternal, fetal or foeto-maternal reasons. Prematurity contributes a significant proportion towards perinatal mortality & morbidity. In addition to its medical importance, preterm delivery has an important economic effect on the country on both short and long term care of these infants. Hence prevention of preterm labour is of paramount importance particularly to Sri Lanka, which is a developing country.

Medical & paramedical staff must be aware of the risk factors and methods available to predict preterm labour. The mothers also should be educated on these situations so that they may seek medical care without delay.

Morbidity in the preterm infant is due to Respiratory Distress Syndrome (RDS), intra-ventricular haemorrhage, necrotizing enterocolitis, delayed closure of ductus arteriosus, cerebral palsy and visual and hearing

impairment. The economic impact on the state involves high financial cost due to intensive care, hospitalization & rehabilitation. An additional disadvantage is the disruption of mother-infant bonding due to the need for long periods of intensive care.

The distinction between preterm rupture of membranes (PROM), & preterm prelabour rupture of membranes (PPROM) should be identified.

The rupture of membranes with labour contractions before 37 completed weeks of gestation is referred to as preterm rupture of membranes (PROM). The rupture of membranes without labour contractions before 37 completed weeks of gestation is referred to as preterm prelabour rupture of membranes (PPROM).

This distinction is important, as the fetal outcome in PROM is clearly more favourable than in the other group. PPRM after 18 hours is referred to as prolonged preterm rupture of membranes.²

2.1.1 Definitions

- Preterm rupture of membranes (PROM) is defined as the rupture of membranes with labour contractions before 37 completed weeks of gestation.
- Preterm labour is defined as the onset of labour pains prior to 37 completed weeks of gestation.
- The prelabour rupture of membranes is defined as rupture of fetal membranes with leakage of amniotic fluid without regular painful uterine contractions occurring at least every 10 minutes and unaccompanied by cervical dilatation and/or effacement.
- The preterm prelabour rupture of membranes is defined as the spontaneous rupture of fetal membranes before 37 completed weeks of gestation with leakage of amniotic fluid without regular painful uterine contractions occurring at least every 10 minutes and unaccompanied by cervical dilatation and/or effacement.

2.1.2 Objectives

- Prevention of preterm rupture of membranes (PROM),
- Prediction of at risk mothers,
- Prompt & effective management once preterm rupture is established.

2.2 Prevention

2.2.1 Identification of women during pre pregnancy period

The risk for preterm rupture of membranes in nulliparous women is hard to identify. In multiparous women, the behavior in past pregnancies is the best predictor of possible risk.

Risk factors

- Mothers of 16 years or less of age.
- Lower socio-economic class
- Body mass index less than 19.0
- Smoking
- **Previous preterm delivery**
- **Multiple pregnancy**
- **Cervical incompetence**
- Uterine abnormalities
- Obstetric complications
 - a. hypertension
 - b. ante-partum haemorrhage
 - c. infection
 - d. polyhydramnios
- Genital tract infections
- Parental genetic disorders
- Anti phospholipid syndrome

2.2.1.1 Cervical Injury

Trauma is a major cause of mid-trimester loss. The most common aetiologies for cervical injury are;

- i. termination of pregnancy,
- ii. following surgical treatment for cervical dysplasia,
- iii. injury occurring during previous delivery.

2.2.1.2 Genital Tract Infections

The presence of bacterial vaginosis (BV) or vaginal infection with Gonococcus, Chlamydia, Trichomonas, Group B Streptococcus (Streptococcus agalactiae), is considered to be a risk factor.

i. Bacterial vaginosis (B.V.)

-It is diagnosed by;

- a homogenous gray white discharge,
- presence of more than 20% clue cells on saline wet smear,
- positive whiff test,
- vaginal pH greater than 4.50.

Women with positive test results should be treated & checked for complete cure. Antibiotic treatment (ampicillin, erythromycin, metronidazole) of women with BV may be associated with a reduction in the incidence of preterm rupture of membranes (PROM).

ii. Chlamydia

Chlamydia trachomatis is one of the most prevalent sexually transmitted bacterial infections. Literature reveals that there is an association between maternal cervical infection^{6,7,8,&9} and the following

- preterm rupture of membranes (PROM),
- preterm delivery (PTD),
- lowbirth weight (LBW),
- perinatal morbidity and mortality,
- post-partum endometritis.

Treatment and eradication of maternal chronic cervical Chlamydial infection reduce the risk of the above complications.¹⁰

The diagnosis of Chlamydial infection is made by;

- i. isolation of organism,
- ii. culture & independent detection by immunoassay,
- iii. polymerase chain reaction (PCR),
- iv. ligase chain reaction,

iii. Group B Streptococcus

Group B Streptococcus (GBS) is recognized as the most frequent cause of severe early onset (less than 7 days of age) infection in the newborn. However, there is still controversy about prophylactic treatment. The possible benefits of antenatal screening & treatment has to be weighed against the possible risks such as fatal anaphylaxis³ and introduction of resistant organisms. A screening may be confined to the following situations;

- i. previous baby affected by Group B Streptococcus (GBS),
- ii. group B Streptococcus (GBS) bacteriuria detected during the current pregnancy,
- iii. preterm labour,
- iv. prolonged rupture of membranes,
- v. fever in labour,

The practice of screening for Syphilis & Gonorrhoea is already well established and should be continued.

Routine bacteriological screening involves taking lower vaginal & rectal swabs from all women between 35 – 37 weeks of gestation and inoculating the samples into enriched medium.

There has been no randomized controlled trial (RCT) comparing antenatal screening with no antenatal

screening. The estimates of efficacy are based on observational studies.

According to The Royal College of Gynaecology and Obstetrics (RCOG) Guidelines until it is clear that antenatal screening for Group B Streptococcus (GBS) carriage does better 'than harm' and that the benefits are cost effective. Nevertheless, there seems little justification at present for recommending routine screening.

Antibiotic prophylaxis for Group B Streptococcus (GBS) is unnecessary for women with preterm rupture of membranes unless they are in established labour. If these women are known to be colonized with Group B Streptococcus (GBS) antibiotic prophylaxis should be considered, especially before 37 weeks⁵. If patient goes into labour & Group B Streptococcus (GBS) is detected incidentally, prophylaxis should be considered. If a woman with a history of Group B Streptococcus (GBS) in a previous history goes into labour unexpectedly, benefit of administration of intrapartum antibiotic prophylaxis has not offered good evidence.⁵

If a woman with a history of an infant with neonatal GBS disease goes into labour intrapartum antibiotics should be offered,

- i. All women at risk of infection should be treated with antibiotics,
- ii. Vaginal cultures of at risk women are recommended.

2.2.2 Prenatal management

- o Good antenatal care is important in the prevention of preterm rupture of membranes (PROM). The at-risk women should be educated on early warning symptoms and to seek medical care promptly. Advise on extra bed rest and abstinence from intercourse should be given to high-risk patients.

- In selected patients with clinical evidence of cervical incompetence prophylactic cervical cerclage is recommended. **(Grade X)**
- Prophylactic antibiotic treatment of women with bacterial vaginosis may be associated with a reduction of preterm rupture of membranes. **(Grade Y)**

2.3 Diagnosis

2.3.1 History

- History of risk factors,
- Fetal age,
- History of fever,
- Dysuria,
- Colour & smell of the vaginal discharge,
- Time of preterm rupture of membranes (PROM) / preterm premature rupture of membranes (PPROM),
- Uncontrollable fluid loss per vaginum is characteristic of preterm rupture of membranes (PROM), / preterm premature rupture of membranes (PPROM),
- Exclude vaginal discharge & urinary incontinence.

2.3.2 Examination

- General examination of the mother,
- Abdominal examination to assess fetal lie, presentation, fundal height, fetal life,
- Speculum examination;
 - a) under strict aseptic conditions,
 - b) visualisation of amniotic fluid in the posterior vaginal fornix,
 - c) passage of clear fluid from the cervical canal,
 - d) check for prolapse or presentation of umbilical cord,
- Check for signs of infection e.g. maternal tachycardia, pyrexia (temperature greater than

38°C), uterine tenderness, purulent vaginal discharge.

- Fetal tachycardia may indicate infection following rupture.

2.3.3 Investigations

- Nitrazine yellow test. – Nitrazine yellow turns black by vaginal secretions (pH is acidic). Amniotic fluid (pH is neutral or alkaline) does not turn Nitrazine black,
- Ferning is seen with amniotic fluid (microscopic test)²,
- Nile blue sulphate test,
- Microscopic examination of fetal squames,
- High vaginal swab for bacterial culture,
- A swab from low vagina & rectum should be taken particularly for detection of Group B Streptococci, **(Grade Y)**
- White blood count (WBC)/ differential count (DC),
- C reactive protein (CRP) –If C reactive protein is raised amniocentesis may be indicated,
- Ultrasound examination for estimation of fetal age, presentation, weight, liquor volume will be useful,
- Cardiotocography should be performed. **(Grade Y)**

2.4 Complications

2.4.1 Maternal Complications

i. Infection

This may be clinical or sub-clinical chorioamnionitis, septicaemia and endomyometritis.

In preterm premature rupture of membranes (PPROM) this incidence may be as high as 30%.

- ii. Placental abruption
- iii. Psychological sequelae
- iv. Death

2.4.2 Fetal & Neonatal Complications

- i. **Prematurity** -which may result in;
 - a) Respiratory Distress Syndrome (RDS),
 - b) Necrotizing Enterocolitis,
 - c) Patent Ductus Arteriosus (PDA),
 - d) Intraventricular haemorrhage,
 - e) Retinopathy of prematurity,
 - f) Hearing defects,
 - g) Cerebral palsy,

- iii). **Oligohydramnios**-Which may be result in;
 - a) Facial anomalies,
 - b) Limb position defects,
 - c) Pulmonary hypoplasia,
 - d) Impaired fetal growth,

- iv) **Fetal hypoxia** - due to;
 - a) Cord compression or prolapse,
 - b) Abruptio placentae,

- v) **Neonatal morbidity** -which may result due to,
 - a) malpresentations,
 - b) oligohydramnios,
 - c) prematurity,

- vi) **Congenital abnormalities** - may be associated–
– Such as;
 - a) Arthrogyphosis multiplex,
 - b) Craniosynostosis,
 - c) Dermatologic abnormalities,
 - d) Hand & foot deformities,
 - e) Facial defects unaccompanied by oligohydramnios,

2.5 Management

The mother should be hospitalized **(Grade X)**

2.5.1 Drugs used in the management

2.5.1.1 Corticosteroids therapy is mandatory **(Grade X)**

The drugs commonly used are;

- a) Two doses of betamethasone each 12 mg. given intra muscular (IM) 24 hourly,
- b) Four doses of dexamethasone each 6 mg. given intra muscular (IM) at 12 hourly intervals,
- c) Four doses of hydrocortisone 500 mg. intravenous (IV) given at 12 hour intervals, This drug has been used as a substitute for dexamethasone or betamethasone when these drugs are not available,^{11, 12, 13, 14 & 15}

Only a single course of corticosteroids therapy is recommended. **(Grade X)**

2.5.1.2 Tocolytics

Tocolytics are given with the intention of inhibiting labour. They serve two purposes, i.e.

- a) To achieve uterine quiescence while arrangements are made for in-utero transfer,
- b) To allow adequate time for corticosteroid prophylaxis to be effective,

The widely used tocolytics are Salbutamol, Nifedipine, Ritodrine, Terbutaline, Nitric oxide donors, Magnesium sulphate, Indomethacin, Oxytocin antagonists (Atociban).

Beta agonists administered between 20 to 36 weeks of gestation are useful in achieving uterine tocolysis.

Meta analysis of randomized trials has concluded that the use of intravenous (IV) beta agonists significantly reduces the proportion of women delivering within the first 48 hours after commencement of treatment^{16,17}.

To reduce the risk of pulmonary oedema with beta agonists,

- They should be administered with minimum volume of fluid when given intravenously.
- They should be used with caution in a woman with multiple pregnancy.
- They should be administered via a controlled infusion device.
- The infusion should be started with a low dose and gradually increased.

Side effects are maternal tachycardia (pulse rate 130 or more), pulmonary oedema, myocardial ischaemia and hyperglycaemia.

Other tocolytics

Recent data from randomized controlled trials suggest that atociban may be just as effective as beta agonists with potentially fewer maternal side effects.⁽¹⁸⁾

2.5.1.3 Prophylactic antibiotics

Antibiotics are recommended in preterm rupture of membranes (PROM).

However, the type of antibiotic used will have to be determined by the antibiotic policy of the hospital.

Drugs recommended are erythromycin and ampicillin.

In the presence of a cervical suture if a vaginal delivery is anticipated removal of the suture is recommended.

However removal may be delayed;

- If awaiting transfer,
- Within the period awaiting corticosteroid prophylaxis,

If the patient is undergoing expectant management with a cervical suture care must be taken to detect infection early. **(Grade X)**

2.5.2 Management grades

The Management is either **Expectant** or **Active**

The choice of expectant management or active management depend on;

- Maturity of the fetus,
- Neonatal facilities available at the institution,
- Presence of intra uterine infection,
- Presence or absence of fetal distress,

This choice of management should be made by the consultant or senior member of the medical staff and should be reviewed regularly. **(Grade X)**

i. Expectant management

The observations made in the mother are

- General – chart;
 - a) Temperature,
 - b) Pulse,
 - c) Blood pressure,
- Local
 - d) Look for uterine tenderness,
 - e) Onset of regular painful uterine contraction,s
 - f) Symphysis-fundal height,
 - g) Observe liquor for presence of meconium, blood,

The observations made in the fetus are;

- a) Kick count chart,
- b) Four hourly heart rate,

- c) Lie and presentation (twice a day),
- d) CTG monitoring daily or more frequently when needed,
- e) Ultrasound studies at weekly or on several occasions according to the prevailing situation.

Educate patient on need to inform ward staff if any change in colour of liquor. i.e. meconium, blood stained, or fever.

If patient has a medical condition requiring antibiotics in labour (e.g. Heart disease) commence them at admission to hospital. **(Grade X)**

ii. Active management

Indications

(Grade X)

- i. Evidence of fetal distress,
- ii. Evidence of intrauterine infection,
- iii. Evidence of abruptio placenta,
- iv. In the presence of fetal abnormalities incompatible with life if spontaneous labour does not commence after 24-48 hrs,
- v. Intrauterine death.

The methods practiced for active management are;

1. Induction
2. Operative delivery

2.5.3 Management strategies

This is done according to the gestational age

i. Preterm prelabour rupture of membranes (PPROM) 24 – 31 completed weeks

Owing to the extreme prematurity seen during this period expectant management is recommended. The infection being the possible danger, close observation has to be maintained.

Greatest risk is to the fetus.

In the presence of infection active management is indicated.

Counseling of parents must be done with regard to

- a) Risks and benefits of expectant management,
- b) Prognosis,
- c) Mode and timing of delivery.

Administer corticosteroids.

Administer antibiotics.

Deliver when the risk of prematurity is minimal.

ii. Preterm rupture of membranes (PROM) 32 - 34 completed weeks of gestation

Management options may depend according to the neonatal support facilities available in the institution.

Administer corticosteroids.

Administer antibiotics.

Deliver at 34 weeks.

iii. Pre term rupture of membranes (PROM) at 34 - 36 completed weeks of gestation

Administer corticosteroids.

Administer antibiotics.

Await spontaneous labour.

If labour does not start within 24 hours, delivery is advisable.

iv. Preterm rupture of membranes (PROM) after 36 completed weeks of gestation

There is no place for expectant management.

Prior consultation with Pediatricians is advisable on arriving at a decision regarding the delivery.

Once the decision to deliver is arrived at, the mode of the delivery, timing of the delivery and place of delivery should be individualized.

2.5.4 Management of postnatal problems

A. Maternal problems

- i. Endometritis
- ii. Puerperal sepsis / septicaemia
- iii. PPH
- iv. Venous thrombosis

B. Disruption of maternal infant bonding

The prolonged care in the SCBU results in poor baby and mother bonding.

C. Neonatal problems

i. Infection

All infants should be thoroughly screened for sepsis and following procedures should be carried out;

- i. Blood culture,
- ii. Endotracheal aspirate culture,
- iii. Urinary latex particle agglutination testing,
- iv. Complete blood picture,
- v. LP for positive blood cultures & clinically septic neonate.

The infants will have to be treated with intravenous Penicillin & Gentamycin initially.

ii. Pre-maturity

Hyaline membrane disease and conditions leading to mechanical ventilation.

iii. Preterm prelabour rupture of membranes (PPROM) before 25 weeks

At this gestational age pulmonary hypoplasia should be considered.

Intracranial haemorrhage,

Jaundice,

Feeding difficulties,

Provision for long-term follow up.

2.6 Special Circumstances

- i. Hind water leak when diagnosed, should be managed as PROM.
- ii. Multiple pregnancy & PROM. Treat in the same manner as for singleton. (Tocolytic use is not recommended)
- iii. Dribbling with previous uterine scar-Refer the guidelines on scarred uterus.
- iv. Dribbling with unstable lie -The possibility of cord/hand prolapse should be borne in mind.
- v. Drilling with heart disease - Risk of infective endocarditis should be borne in mind.

Before commencing on induction of labour (IOL)

Transfer to a Tertiary care centre if necessary.

Maternal antibiotic therapy should be commenced. It has been approved following controlled trials of antibiotic use, that maternal puerperal infection has been reduced.

Ampicillin 2G 8 hourly during labour may be administered.

At labour Neonatologists should be present.

2.7 Summary of management

1. Complicated

Prompt delivery in the presence of the following conditions.

- a) Fetal lung maturity: Indicated by lecithin/spingomyelin (L/S) ratio >2 of pooled vaginal amniotic fluid.
- b) Evidence of chorio-amnionitis, indicated by;
 - (i) maternal pyrexia unexplained by an upper respiratory tract infection,
 - (ii) elevated CRP,
 - (iii) tender uterus,
 - (iv) offensive amniotic fluid.

Start therapeutic antibiotics
- c) Fetal jeopardy, indicated by;
 - (i) Non-reassuring CTG,
 - (ii) Poor biophysical profile. (Emergency Caesarean Section may be necessary).

2. Uncomplicated

Treatment varies according to the gestational age.

a) Term (>36 weeks) The goal is delivery. Prolonging the pregnancy has no maternal or fetal benefits. Depending on the clinical presentation, either induction of labour or Caesarean Section should be performed.

b) Preterm (25-35) The goal is the prolongation of pregnancy to minimize the many neonatal risks of prematurity. The patient should be transferred to a perinatal center for in-hospital conservative management. The following measures may be effective,

- i. **Bed rest:** Leg exercise should be practiced to prevent thrombosis.

- ii. **Prophylactic antibiotics:** Used after obtaining vaginal/cervical cultures, specifically looking for Group B beta haemolytic Streptococcus.
- iii. Maternal corticosteroids: To accelerate fetal lung maturity, two doses of betamethazone 24 hours apart.
- iv. **Monitoring of fetal well being:** Serial non-stress tests & biophysical profiles.

c)Pre-viable (<24)

The goal is maternal safety because the likelihood of perinatal survival is low. The patient should be offered options.

- i. Induction of labour- Intravenous oxytocin
- ii. Home management & follow up: bed rest

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