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NURSING

PHS 205

SEMEN

Semen is also known as seminal fluid; it is an organic fluid that contains spermatozoa. It is secreted by gonads (sexual glands) and other sexual organs of male and hermaphroditic animals and can fertilize the female ovum. In humans, seminal fluid contains several components besides spermatozoa: proteolytic and other enzymes as well as fructose are elements of fluid which promote the survival of spermatozoa, and provide a medium through which they can move or ‘swim’. Semen is produce from seminal vesicle located in the pelvis. The process of discharge is called ejaculation.

Fertilization: Depending on the species, spermatozoa can fertilize ova externally or internally, in external fertilization, the spermatozoa fertilize directly, outside of the female’s sexual organs. Examples include spawn ova. During internal fertilization, however fertilization occurs inside the female’s sexual organs. Internal fertilization takes place after insemination of a female by a male through copulation which occurs through the vagina. Examples include mammals, reptiles, birds etc.

Composition: the testes produces 200 – 500 million spermatozoa. During the process of ejaculation, sperm passes through the ejaculatory ducts and mixes with fluids from the seminal vesicles, the prostate and bulbourethral glands to form the semen. the seminal vesicles produce yellowish viscous fluid rich in the fructose and other substances that makes up 70% the human semen. The seminal plasma provides a nutritive and protective medium for the spermatozoa during their journey through the female reproductive tract. the normal the vagina is a hostile one for sperm cells, as it is very viscous and patrolled by immune cells. The components in the seminal plasma attempt to compensate for this hostile environment. Basic amines such as putrescine, spermine, spermidine and cadaverine are responsible for the smell and flavor of semen. These alkaline bases counteract and buffer the acidic environment of the vaginal canal and protect DNA inside the sperm.

Semen is typically translucent with white gray or even yellowish tint. Blood in the semen can cause a pink or reddish color known as hematospermia, and may indicate a medical problem which should be evaluated by a doctor if it persists. Semen can transmit many sexually transmitted diseases and pathogens including viruses like HIV and Ebola. Swallowing semen carries no additional risk other than those inherent in fellatio. Viruses in semen survive for a long time once outside the body.

In rare circumstances, humans can develop an allergic to semen, called human seminal plasma sensitivity. It appears as a typical localized or systemic allergic response upon contact with seminal fluid. A semen allergy can be distinguished from a latex allergy by determining if the symptoms disappear with use of a condom. Desensitization treatments are often very successful.

MALE INFERTILITY

Male infertility refers to a male’s inability to cause pregnancy in a fertile female. In humans it accounts for 40-50% of infertility. It affects approximately 7% of all men. Male infertility is commonly due to deficiencies in the semen and semen quality is used as surrogate of male fecundity.

Causes;

Immune infertility: Antisperm antibodies (ASA) have been considered as infertility cause in around 10- 30% of infertile couples. ASA production are directly against surface antigens on sperm, which can interfere with sperm motility and transport through the female reproductive tract, impaired fertilization, impaired growth and development of the embryo. Risk factors for the formation of antisperm antibodies in men include the breakdown of blood testes barrier, trauma and surgery, testicular cancer, prostatitis, and unprotected receptive anal or oral sex with men.

Genetics: Chromosomal anomalies and genetic mutations and genetic mutations account for nearly 10-15% of all male infertility cases.

Klinefelter syndrome: one of the most common causes of infertility is klinefelter syndrome affecting 1out of 500 – 1000 newborn males. Males with this syndrome carry an extra X Chromosomes (XXY) meaning they have 47 chromosomes compared to the normal 46 in each cell. There are varieties in klinefelter syndrome, where some cases may have extra X chromosomes in some mosaic klinefelter syndrome or where individuals have the extra X chromosomes in all cells. The reduction of testosterone in the male body normally results in an overall decrease in the production of viable sperm for the individuals thereby forcing them to turn to fertility treatments to father children.

Y chromosomal deletion: it is a direct cause of male infertility due to its effects on the sperm production, occurring in 1 out of every 2000 males. Usually affected men show no symptoms other than at times can exhibit smaller testes size. Men with this condition can exhibit azoospermia (no sperm production), oligozoospermia (small number of sperm production), or they will produce abnormally shaped sperm (teratozoospermia). This case of infertility occurs during the development of gametes in the male, where a normal healthy male produce both X and a Y chromosome, affected males have genetic deletions in the Y chromosomes. These individuals are thereby “Y linked” although daughters are not affected due to lack of the Y chromosomes.

Other causes include;

Age

Abnormal set of chromosomes

Neoplasm

Trauma

Hydrocele

Malaria

Testicular cancer etc.

Pre-testicular causes: this refers to that impede adequate support of the testes and include situations of poor hormonal support and poor general health including:

* Varicocele is a condition of swollen testicle veins, it is present in 15% of normal men and in about 40% of infertile men. It is present in up to 35% of cases of primary infertility and 69- 81% of secondary infertility.
* Tobacco smoking is an increasing evidence that the harmful products of tobacco smoking may damage the testicles and kill sperm, but their effect on the male fertility is not clear.
* DNA damage: common inherited variants in the genes that encode enzymes employed in DNA mismatch repair are associated with increased risk of sperm DNA damage and male infertility.
* Epigenetic: an increasing amount of recent evidence has been recorded documenting abnormal sperm DNA methylation in association with abnormal semen parameters and male infertility.

Post testicular causes.

* Vas deferens obstruction.
* Lack of vas deferens, often related to genetic makers for cyclic fibrosis.
* Infection e.g. prostatitis.
* Retrograde ejaculation.
* Ejaculatory duct obstruction.
* Impotence.

Diagnosis

The diagnosis of fertility begins with a medical history and physical exam by a physician, physician assistant or nurse practitioner. Typically, two separate semen analyses will be required.

Medical history

The history should include prior testicular or penis insults (torsion, cryptorchidism, trauma), infections (mumps, orchitis, epididymitis), environmental factors, excessive heat, radiation, medications and drug use (anabolic steroids, alcohol, smoking). Sexual habits, frequency and timing of intercourse, use of lubricants, and each partner’s previous fertility experiences are important. Loss if libido and headaches may indicate a pituitary tumor. The past medical or surgical history may reveal thyroid or liver disease, radical pelvic or hernia repair. The family may reveal genetic problems.

Sperm sample

The volume of the semen sample, approximate number of total sperm cells, sperm motility progression and % of sperm with normal morphology are measured. This is the most common type of fertility testing. Semen deficiencies are often labeled as follows;

* Oligospermia or oligozoospermia - decreased number of spermatozoa in semen.
* Aspermia – complete lack of semen.
* Hypospermia – reduced seminal volume.
* Azoospermia – absence of sperm cells in semen.
* Teratospermia – increase in sperm with abnormal morphology.
* Asthenozoospermia – reduced sperm motility.
* Necrozoospermia – all sperm in the ejaculate are dead.
* Leucospermia – a high level of white blood cells in semen.
* Normozoospermia or normospermia – it is a result of semen analysis that shows normal values of all ejaculate parameters by WHO but still there are chances of being infertile. This is also called an unexplained in fertility.

Ultrasonography

Scrotal ultrasonography is useful when there is a suspicion of some particular diseases. It may detect signs testicular dysgenesis, which is often related to an impaired spermatogenesis and to a higher risk of testicular cancer. Doppler ultrasonography useful in assessing venous reflux in case of a varicocele, when palpation is unreliable or in detecting recurrence or persistence after surgery, although the impact of its detection and surgical correction on sperm parameters and overall fertility is debated.

Prevention

* Avoid smoking.
* Avoid heavy marijuana and alcohol use.
* Avoid excessive heat to the testes.
* Maintaining optimal frequency of coital activity.
* Wearing a protective cup and jockstrap to protect the testicles in any sport.
* Diet: healthy diets rich in such nutrients as omega-3, fatty acids and vitamins, and low in saturated fatty acids (SFAs) and trans-fatty acids (TFAs) are inversely associated with low semen quality parameters.

Hormonal therapy

Administration of luteinizing hormone (LU) (or human chorionic gonadotropin) and follicle stimulating hormone (FSH) is very effective in the treatment of the male infertility due to hypogonadotropic hypogonadism. Estrogen, at some concentration, has been found to be essential for male fertility/spermatogenesis. Low- dose estrogen and testosterone combination therapy may improve sperm count and motility in some men, including in men with severe oligospermia.