

Biochemistry Team

INFERTILITY INVESTIGATION



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- Is for team notes
- Is for important notes

INFERTILITY INVESTIGATION

Definition:

Failure of a couple to conceive after one year of regular, unprotected intercourse

Infertility may be caused by endocrine problems:

- This is **common in females**
- But **rare** in males

ENDOCRINE investigation in the sub fertile women

- INVESTIGATION depend on the phase of **THE MENSTRUAL CYCLE**
- Elevated serum [progesterone] at **day 21** of the menstrual cycle indicates that **ovulation** has occurred (*menstruation can occur without ovulation this is why we check the progesterone level*)
- In both men & women infertility a serum [FSH] > 25U/L indicates **primary gonadal failure**



You will not be asked about any numbers – Dr. Reem



Presence of ovulation is conformed by measuring progesterone level at day 21 and IF :

- > 30 nmol/L (indicates ovulation)
- < 10 nmol/L (no ovulation)

Endocrine investigation is of diagnostic value for women who have :

- Irregular or no menstruation
- No ovulation

Clinical History taking:

- Should be **full** clinical history
- It should be **before** physical examinations
- Information about:
 - Previous pregnancies
 - Contraceptive practice
 - Serious illnesses
 - Past chemotherapy or radiotherapy (*can cause gonadal failure*)
 - Congenital abnormalities
 - Smoking habits
 - Drug usage (*some drugs can cause Hyperprolactinemia which will cause gonadal dysfunction*)
 - STD
 - Frequency of intercourse

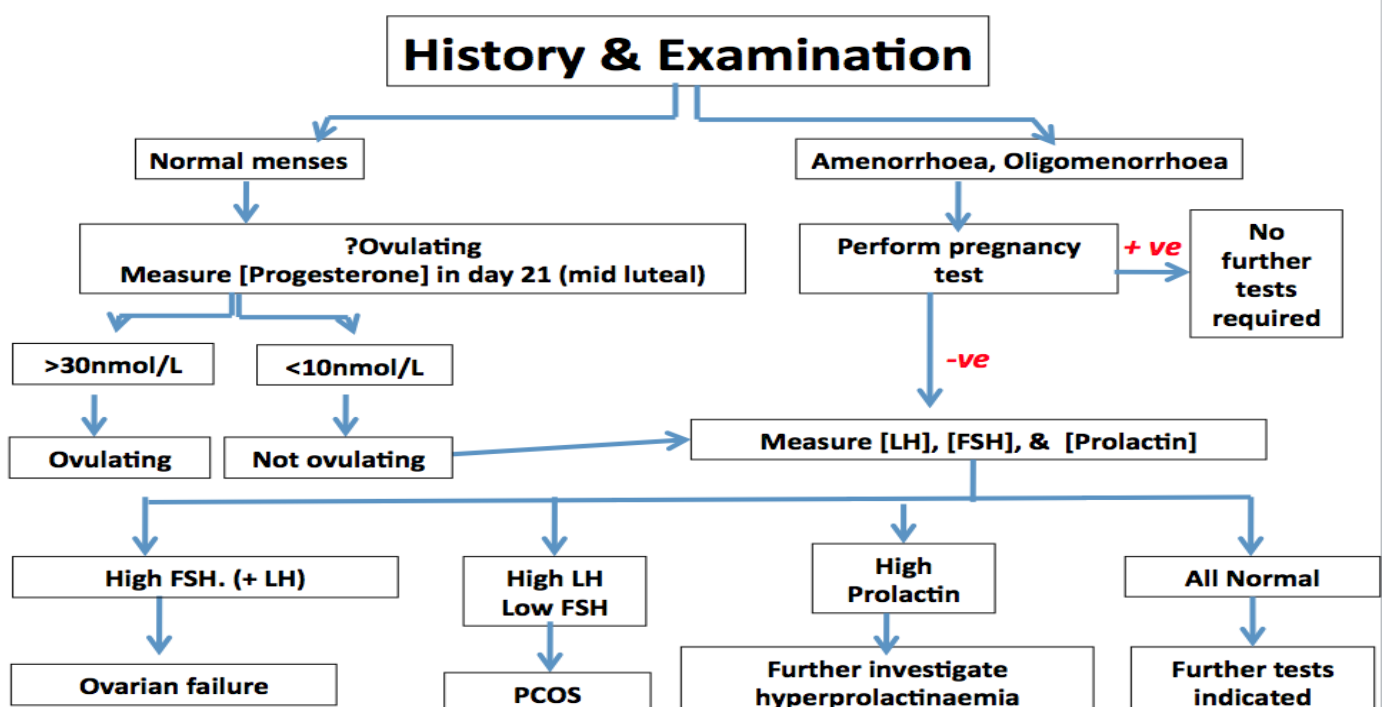
Physical Examination:

Should look for indications of:

- Hypothalamic-pituitary or thyroid disorders
- Cushing's syndrome
- Galactorrhoea (inappropriate breast milk production; i.e. in the absence of pregnancy most commonly caused by **Hyperprolactinemia**)
- Hirsutism (an increase in body hair with male pattern distribution) (*androgen excess*)

INVESTIGATION OF FEMALE INFERTILITY

Diagnostic approach to infertility in the woman





Endocrine causes of infertility in women

Endocrine causes are more common in women

- **Excessive androgen secretion by ovaries due to :**
obesity → Insulin resistance

- **Primary ovarian failure:**

Postmenopausal hormonal pattern: (elevated gonadotropins [FSH+LH] & ↓ estradiol)

Hormone replacement therapy can be given (this will **not treat the infertility**)

- **PCOS:**
 - increase serum [LH]
 - Normal (or low) [FSH]

- **Hypogonadotrophic hypogonadism:** Rare

Due to hypothalamic-pituitary lesion (↓ FSH, LH & estradiol)

- **Cushing's syndrome** (due to increase production of androgens and hirsutism)
- **Hyperprolactinemia**

Diagnosis of PCOS*

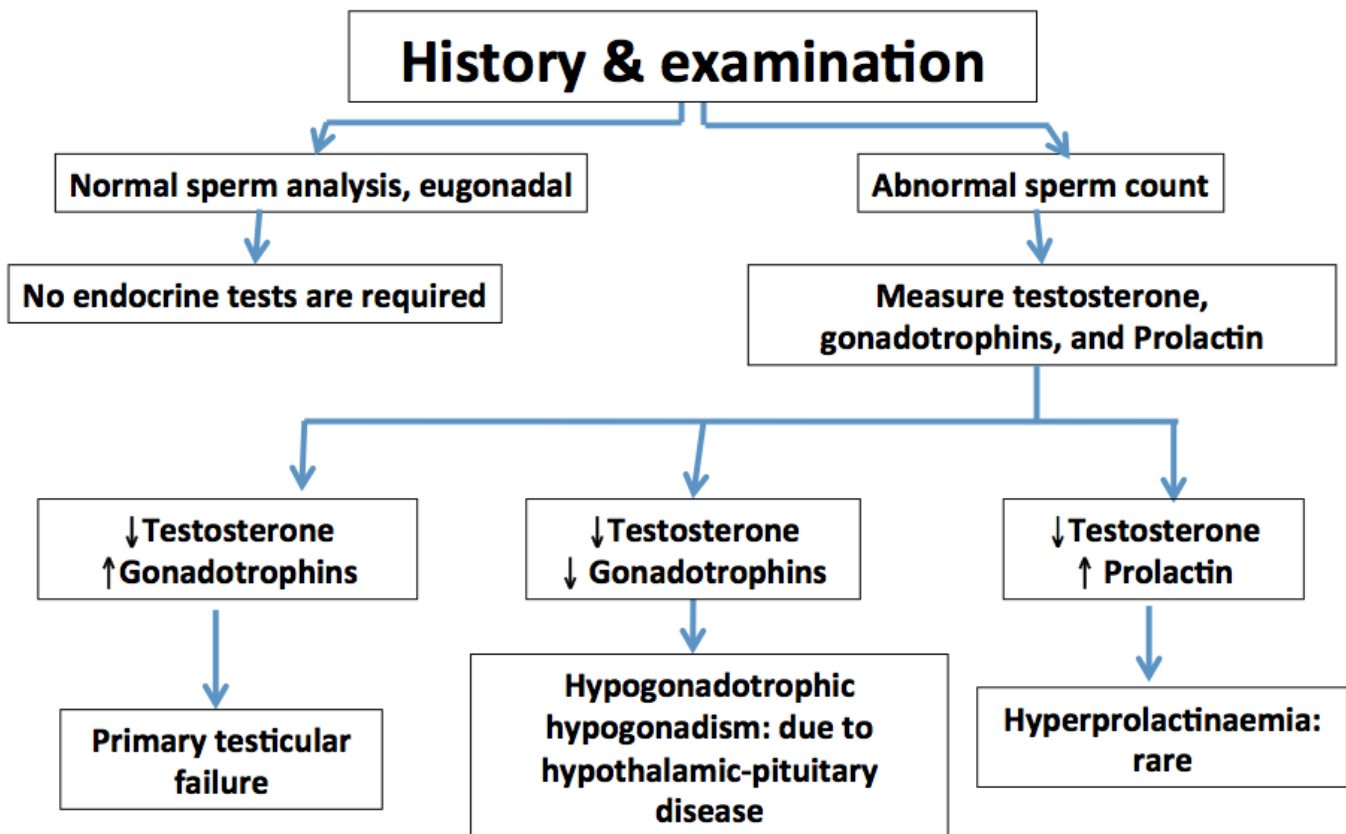
In 2003, the European Society for Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine (ASRM) recommended that **at least 2 of the following 3 features are required for PCOS to be diagnosed:**

1. Oligo-ovulation or anovulation manifested as oligomenorrhea or amenorrhea
2. Hyperandrogenism (clinical evidence of androgen excess) or hyperandrogenemia (biochemical evidence of androgen excess)
3. Polycystic ovaries (as defined on ultrasonography)

- **ENDOCRINE investigation in the sub fertile men**
- Eugonadal men (**normal**) with normal sperm analysis **do not need** endocrine investigation
- In hypogonadal men , **testosterone and gonadotrophins** should be measured

INVESTIGATION OF MALE INFERTILITY

Diagnostic approach to subfertility in the man



Semen Analysis:

- Comment on:
 - Volume
 - Liquefaction time
 - Sperm density (count)
 - Motility
 - The presence of abnormal spermatozoa (abnormal shape, or motility)
 - pH
 - WBCs (*infections*)



CAUSES OF SUBFERTILITY IN MEN

- **Primary testicular failure:**
 - Damage to both the interstitial cells and tubules
→ ↓ **Testosterone** & ↑ **Gonadotrophins** (LH & FSH)
 - Only tubular impairment → selective ↑ **in FSH**, while androgen may be normal
- **Hypothalamic-pituitary disease :**
 - Decrease testosterone with low gonadotrophins
 - Suggest hypogonadotropic hypogonadism
- **Hyperprolactinemia (a rare cause)**

HYPERPROLACTINAEMIA

Prolactin is an anterior pituitary hormone

Its secretion is tightly regulated:

- **Stimulated** by **TRH from the hypothalamus**
- **Inhibited** by **dopamine from hypothalamus**

It acts directly on the mammary glands to control lactation

Hyperprolactinaemia is elevated circulating [Prolactin]

A common condition (*in women*)

It causes infertility in both sexes due to gonadal function impairment.

What is the early indication of hyperprolactinaemia?

- **In women:** **amenorrhoea & galactorrhoea**
- **In men:** no early signs are present

Causes of hyperprolactinaemia

Diagnosis of the cause

Exclude

- Stress
- Drug e.g. oestrogens, phenothiazines, metoclopramide (*can be used to diagnose cause of Hyperprolactinemia*), α-methyl dopa
- Seizures
- 1^{ary} hypothyroidism (prolactin is stimulated by the raised TRH)
- Other pituitary disease

Differential diagnosis

- **Prolactinoma** (commonly microadenoma)
- **Idiopathic hypersecretion** (e.g. due to impaired secretion of dopamine that usually inhibits prolactin release)



How to differentiate between prolactinoma & idiopathic hypersecretion?

- Detailed pituitary imaging
- Dynamic tests of Prolactin secretion:
 - Administration of TRH, then measure serum [prolactin]:
 - If there is a **rise**: **idiopathic hyperprolactinaemia**
 - If **no rise**: pituitary tumor



1- As an endocrine investigation we should measure which one of the following to confirm presence of ovulation :

- A) FSH
- B) LH
- C) Progesterone
- D) Estrogen

2- A 30-year-old woman comes to clinic to discuss abnormal menstrual periods. Menarche was at age 14. Her periods were never entirely predictable but over the past year they have been occurring less often, about every two or three months. Her last menstrual period was two months ago. She has not been sexually active for over a year. She has no chronic medical problems. After the investigation done ,, the doctor told her that she had a condition called PCOS. (Polycystic ovarian syndrome) From the following which one of the hormones profiles is identical for her :

- A) Low level LH , high level FSH
- B) High level LH , high level FSH
- C) Low level LH , low level FSH
- D) High level LH, low level FSH

C - D