Med Pulse

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MALE INFERTILITY

One in every four couples of reproductive age in developing countries presenting with an unfulfilled desire for a wanted pregnancy. Inability to have a successful healthy birth (infertility/subfertility) can be defined as either a disease of the reproductive tract (no reproductive success after 1 year of actively attempting for a pregnancy) or a disability that results in an impairment of function.

Need for counseling in women and men Fertility-awareness messaging for decision-making, counsel-ing, and infertility/subfertility diagnosis, care and treatment specifically target the pre-pregnancy period also sometimes defined as, and includes the preconception period.

Infertility Vs. Impotence

It is important to note that infertility and impotence are quite different entities. Failure to discern the difference between the two is a needless cause of embarrassment to most men who stay away from andrology clinics because of the stigma that goes with the latter term.

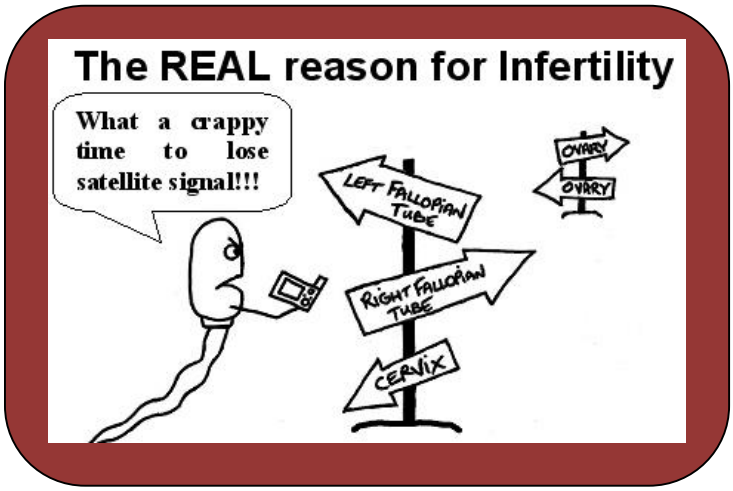
Impotence means an inability to attain or sustain erections for satisfactory sexual intercourse.

The term has no bearing whatsoever on the fertility status of the man. It is thus possible for a totally impotent man to be potentially fertile and it will be possible to produce a pregnancy in the wife of such a man by insemination of the husband's semen.

Infertility, on the other hand, means an inability to produce children. This usually results from the husband's semen being infertile or sub-fertile. Most infertile men are perfectly normal in terms of potency and have very satisfactory sexual relations with their partners.

Male Infertility at a glance

Causes of Male Infertility	Fertility Treatment
Low sperm count (fewer than 15 million per ml)	IUI or IVF with intracytoplasmic sperm injection (ICSI)
Blocked tubes that carry sperm from the testicles to semen for ejaculation	IUI or IVF with (ICSI)
Varicocele	Urologist consultation; surgical repair
Complications from sexually transmitted disease (STD)	IUI, or IVF with or without ICSI
Physical obstructions, ejaculation issues, or retrograde ejaculation	Urologist consultation; IUI, or IVF with or without ICSI
Hormonal deficiencies	Clomid or fertility medications with or without IUI or IVF
Genetic problems	Preimplantation Genetic Diagnosis (PGD) or Preimplantation Genetic Screening (PGS) with IVF
Environmental or lifestyle issues	Change in patterns, exposure or habits



Causes of Infertility

Pathological

1. Varicocele
2. Infections:
   A. Acute: small pox, mumps, other viral infections
   B. Chronic: TB, leprosy, prostatitis
3. Sexually transmitted diseases

Genetical

Genetic, endocrine & familial disorders:
Klinefelter's syndrome, Young's syndrome, cystic fibrosis, adrenal hyperplasia

Systemic (Medical and Surgical)

1. Undescended testes (cryptorchidism)
2. Previous surgery: inguinal, scrotal, retroperitoneal, bladder neck, vasectomy
3. Obstructions: congenital (aplasia), vasectomy, post-infective
4. Systemic illnesses esp. hepatic, renal
5. Immunologic: infection, obstruction
6. Idiopathic - cause unknown
7. Spinal cord lesions

Injury

1. Direct: testicular or pelvic trauma, heat, irradiation
2. Indirect: radiotherapy, chemotherapy, environmental toxins, drugs, marijuana, tobacco, alcohol

Sexual

1. Ejaculatory disturbances
2. Sexual dysfunctions

Diagnostic Tool

Semen Analysis

A perfectly normal semen analysis report generally precludes a significant male factor component and investigation and treatment should be more appropriately targeted at the wife.

Often, in the case of male infertility, the semen analysis is abnormal. Either the count is low (oligospermia) or sperms are altogether absent in the ejaculate (azoospermia).

Sometimes, sperm motility is seriously affected (asthenospermia) and sometimes the sperms are totally immobile or dead (necrospermia). There are many other anomalies that one may find on semen analysis.

Aspermia	No semen (no or retrograde ejaculation)
Asthenozoospermia	Percentage of progressively motile (PR) spermatozoa below the lower reference limit
Asthenoteratozoospermia	Percentages of both progressively motile (PR) and morphologically normal spermatozoa below the lower reference limit
Azoospermia	No spermatozoa in the ejaculate (given as the limit of quantification for the assessment method employed)
Cryptozoospermia	Spermatozoa absent from fresh preparations but observed in a centrifuged pellet
Haemospermia (Haematospermia)	Presence of erythrocytes in ejaculate
Leukospermia (Leukocyte-Spermia, Pyospermia)	Presence of leukocytes in the ejaculate above the threshold value
Necrozoospermia	Low percentage of live, and high percentage of immotile, spermatozoa in the ejaculate
Normozoospermia	Total number (or concentration depending on outcome reported)* of spermatozoa, and percentage of progressively motile (PR) and morphologically normal spermatozoa, equal to or above
Oligoasthenozoospermia	Total number (or concentration depending on outcome reported)* of spermatozoa, and percentage of progressively motile (PR) spermatozoa, below the lower reference limits
Oligoasthenoteratozoospermia	Total number (or concentration depending on outcome reported)* of spermatozoa, and percentages of both progressively motile (PR) and morphologically normal spermatozoa, below the lower reference limits
Oligoteratozoospermia	Total number (or concentration depending on outcome reported)* of spermatozoa, and percentages of morphologically normal spermatozoa, below the lower reference limits
Oligozoospermia	Total number (or concentration depending on outcome reported)* of spermatozoa below the lower reference limits
Teratozoospermia	Percentages of morphologically normal spermatozoa below the lower reference limits

The following is a list of hormonal disorders which can disrupt male infertility:

Male Hormone Levels			
Hormone to Test	**Normal Values**	**What value means**	
Testosterone	270-1100 ng/dl	Testosterone production is stimulated by Leydig cells in the testicles. Low levels of testosterone combined with low FSH and LH are diagnostic of Hypogonadotropic hypogonadism.	
Free Testosterone	0.95-4.3 ng/dl		
% Free Testosterone	0.3% - 5%	A normal male has about 2% free, unbound testosterone	
Follicle Stimulating Hormone (FSH)	1-18 mIU/ml	Basic hormone testing for males often only includes FSH and testosterone.	
Prolactin	< 20 ng/ml	A level two or three times that of normal may indicate a pituitary tumor, such as a prolactinoma, which may lead to decreased sperm production. Elevations can be treated with bromocriptine.	
Luteinizing Hormone (LH)	2-18 mIU/ml	LH stimulates Leydig cells and production of testosterone. A problem with LH levels alone is rarely seen, so testing is only needed if testosterone level is abnormal.	
Estradiol (E2)	10-60 pg/ml		
Progesterone (P4)	0.3-1.2 ng/ml		

1. **Hyperprolactinemia:**
   Elevated prolactin--a hormone associated with nursing mothers, is found in 10 to 40 percent of infertile males. Mild elevation of prolactin levels produces no symptoms, but a greater elevation of the hormone reduces sperm production, reduces libido and may cause impotence. This condition responds well to the medicine bromocriptine.

2. **Hypothyroidism:**
   Low thyroid hormone levels--can cause poor semen quality, poor testicular function and may disturb libido. May be caused by a diet high in iodine. Reducing iodine intake or beginning thyroid hormone replacement therapy can elevate sperm count. This condition is found in only 1 percent of infertile men.

3. **Congenital Adrenal Hyperplasia:**
   Occurs when the pituitary is suppressed by increased levels of adrenal androgens. Symptoms include low sperm count, an increased number of immature sperm cells, and low sperm cell motility. It is treated with cortisone replacement therapy. This condition is found in only 1 percent of infertile men.

4. **Hypogonadotropic Hypopituitarism:**
   Low pituitary gland output of LH and FSH. This condition arrests sperm development and causes the progressive loss of germ cells from the testes and causes the seminiferous tubules and Leydig (testosterone producing) cells to deteriorate. This may be treated with the drug Serophene. However, if all germ cells are destroyed before treatment commences, the male may be permanently infertile.

5. **Panhypopituitafism:**
   Complete pituitary gland failure - lowers growth hormone, thyroid-stimulating hormone, and LH and FSH levels. Symptoms include: lethargy, impotence, decreased libido, loss of secondary sex characteristics, and normal or undersized testicles. Supplementing the missing pituitary hormones may restore vigor and a hormone called HCG may stimulate testosterone and sperm production.

Genetic Disorders

Klinefelter's Syndrome:

This is a genetic condition in which each cell in the human body has an additional X chromosome--men with Klinefelter's Syndrome have one Y and two X chromosomes. Physical symptoms include peanut-sized testicles and enlarged breasts. A chromosome analysis is used to confirm this analysis. If this condition is treated in its early stages (with the drug HCG), sperm production may commence and/or improve. However, Klinefelter's Syndrome even-tually causes all active testicular structures to atrophy. Once testicular failure has occurred, improving fertility is impossible.

Psychological/Physical/Behavioral Problems:

1. Retrograde Ejaculation:

Is a condition in which semen is ejaculated into the bladder rather than out through the urethra because the bladder sphincter does not close during ejaculation. If this disorder is present, ejaculate volume is small and urine may be cloudy after ejaculation. This condition affects 1.5 percent of infertile men and may be controlled by medications like decongestants which contract the bladder sphincter or surgical reconstruction of the bladder neck can restore normal ejaculation.

Several sexual problems exist that can affect male fertility. These problems are most often both psychological

and physical in nature: it is difficult to separate the physiological and physical components.

2. Erectile Dysfunction (ED):

It is also known as impotence. ED is the result of a single, or more commonly a combination of multiple factors. In the past, ED was thought to be the result of psychological problems, but new research indicates that 90 percent of cases are organic in nature. However, most men who suffer from ED have a secondary psychological problem that can worsen the situation like performance anxiety, guilt, and low self-esteem. Many of the common causes of impotence include: diabetes, high blood pressure, heart and vascular disease, stress, hormone problems, pelvic surgery, trauma, venous leak, and the side effects of frequently prescribed medications (i.e. Prozac and other SSRIs, Propecia).

3. Premature Ejaculation:

It is defined as an inability to control the ejaculatory response for at least thirty seconds following penetration. Premature ejaculation becomes a fertility problem when ejaculation occurs before a man is able to fully insert his penis into his partner's vagina. Premature ejaculation can be overcome by artificial insemination or by using a behavioral modification technique called the "squeeze technique" which desensitizes the penis.

4. Ejaculatory Incompetence:

This rare psychological condition prevents men from ejaculating during sexual intercourse even though they can ejaculate normally through masturbation. This condition sometimes responds well to behavioral therapy; if this technique does not work, artificial insemination can be employed using an ejaculate from masturbation.

TREATMENT

Treatment of male infertility is difficult and sometimes frustrating. Immediate results are hard to produce and persistence with therapy is required.

The following modalities of treatment are generally employed.

- ***Medical Treatment:***

  This consists of the administration of certain drugs to improve seminal quality. Clomiphene citrate, mesterolone, tamoxifen, gonadotropin injections, antibiotics, steroids and a whole lot of other medicines etc. are commonly used. In India, there are also many alternative medicines. Except is some specific clinical states, most of these are of dubious efficacy, at best.

- ***Surgical Treatment:***

  Obstructions in the sperm conduction pathway, Varicocele, Undescended testes etc. can be treated by operation.

  Modern microsurgical techniques are of great help. Even patients who have undergone a vasectomy in the past can have their vasectomy reversed and the tubes recanalised successfully using microsurgery.

- ***Assisted Reproduction:***

  In many cases, neither medicines nor operations are of help. In such cases, an attempt is made in the reproductive laboratory to improve semen quality and facilitate the penetration of the sperm into the ovum. This includes sperm washing/capacitation, intra-uterine insemination (IUI), gamete intra-fallopian transfer (GIFT), in vitro fertilization (IVF), and micro-manipulation (ICSI).

  Microsurgery and assisted reproduction require considerable training, skill and infrastructure.

  Despite the availability of so many treatment modalities, some patients remain incurable and no treatment, cheap or expensive, can improve their fertility prospects.

  One then has no alternative but to recommend an AID (donor insemination) or adoption

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