OVARIAN RESERVE ASSESSMENT

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Background

Ovarian reserve (OR) :

- **Female fertility declines with increased age; decline starts at 30, virtually zero at mid 40s. This is due to decrease in oocyte quantity and quality.**
- **OR Effects the response to ovarian stimulation.**
- **OR Effect the chance of pregnancy**

Assessment of ovarian reserve by:

1- Follicle stimulating hormone (FSH): early follicular phase

2- Estradiole (E_2) level

3- Progesterone level (mid-luteal)

4- Inhibin B level

5- Antimullerian hormone (AMH)

6- Ultrasound :

- Antral follicle count (AFC)
- Ovarian volume
- Ovarian blood flow

7- Dynamic tests:

- Clomiphene citrate challenge test (CCCT)
- Exogenous FSH ovarian response test (EFFORT)
- Gonadotropin agonist stimulation test (GAST)

8- Ovarian biopsy

Follicle stimulating hormone (FSH)

- Usually measured on cycle day 2 or 3.
- Women with FSH > 10 IU/L do worse.
- Women with FSH> 15 IU/L on one test do worse on IVF
- Variation from month to month:

- For young women even one low level means reduced yield.

- For women > 40 years are ominous.

Serum estradiole (E_2)

- E_2 alone is of little value
- Suggested E_2 of >80pg/ml day 3 pre IVF cycle---higher cancellation rate
- Some attempts to combine E_2 and FSH levels------of little value

Serum progesterone

- **Early LH surge and elevation of progesterone (P_4) suggested sign of poor ovarian reserve .**
- **No independent role in assessment of ovarian reserve.**
- **E_2/P_4 ratio may have a role in differentiating conceptual cycles**

Anti-Mullerian Hormone (AMH)

- **AMH is a glycoprotein**
- **Appears in female serum at puberty**
- **It is secreted by granulosa cells of pre-antral and small antral follicles**
- **Physiological function = prevent excessive follicle recruitment.**
- **Not cycle-dependent ; can be measured any day**
- **Less cycle to cycle variation than FSH**
- **Not affected by GnRH agonists, can be measured during down-regulation.**
- **Clinical role not definitely established .**
- **More accurate than other tests, but still expensive**

Inhibin β

- **Heterometric protein 32kDa similar to AMH**
- **Selectively inhibits FSH (TGF-β family)**
- **Levels > 45pg/ml---poor response to FSH**
- **But high false positive rate**
- **Not currently useful**

Antral Follicle Count (AFC)

- Follicle 2 to 5 mm on Day 1 or 2
- Inter-observer variation
- Some correlation with ovarian response but only at low threshold
- If AFC < 5 → significantly worse outcome

Ovarian vascularity

- **Trans-vaginal pulse Doppler can assess ovarian blood flow. However, much heterogeneity of techniques due to different equipment, and variation in technique.**
- **Some suggestion that high vascularity in late follicular phase is a good prognostic sign**
- **No clinical value at present**

Clomiphene citrate challenge test (CCCT)
(Navot, Rosenwaks, Margolioth 1987)

1. Measure baseline E_2,FSH, LH at cycle day 2-3
2. Administer CC 100 mg/ day (day 5-9)
3. Measure E_2, FSH, and LH on Day 9-11
4. Exaggerated FSH after CC bad prognostic sign
5. Probably no better than basal FSH

Exogenous FSH ovarian reserve test (EFFORT) (Fanchin et al 1994)

- Baseline E_2 and FSH
- Administer 300 IU FSH
- Re-check E_2, 24 hrs. later
- Of no proven benefit

GnRH-agonist stimulation test (GAST) (Garcia 1993)

- **Physiological response to GnRH agonist is a flare up followed by suppression.**
- **Latent impairments of ovarian function may be diagnosed by abnormal response.**
- **Data are still insufficient for clinical use**

Ovarian Biopsy

- **Reproductive potential depends on the number of primordial follicles in ovarian cortex.**
- **Counting the number of follicles on ovarian biopsy is an attractive concept. However, biopsies studied showed high variation in follicular numbers.**
- **Of no clinical value**

THANK YOU