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Infertility

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World Health Organization (WHO) defines infertility as a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. This article will review the evaluation, management and treatment of both male and female infertility.

Objectives:

- Describing epidemiology of both male and female infertility.
- Review the most common findings of both male and female infertility.
- Outline the management for known cause in both cases.
- Explain the importance of improving health care coordination among the inter-professional team to enhance and improve outcomes for both male and female infertility.

Introduction:

Infertility is failure to conceive within one or more years of regular unprotected intercourse. **Sub-infertility** refers to a state in which a couple has tried to unsuccessfully to have child for a year or more. The term sub-infertility means less fertile than a regular couple. **Primary infertility** denotes who has never conceived. Secondary infertility indicates previous pregnancy but failure to conceive subsequently. **Fecundability** is the probability of achieving a pregnancy within one menstrual cycle, in a healthy young couple it is 20 percent. Fecundity is the probability of achieving a live birth within a single cycle.

Epidemiology:

Generally worldwide, it is estimated that one in seven couples achieve conception if they so desire, within one year of having regular intercourse with adequate frequency (4-5 times a week). Another 10 percent will achieve

the objective by the end of second year. As such, 10 percent remains infertile by the end of the second year. Estimates suggest that between 48 million couples and 186 million individuals live with infertility globally.

Etiology:

World Health Organization (WHO) performed a large multinational study to determine gender distribution and infertility etiologies. Conception depends on the fertility potential of both male and female partner. For infertility, males contribute 30-40% of cases, females contribute 40-55% of cases and both contribute about 10 percent of cases. Remaining 10% of couple, have unexplained cause of infertility.

Causes of male infertility:

- ✚ Obstruction of the reproduction tract causing dysfunctionalities in the ejection of semen.
- ✚ Defective spermatogenesis
- ✚ Hypospadias causes failure to deposit sperm high in the vagina
- ✚ Infection like mumps and orchitis after puberty may permanently damage spermatogenesis
- ✚ Hypoprolactimia is associated with impotence
- ✚ Loss of sperm motility(asthenozoospermia)
- ✚ Errors in seminal fluid either low or high volume of ejaculation (normal value in 20mL or more)

Causes of female infertility:

- ✚ Ovulatory disorders- 25%
- ✚ Endometriosis-15%
- ✚ Pelvic adhesions-12%
- ✚ Tubal blockage-11%
- ✚ Other tubal/uterine abnormalities-11%
- ✚ Hyperprolactemia -7%

Evaluation:

The 5 diagnostic evaluation categories are:

1. **Semen analysis:** This article will list the normal semen values of semen analysis as determined by WHO (2002).

Semen parameters	Reference value
Volume	20mL or more
pH	7.2-7.8
Sperm concentration	20 million per mL or more
Motility	50% or more with progressive forward motility
Morphology	15% or more in normal form
Viability	75% or more living
Leukocytes	Less than 1 million per mL
Sperm agglutination	Less than 2

2. **TRUS** – Trans-rectal ultrasonography is done to visualize the seminal vesicles, prostate ejaculatory ducts obstruction.
3. **Assessment of ovarian function:** Use of at home, 'fertility monitor' and checking of vaginal mucus discharge to determine the optimal timing of intercourse may be most helpful. Also the use of LH Surge kit can detect LH surge in urine by getting a deep blue color of dipstick. The test is performed between

12th and 16th day of regular cycle and indicates evidence of ovulation and helps in identifying the fertile window. Ovulation can also be detected by hormone estimation. Estimating progesterone on day 8 and 21 of cycle. An increase in value from 1mg per mL to greater than 6mg per mL suggests ovulation. This review will discuss other common test to assess ovarian reserve like FSH and estradiol levels and Anti- Mullerian Hormone. FSH levels less than 10IU/mL demonstrates likely normal ovarian reserve 10-20IU/ mL is intermediate and FSH greater than 20 IU/mL is a poor prognosis for spontaneous ovulation due to low ovarian reserve. Serum estradiol attains peak rise approximately 24-30 hours prior to ovulation. AMH is the hormone expressed by preantral and antral follicles representing a marker of ovarian function that can be measured at any time during a woman's cycle.

- <0.5 ng /mL predicts difficulty getting more than three follicles to grow
- <1.0 ng /mL shows limited egg supply that may require more aggressive ovulation induction protocols.
- 1.0 – 3.5 ng /mL shows normal values.
- >3.5 ng /mL shows ample supply and may require mild induction to prevent ovarian hyper-stimulation syndrome.

4. **Assessment of fallopian tubes:** This article will discuss two common tests for checking the tubal patency. The most common one is hysterosalpingography (HSG)-in this test instead dye is introduced transcervically. The test is done in the post menstrual phase, two days after the stoppage of menstruation. It is avoided if the woman has pelvic infection. It can precisely detect the site of block in the tube. It can reveal any abnormality in the uterus such as fibroid or synechiae. Disadvantage of HSG is radiation risk. Another test is Laparoscopic chromotubation – this is an invasive investigation hence performed only after male factors and ovulation functions have been found normal or corrected. It involves checking for tubal patency laproscopically by injecting methylene blue through the cervix into the fallopian tube to confirm the spillage of the dye into the pelvic cavity. It also helps in the detection of PID, endometriosis and pelvic adhesions along with tubal patency. Chromotubation is the diagnostics and therapeutic procedure as it can allow for release of peritubal adhesions and fimbrial block. Appropriate surgery for infertility can be planned based on the findings.
5. **Assessment of uterine cavity** is done by Sonosalpinogography - this test involves slow injection of physiological saline into the uterine cavity using a pediatric Foley's catheter. The catheter balloon is inflated at the level of the cervix to prevent fluid leak. Ultrasonography of the uterus and the fallopian tubes is the done. Ultrasound can follow the fluid through the tube up to the peritoneal cavity and in the pouch of Douglas.

Management of infertility:

Management of infertility or subfertility would depend upon the cause identified, duration and age of the couple, especially the female.

This article will list methods of treatment for both male and female infertility.

General instructions:

When minor defects are detected in both the husband and wife each of which alone could not cause infertility but in combination they decrease the fertility potential, the faults should be treated simultaneously.

- I. **Body weight:** Overweight or underweight of any partner should be adequately dealt with to obtain an optimal body weight.
- II. **Smoking and alcohol:** Excess smoking or alcohol to be avoided.
- III. **Ideal coital frequency:** intercourse on multiple days during the fertile window period, which includes the five preceding and the day of anticipated ovulation should be reviewed with the couple.

IV. Avoidance of lubricants and douches to be stressed.

Management of male infertility:

The treatment of male partner is indicated in extreme oligospermia, azoospermia, low volume ejaculate and impotency. Measures to improve spermatogenesis are advised:

1. Medications to treat specific causes: Human chorionic gonadotropin (hCG) and human menopausal gonadotropin (hMG) for hypogonadism. Dopamine agonist (cabergoline) for hyperprolactinemia and altered testosterone level to improve libido, potency and fertility. Clomiphene citrate to increase serum levels of FSH, LH and testosterone.
2. Special treatment for cause such as Intrauterine insemination (IUI), In vitro fertilization (IVF), Intracytoplasmic sperm injection (ICSI), Artificial insemination with donar 9AID) sperm.
3. Surgical treatment – in men, whose testicular biopsy shows normal spermatogenesis and obstruction is suspected, vasoepididymostomy or vasovasostomy may help.

Management of female infertility:

Treatment of female is also according to the disorders identified.

1. For ovulatory dysfunction- induction of ovulation using drugs such as clomiphene citrate, letrozole, FSH, hCG, GnRH. The correction of biochemical abnormality- metformin for hyperinsulinemia, dexamethasone for androgen excess, bromocriptine for prolactin excess.
2. Surgery: Laproscopic ovarian drilling (LOD), or laser vaporization for polycystic ovarian syndrome (PCOS). Tubotubal anastomosis for adhesions in tube. Cannulation and balloon tuboplasty for block in tube. Fimbrioplasty for fimbrial adhesion.

Management for unexplained infertility: unexplained or persistent infertility refers to those couples who have undergone complete basic infertility workup and in whom no abnormality has been detected and still remains infertile. The reported evidence is about 10%-20%. About 60%-80% of those couples become pregnant within 3 years without any treatment. The recommended treatment for unexplained infertility is induction of ovulation, IUI, and super ovulation combined with IUI.

Prognosis:

This section of article will cover the pregnancy rates per cycle for each of the treatment modalities as per the data collected from a retrospective analysis of 45 separate studies.

- ❖ No treatment – 1.3% to 3.8%
- ❖ IUI alone 4%
- ❖ Clomiphene citrate CC alone 5.6%
- ❖ Gonadotropins done 7.7%
- ❖ Gonadotropins with IUI 17.1%
- ❖ IVF 20.7%

In 2009 a study showed the women who failed CC plus IUI should go straight to IVF instead of gonadotropins plus IUI prior to IVF. This study results showed that pregnancy was achieved in less time, fewer treatment cycles were required and also financial cost per delivery was reduced.

Complications:

The three primary complications associated with infertility treatments are multiple pregnancies, ectopic pregnancy and ovarian hyper stimulation syndrome.

Conclusion:

After studying a number of books and journal articles the author came to conclusion that infertility is not just a physical disorder but should be viewed in socio-cultural context as the infertility has the socio-psychological impact on the life of the infertile couple. Since infertility is a devastating diagnosis bringing a lot of sorrows and anxiety to the patient and the family involved. The author believes that the primary intervention that the health care team can implement for the involved couple and the family is, psychological counselling and the best method to improve the outcomes of planned future treatment is to complete an intermediate and thorough investigation into both partners the possibility of complication and realistic expectation of the chances of pregnancy must be made clear to the couple during counselling. Although both women and men can experience infertility but women are often perceived with infertility regardless of whether they are infertile or not. Infertility has significant negative social impacts particularly on women who frequently experience violence, divorce, social stigma, emotional stress, depression anxiety and low self-esteem. Lastly, This article is meant to provide an overview and basic knowledge of infertility about its etiology, epidemiology, diagnosis, management and prognosis.

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