Infertility & ART

Sub fertility

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Definition

- Infertility is defined as the inability of a couple to achieve conception after 1 year of unprotected coitus.
- Sub fertility is another commonly used term by infertility specialist.

- Sterility is an absolute state of inability to conceive.
- Childless is not infertility

Frequency of conception

- The fecundability of a normal couple has been estimated 20-25%

- About 90% of couples conceive after 12 months of regular unprotected intercourse.

✦ 50-60% will conceive in 3 months

✦ 70% will concave in 6 months.

Types or classification

- Primary infertility -when couple never conceived before
- Secondary infertility -when the same states developing after an initial phase of fertility

A concept of fertility

- Before puberty
- After puberty & before maturation
- Fertility usually low until the age of 16-17 years
- During pregnancy
- Dring lactation
- After menopause

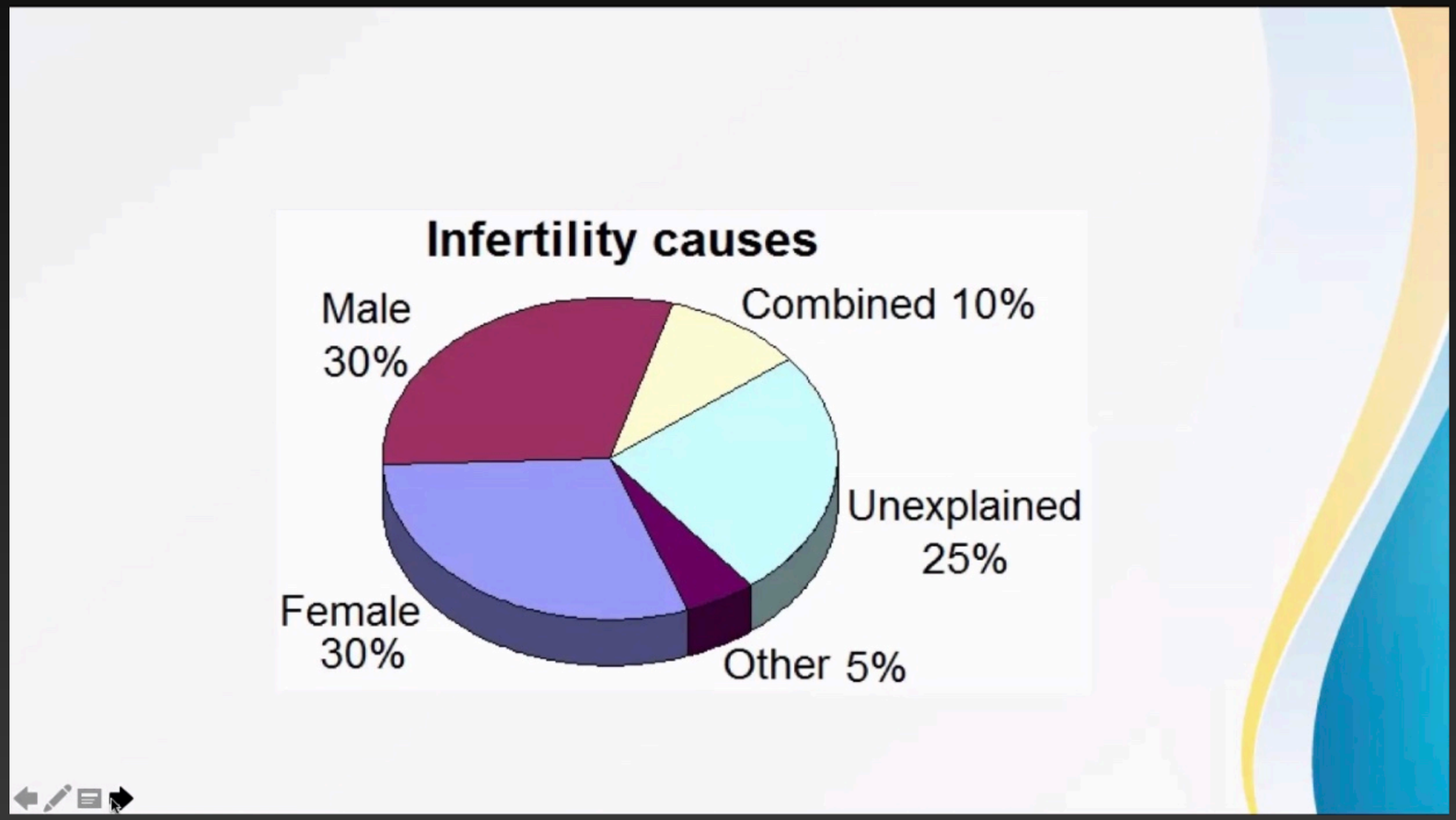
Causes of infertility

According to Jeffcoate’s

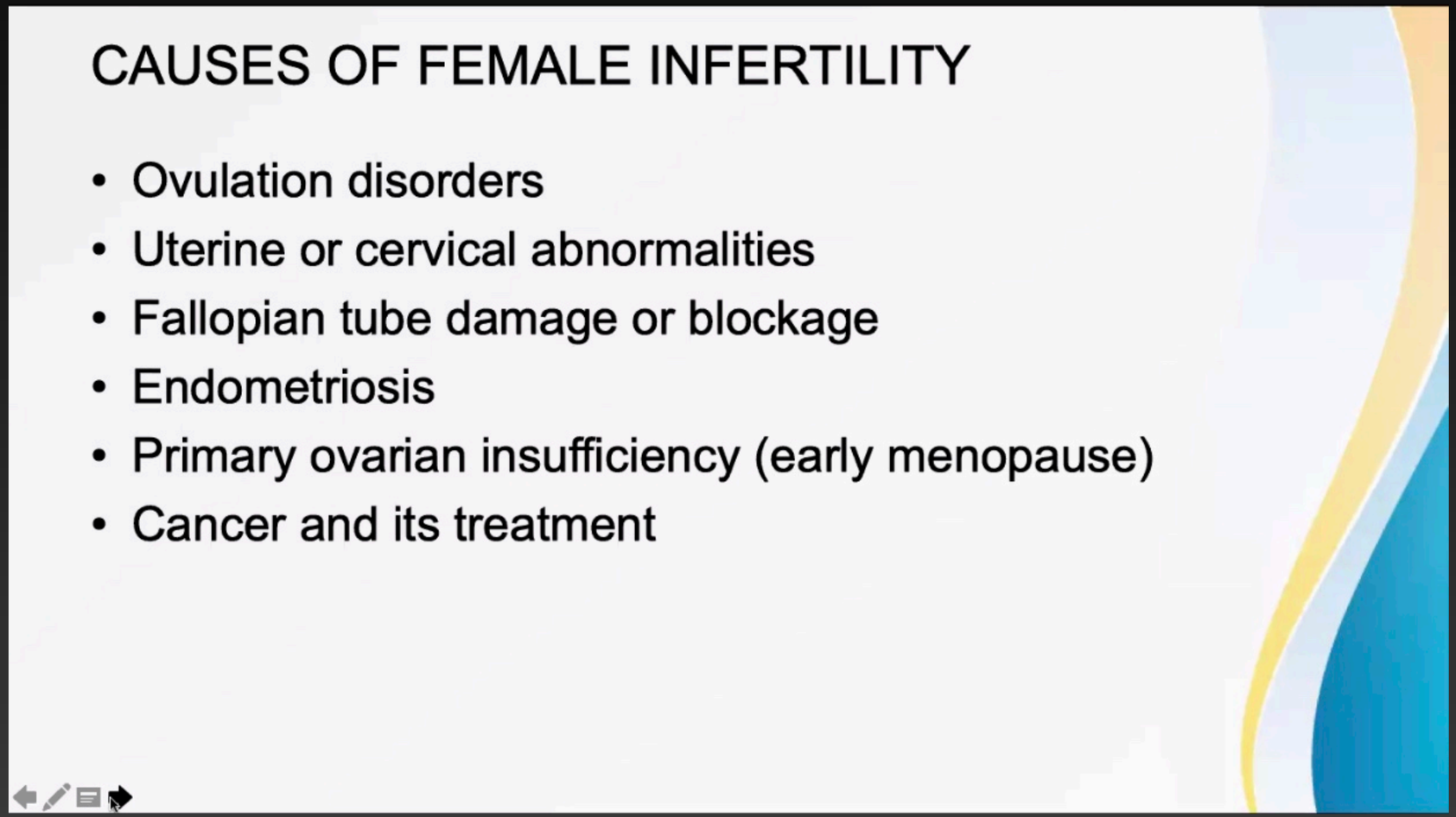
- Female factors - 40%
- Male factors - 35%
- Combined -10-20%
- Unexplained -rest

Causes of infertility

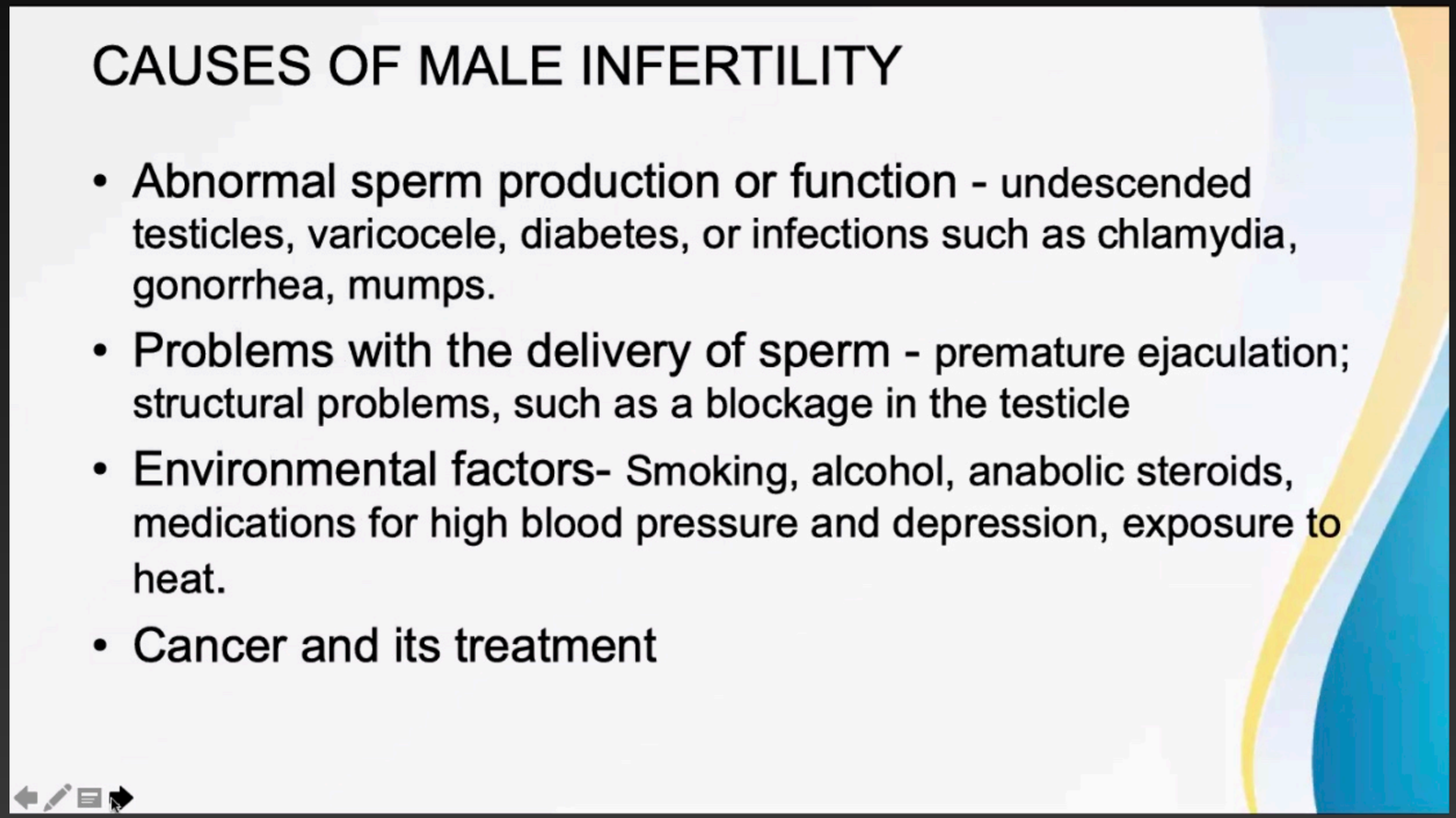
Now a days observe by infertility specialist



Causes of female factors



Male factors



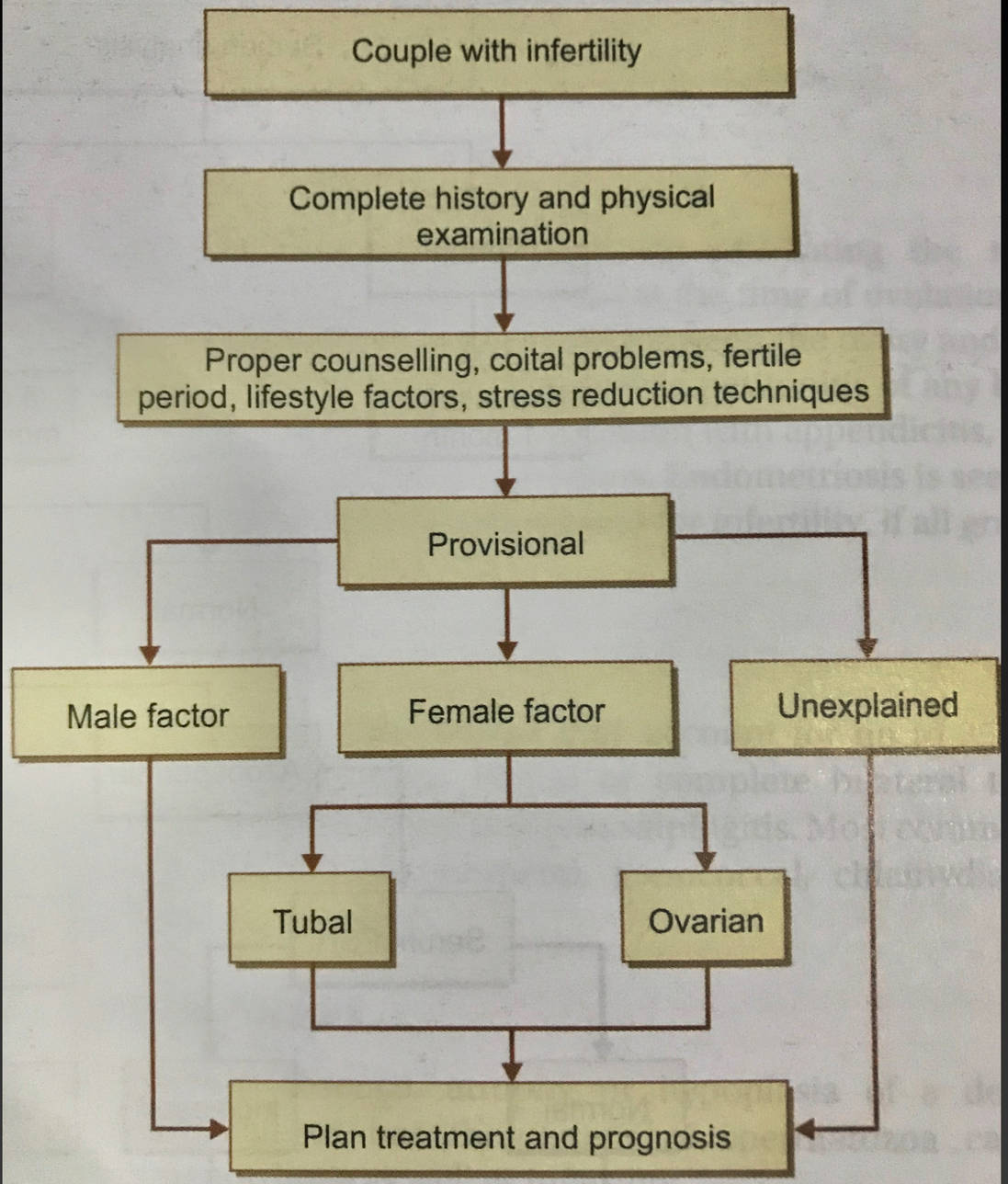
History

- Duration of infertility
- Family history, age of menopause, genetic disease
- Sexual history
- Pregnancy history
- Menstrual pattern
- History of STDs
- Medical and surgical history
- Medication and habits

Physical examination

- Weight and height, Body mass index(BMI)
  - Underweight: BMI < 18 kg/m2
  - Overweight: BMI 25-29 kg/m2
  - Obese: BMI > 30 kg/m2
- Thyroid
- Breast - Assess development
- Skin - Acne, hirsutism, Acanthosis Nigricans

Flow chart 46.1: Assessment of couple with infertility



Ovulation detection: Menstrual history

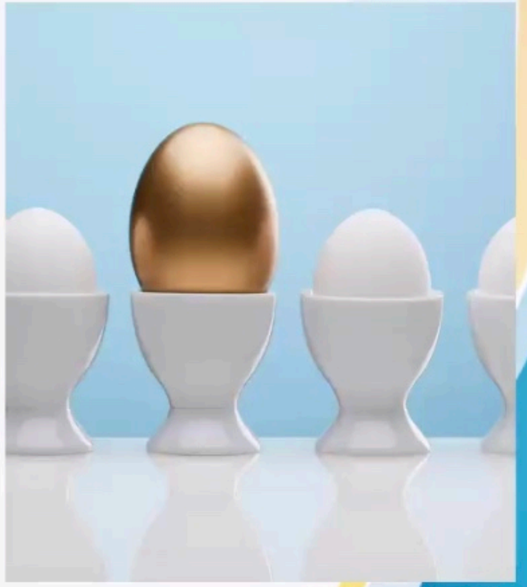
- Menstrual history can help determine if ovulation is occurring
- Most ovulatory menstrual cycles are 21-35 days
- Menses may occur in absence of ovulation, but usually unpredictable and differ in intercycle duration

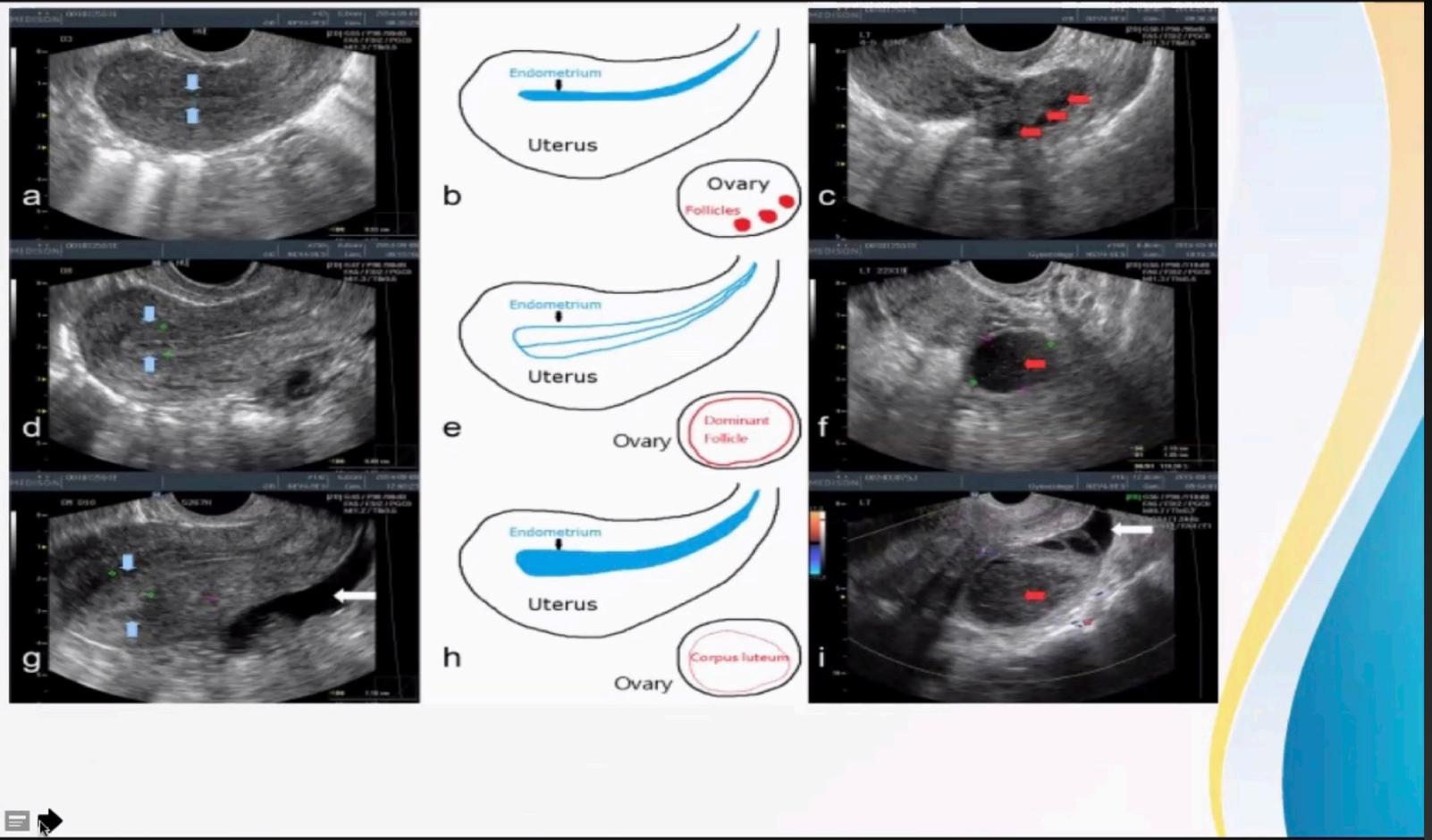
Causes of menstrual irregularities

- PCOS
- Thyroid dysfunction
- Hyperprolactinemia
- Hypothalamic dysfunction
- Primary ovarian insufficiency (POI/POF)

Detection of ovulation

- Ovulation Predictor kit (LH surge) Begin testing day 9-10
- Midluteal Progesterone Level (>3ng/mL)
- Transvaginal ultrasound for follicular monitoring
- Basal Body Temperature charting




a
b
Endometrium
Uterus
Ovary
Follicles
c
d
e
Endometrium
Uterus
Ovary
Dominant Follicle
f
g
h
Endometrium
Uterus
Ovary
Corpus luteum
i

Ovarian Reserve testing

- Females born with fixed number of gametes
- 7 million oocytes at 7 months fetal gestation
- By birth, down to 1 million
- By puberty, down to 300,000
- By menopause, down to ZERO

Ovarian reserve testing

- Early follicular serum FSH

  FSH > 10-11 mIU/mL associated with decrease in egg quality and fertility

  FSH levels in menopause typically >20 mIU/mL

- Antral follicle count
- Antimullerian hormone (AMH)

  Produced by granulosa cells in antral follicles

  Reflects size of remaining follicle pool

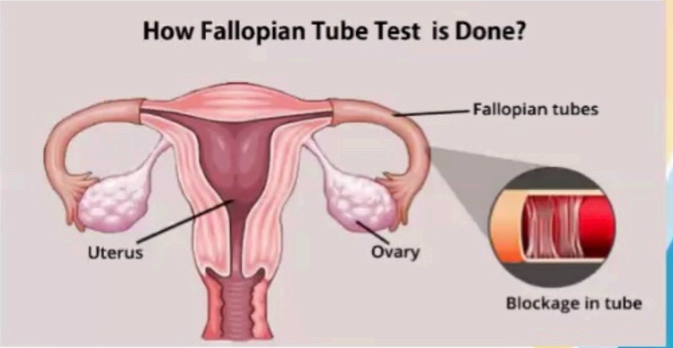
Tubal patency Testing

Damage to fallopian tubes can result from:

- Sexually transmitted infections
- PID, Chlamydia, Gonorrhea
- Peritonitis
- Ruptured appendix
- Prior pelvic surgery
- Endometriosis

Tubal patency Testing

- Hysterosalpingogram (HSG)
- Laparoscopy with chromopertubation
- Saline infusion sonogram (SIS)

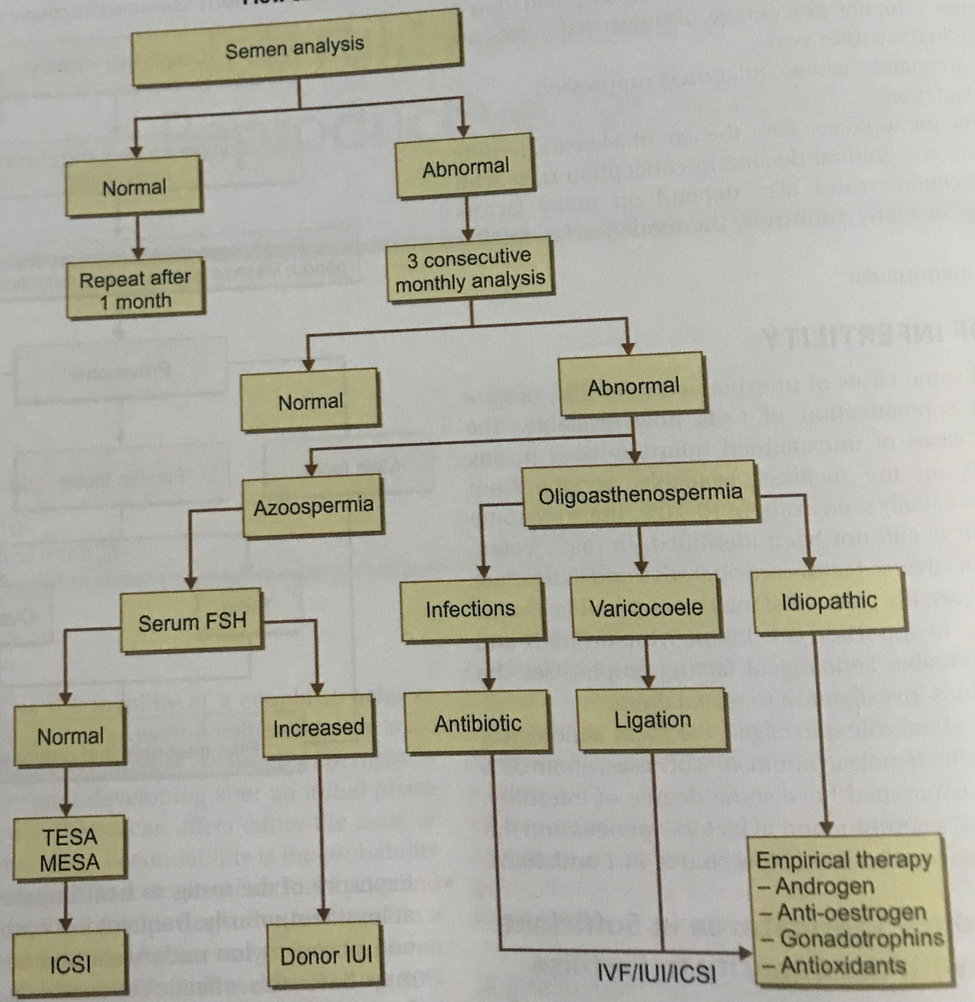


Uterine evaluation

- Endometrial cavity assessment
  - HSG
  - SIS
  - Hysteroscopy
- 3-D ultrasound or MRI for Mullerian anomalies

Assessment of male factors

Flow chart 46.2: Assessment of male factor



Abbreviations: FSH, follicle-stimulating hormone; ICSI, intracytoplasmic sperm injection; MESA, micro-epididymal sperm aspir

Semen analysis

WHO 2010

Parameter	Lower Reference Limit
Semen volume (ml)	1.5
Sperm concentration (10^6/ml)	15
Total sperm number (10^6/ejaculate)	39
Progressive motility (PR, %)	32
Total motility (PR +NP, %)	40
Vitality (live sperms, %)	58
Sperm morphology (NF, %)	4
pH*	>/=7.2
Leucocyte* (10^6/ml)	<1
MAR/Immunobead test* (%)	<50

*Parameters agreed on consensus

Abnormal semen

Aspermia -No semen

Hypospermia -volume <2ml

Hyperspermia - volume >2ml

Azoospermia - no spermatozoa in semen

Oligospermia <20 million sperm/ml

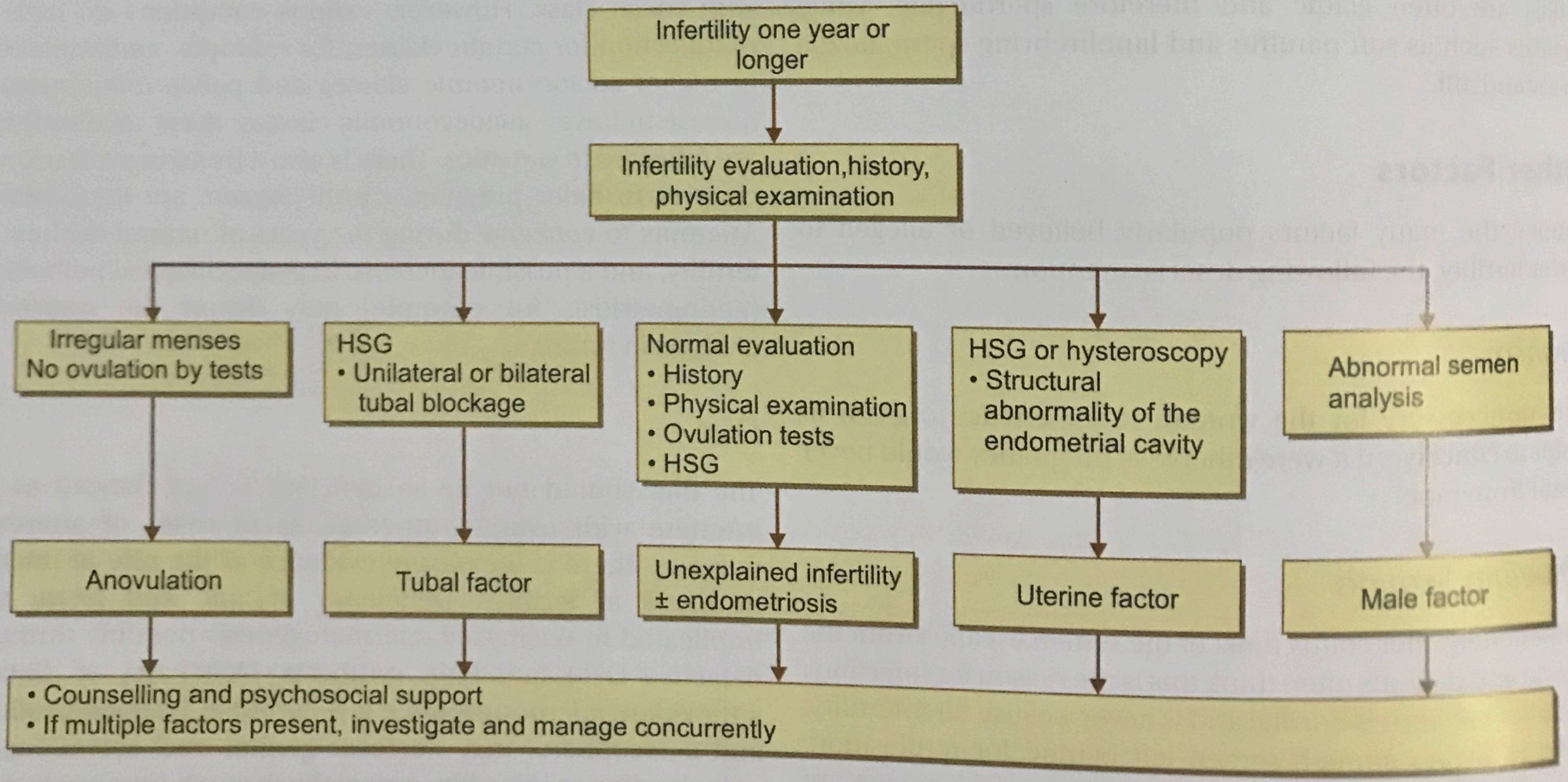
Polyzoospermia - >250 million sperm/ml

Asthenospermia - decrease motility (<25%)

Teratozoospermia - >50% abnormal spermatozoa in semen

Necrospermia - motility 0%

Flow chart 46.4: Diagnostic and treatment algorithm: infertility



Management of infertility

Tailor to the underlying etiology of infertility

Ovulatory dysfunction

- Correct underlying endocrinopathy, TSH/prolactin
- Ovulation Induction medications
- Monitor treatment for response
- Failure to achieve pregnancy in 3-4 cycles warrants reevaluation

Medications for ovulation induction

- Clomiphene Citrate
  - Selective estrogen receptor modulator(SERM)
  - Blocks estrogen feedback to the hypothalamus and pituitary
  - More FSH is released, stimulating follicular recruitment
- Aromatase Inhibitors (i.e. letrozole)
  - Block conversion of androgens to estrogens
  - Lowers circulating estrogen levels,increases FSH
- Gonadotropins

NEJM 2007;356:551-66.

Management of infertility

Diminished Ovarian Reserve

- If female partner age >37 years old or early follicular phase FSH >10-15 mIU/ML, consider IVF.

Uterine factor

- Most amenable to surgical repair and most can be performed hysteroscopically

Tubal Disease

- Consider surgical repair for tubal occlusion due to infection, adhesions or endometriosis
- Laparoscopy provides a definite assessment and possible treatment of tubal blockage
- If tubes severely damaged and/or surgical repair unsuccessful, IVF best option
- PLEASE REMOVE THE TUBES IF THEY ARE DAMAGED!

Management of Infertility

Unexplained Infertility

- Normal fertility evaluation but failure to conceive.
- Treatment with superovulation and IUI or with gonadotropin therapy is beneficial.
- May encourage couples to move on to IVF.
- IVF provides insight to the possible cause of the couple's infertility and overcomes undetected defects

Guzick. Efficacy of treatment for unexplained infertility.Fertil Steril 1998

Surgery for infertility

Laparoscopy

- Lysis of pelvic adhesions
- Tuboplasty/fimbrioplasty
- Removal of endometriomas
- Use of procedures declining as IVF success rates increase

Hysteroscopy

- Resection of uterine septum, polyps, fibroid
- Lysis of adhesions

Jacobson. Cochrane Database System Rev. CD001398. 2002.

Poor ovarian reserve

- Indicates a reduction in quantity and quality of oocytes
- AFC 5–7 follicles or AMH 0.5–1.1 ng/ml
- Management - Early IVF
- Adjuvants like Androgen or Growth hormone supplementation.
- Early detection and active management are essential to minimize the need for egg donation in these women.

J Hum Reprod Sci. 2016 Apr-Jun; 9(2): 63–69.doi: 10.4103/09741208.183514

ART

Assisted reproductive technology is not new includes medical procedures used primarily to address infertility. This subject involves procedures such as in vitro fertilisation, intracytoplasmic sperm injection (ICSI), cryopreservation of gametes or embryos, and or use of fertility medications.

IVF & ET

In vitro fertilisation and Embryo transfer - it is a technique where super ovulation is stimulated by the use of clomiphene and or gonadotropins so several ova can be harvested and remove them from the ovaries and fertilised in a lab by the sperms by semen preparation by various technique. Once fertilised ovum have multiplied, the embryo transferred to women’s uterus.

Indication of IVF

- Ejaculatory failure -may be anatomical like hypopediasis, secondary to spinal cord injury or other neurological problems
- Retrograde ejaculation - may occur in multiple sclerosis
- Impotence
- Male sub fertility due to oligospermia, hypospermia, asthenozoospemia or teratozoospermia
- Anti sperm antibody in male or female
- Cervical mucus hostility or poor cervical mucus
- Disease or deformity of cervix difficult for sperm penetration
- Unexplained infertility
- Mild to moderate endometriosis or ovarian dis function

IUI

IUI: Intrauterine insemination- this involves the collection of semen by an emission occurring other than during coitus (usually masturbation), and its transfer into the uterus.

IUI Indications

- Unexplained infertility
- Cervical problem
- Ejaculation dysfunction
- Mild male factor

- *NICE Guidelines*: IUI gives best results where post wash motile sperm count is at least 2-5 million .

IUI is not recommended for :

- Severe male factor
- Women who have severe disease of the fallopian tubes
- Women with a history of pelvic infections
- Women with moderate to severe endometriosis.

Intracytoplasmic sperm injection

- This technique has been used in case of aspermia, azoospermia and in fictional disorder of sperm, when conventional IVF failed.
- Here holding ovum by ovum holding forceps and injection of sperm with pipettes under an inverted microscope.
- To obtained sperm variety of methods included

✤ RETA rete testis aspiration

✤ PESA

✤ TESA

✤ TESE - testicular sperm extraction

✤ SPAS -spermatocele aspiration

✤ MESA

Complications of ART

- Twin or higher order multiple gestation
- Ovarian hyperstimulation syndrome

The End

Thank you