FAILED OOCYTE MATURATION

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INTRODUCTION

- In our laboratory,we perform (X) IVF and (Y) ICSI per year with a success rate of...
- ..% of harvested oocytes are immature;...% of these immature oocytes resume meiosis spontaneously.
- About 50% of the immature oocytes resume meiosis under our culture conditions.
- We present here a case report of a failed oocyte maturation in vitro in a healthy subfertile women.

HISTORY

- Women, 39 years old, P_0 G_0, with a history of primary tubal subfertility of 9 years.
- Menarche: 15 years old, cycles described like regular although long (35 days).
- Partner: 36 years old, without medical or surgical background.
- No history of heriditary transmitted desease in both family.

IVF RECORDS

Years	Setting	Oocytes harvested	Technique	Number of embryos	Remarque
1994	Private clinic	10	IVF	1	No pregnancy
1995	Private clinic				Stimulation stopped because of early rise of E2
1996	Private clinic	3	IVF	1	No pregnancy

IVF CULTURE CONDITIONS

- Semen preparation on pure sperm gradient (90%, 45%).
- Decornisation at 20 hours post insemination.
- Immature oocytes are left in $G_{1.2}$ medium (IVF science scandinavia) to reach maturation.
- In case of no maturation: observation in contrast of phase 18 to 72 hours post insemination, than observation in fluorescent microscope (Hoechst marking) to highlight the maternal chromatin and the spermatozoid.

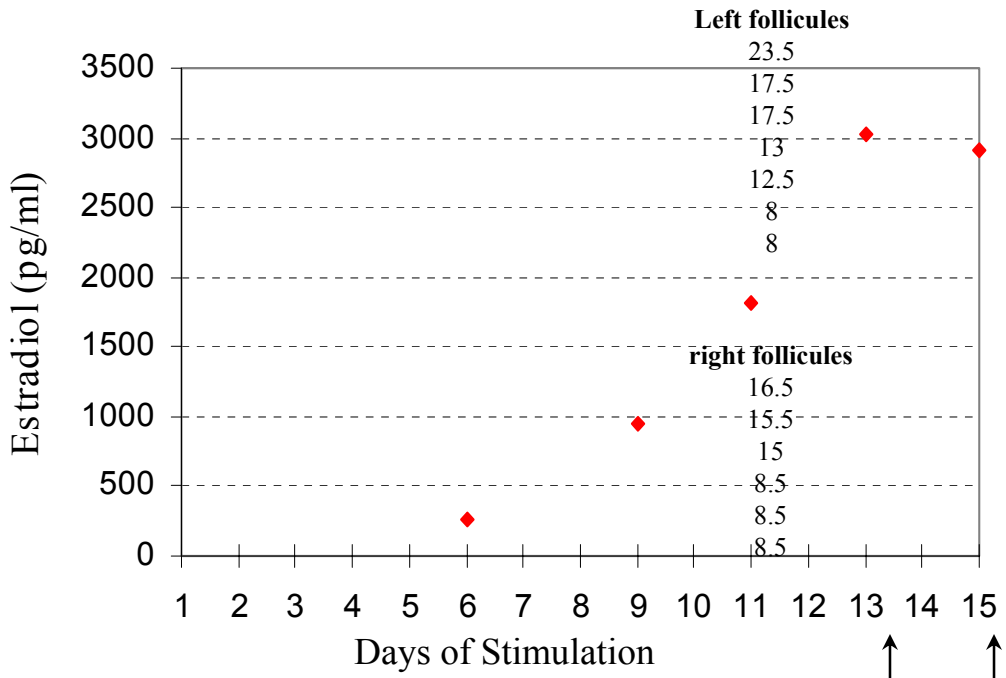
CLINICAL FINDINGS

- Ovulatory BBT curve is Normal
- Hormonal investigation

F S H	6 . 4 U / l
L H	4 . 6 U / l
E 2	8 8 p m o l/ l
p r o la c tin	1 2 . 4 p ic o g r a m

- Ovaries:
  - left hydrosalpinx with adherential peritubal state
  - The right ovary is small but morphologically normal, with ancient corpus luteum, suggesting normal response to LH and ovulation
  - The left ovary is normal
- Genetic analysis: Karyotype 46 XX

Ovarian Stimulation: (Long Stimulation Protocol)
Gonadotrophin inhibitor: Lucrin^{R} 0.1 mg, -18 days
Follicular growth stimulation: Pergonal^{R} 3 bulps per day, J1-J12. Total dose: 2700 UI
Ovulatory stimulation: Profasi^{R} J13 (dose: 10'000 UI)



hCG **ponction**

oocytes envisaged to be harvested: 8
oocytes harvested: 8

EXAMINATION OF FAILED OOCYTES MATURATION WITH HOCHST STAINING

N° of oocyte	Total of sperm bound to ZP	Decondensed sperm	Meiotic state	Cumulus evaluation
1	2	1	MI + Decondesed chromatin	expanded
2	9	1	MI	expanded
3	11	1	MI	expanded
4	5	1	MI	expanded
5	20	0	Decondesed chromatin	expanded
6	22	0	MI	expanded
7	7	0	MI + Decondesed chromatin	expanded
8	28	0	Decondesed chromatin	expanded

DISCUSSION 1

- The pregnancy rate from oocytes matured in vitro are much lower than those of in-vivo stimulation cycles.
- Response to gonadotrophins:
  - Follicular growth and E2 increase during stimulation indicating a normal response to FSH
  - Expansion of the cumulus (mucification) indicates an effect of HCG (LH- like) on the follicule, and probably normal LH receptors

DISCUSSION 2

- Absence of Fertilization may be due to:
  - Sperm: no problems linked to
    - attachment
    - Penetration
    - decondensation

DISCUSSION 3

- **Possible causes of oocytes immaturity**
  - No response to HCG (responsible for meiosis resumption in vivo) due to the absence or alteration of LH receptors on granulosa cells. This hypothesis is unlikely, according to the previous investigations showing normal menstrual cycles.
  - The signal transduction pathways activated by binding to its receptor may present anomalies.
  - The oocytes may present intrinsic anomalies which prevent completion of meiosis. The oocyte acquires the competence to resume meiosis during its growth phase when the different factors involved in meiosis resumption appear in the oocyte. In vitro, meiosis resumption occurs spontaneously (without LH) and a block of this process in vitro is more in favour of intrinsic anomalies of the oocyte than the LH pathway. The failure of the 8 oocytes to progress beyond the MI in-vitro is consistent with hypothesis.

CONCLUSION

In-vitro maturation (IVM) of oocytes is a promising technique to reduce the costs and avert the side-effects of gonadotrophin stimulation for IVF

⟹ Optimisation of IVM remains a challenge