

A Brief Clinical Overview of Etiological Factors in Infertility

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Abstract

Infertility is the inability to conceive after one year of cohabitation without the use of any contraceptives. Infertility is a common problem that affects one in six couples. Some of the causes of infertility in men include varicocele, testicular torsion or trauma, cryptorchidism, infections of the seminal vesicles, hypogonadotropic hypogonadism, genital dyskinesia, reproductive canals obstruction, anti-sperm antibodies, and obesity. Bacterial infections of the genital system are also important and common causes of infertility. Infections can disrupt the reproductive process through a variety of processes. Also, various studies have shown that Chlamydia trachomatis is directly related to sperm function and its effect on sperm parameters. This article gives you a brief overview of infertility and the factors that cause infertility and exacerbate it.

Keywords: Infertility, Chlamydia trachomatis, Male factors

1 Introduction

About 10 to 15 percent of couples have infertility problems, meaning that one in every 5 to 6 couples in reproductive age has an infertility problem (ollero, Gil-Guzman et al. 2001). Male factors (Fig. 1), account for only about 35 percent of all infertility factors and 20 percent are female factors. Some of the causes of infertility in men include varicocele, testicular torsion or trauma, cryptorchidism, infections of the seminal vesicles, hypogonadotropic hypogonadism, genital dyskinesia, reproductive canals obstruction, anti-sperm antibodies, and obesity (2000). These processes include damage to spermatogenesis, sperm dysfunction, and obstruction of the genital tract. Bacterial infections increase the presence of leukocytes in sperm, which release large amounts of oxygen-reacting species that causes increased mortality and DNA damage and reduce motility and acrosomal reactions in sperm. Chlamydia is known to be a silent disease. The most important bacteria in the urogenital tract include Chlamydia trachomatis, Neisseria gonorrhoea, and some genital types of mycoplasma, such as genital mycoplasma (Keck, Gerber-Schafer et al. 1998). Bacterial infections of the genital system are also important and common causes of infertility. A wide range of bacteria is involved in infertility to varying degrees. Infections can disrupt the reproductive process through a variety of processes.

2 Saying the question

Infertility is the inability to conceive after one year of cohabitation without the use of any contraceptives. Infertility is a common problem that affects one in six couples (Irvine 1998). The main sperm parameters that affect male infertility include sperm count, motility, and morphology. Sperm count: The normal sperm count should be more than 15 million per milliliter of sperm fluid. Sperm motility: Sperm motility is one of the most important factors in determining the fertility

potential of individuals. Sperm motility is progressive and non-progressive in two ways that progressive movement less than 39% can be the cause of infertility. Sperm morphology: Sperm has parts called the neck, head, tail, and middle. For the sperm to be normal, the neck, head, tail, and middle, of the sperm must be normal. The acrosomal region that makes up 40 to 70 percent of the head area must be well defined. It should also be attached to the head. Also, the sperm tail should be narrower than the middle piece and without twisting (Evans and Maxwell 1987).

3 Idiopathic infertility

Despite all the methods used, about 25% of patients have an abnormal semen analysis, for which no cause has been found. This condition is known as men's idiopathic infertility, which is probably due to several reasons (Fig. 2).

4 Infertility caused by infectious and bacterial agents

Bacterial infections of the genital system are common causes of infertility, and a wide range of bacteria are involved in causing infertility in men to varying degrees. Infections disrupt fertility through a variety of processes. These mechanisms include damage to the spermatogenesis process, sperm dysfunction, and obstruction of the genital tract. The most important bacteria associated with male genital infections include Chlamydia trachomatis, Neisseria gonorrhoea, and some species of the genus Mycoplasma, such as Mycoplasma genitalia. (Keck, Gerber-Schafer et al. 1998). Bacterial infection also destroys the blood-testicular barrier and leads to the formation of large amounts of anti-sperm antibodies that can be detected in serum and sperm. Urinary tract infections are one of the leading causes of infertility in men, accounting for about 8 to 35 percent of male infertility cases worldwide.

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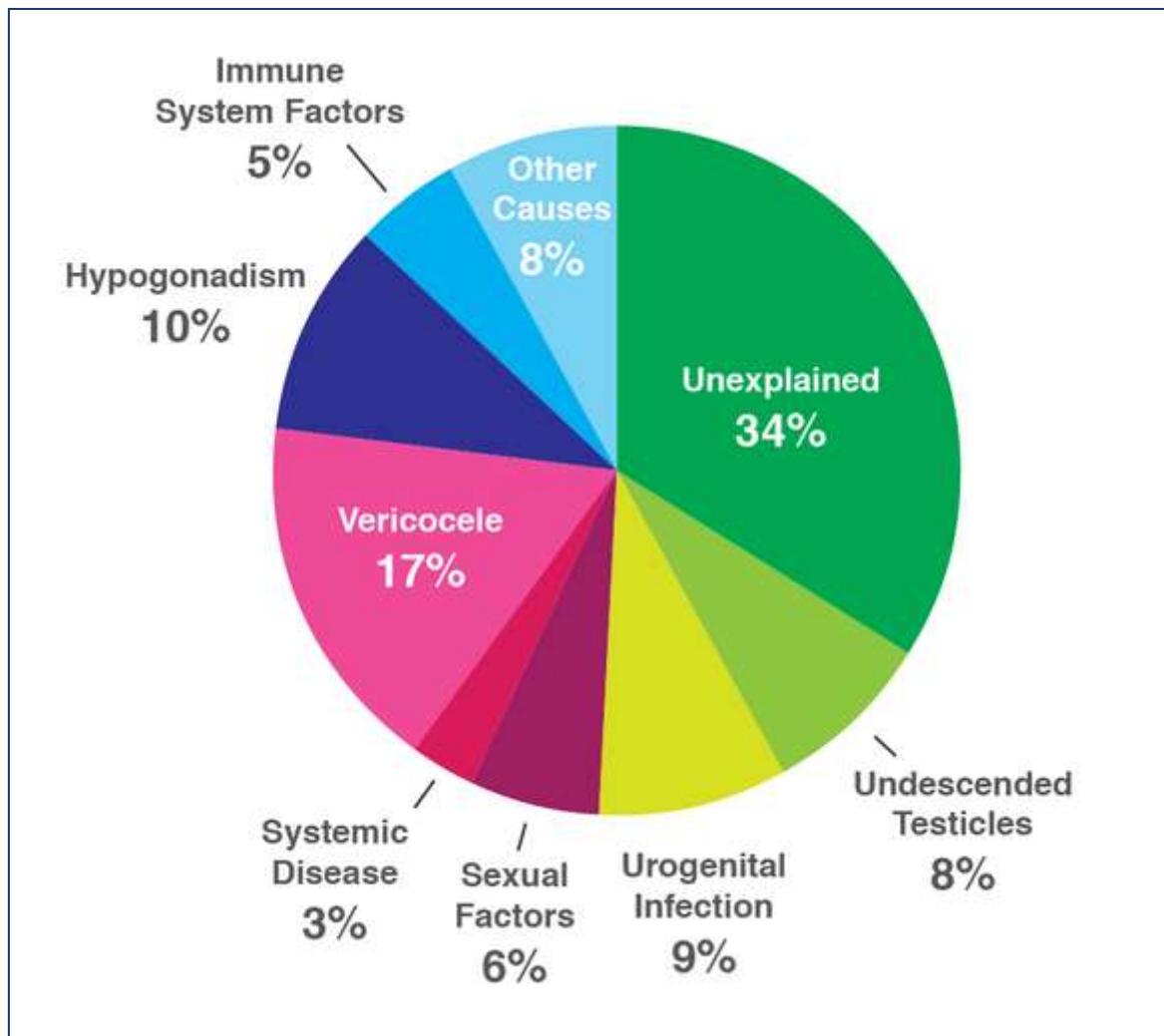


Figure 1: Reasons for Male Infertility

Studies have shown that the spermatogenesis process is temporarily disrupted in 60% of patients with acute inflammation of the epididymis, and antibiotic therapy restores sperm parameters to normal levels. Chlamydia is one of the most important species causing infertility (Keck, Gerber-Schafer, et al 1998).

5 Chlamydia immunological response

Various studies have shown that Chlamydia trachomatis is directly related to sperm function and its effect on sperm parameters. The primary response to chlamydia-infected epithelial cells is first the neutrophil response and then lymphocytes, macrophages, and plasma cells. External agents attack and then eosinophilic attack occurs. The release of cytokines and interferons by infected epithelial cells increases the inflammatory cascade. Chlamydial infection first results in a hemorrhagic response. As a result, IgA secreted immunoglobulin and IgM-IgG antibodies are released into the bloodstream and cellular immunity is established. The immune response to Chlamydia trachomatis is similar to that of the primary microbe and the frequency of recurrent infections. Chlamydia can persist even after an increased immune response and cause a chronic infection.

6 Chlamydial urinary tract infections

According to the World Health Organization (WHO), about 92 million new cases of Chlamydial urinary tract infections occur worldwide each year. The predisposing factors for this infection are different in various societies. Studies show that Chlamydia trachomatis can stay in the genitals for a long time. Residues of infection are present in 87% of untreated men and women and are the main cause of infection complications.

7 The direct link between Chlamydia trachomatis and sperm function

This association was first observed in the laboratory using the immunofluorescence test with a monoclonal antibody by electron microscopy. Sperm penetration testing has shown that Chlamydia trachomatis can attach to them when sperm are moving forward. Observations with electron microscopy in male ejaculation show the presence of elementary bodies (EB) and reticulate bodies (RB) forms of Chlamydia trachomatis in sperm. After moving the pathogenic type of EB into the nucleus, the whole steps of RB formation are performed at the head of the sperm. The sperm can carry Chlamydia trachomatis in or even transfer the Pathogenic agent into the peritoneal membranes of the uterus and fallopian canal.

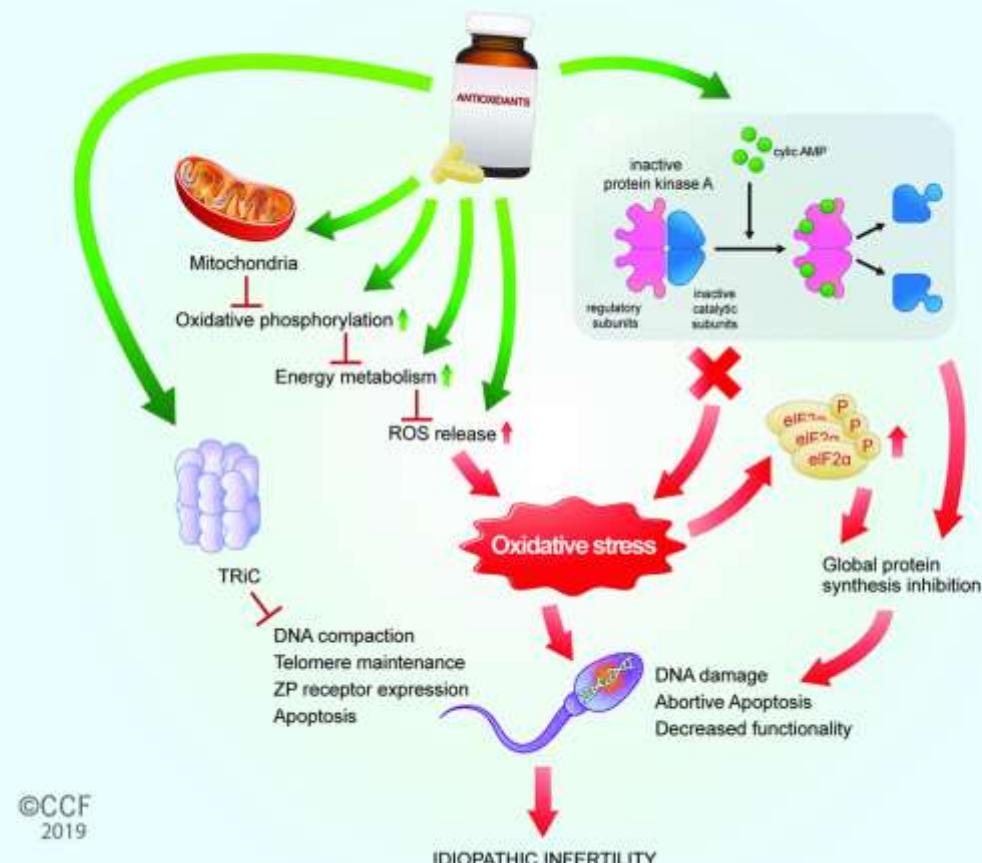


Figure 2: Several causes of idiopathic infertility

Being exposed to *Neisseria* and *Chlamydia trachomatis* may also increase the risk of HIV infection. All HIV-negative people should be screened for *Chlamydia trachomatis* infections and other Sexually Transmitted Diseases (STD) disease at first and then annually, and this should be done every 3 to 6 months if they are in the high-risk group.

8 Conclusion

Chlamydia trachomatis has become the most widespread bacterial (STD) worldwide which is responsible for about 50% of the causes of pelvic inflammatory disease and about 87% of untreated men and women. *Chlamydia trachomatis* has always been the most prevalent infection observed in the non-gonococcal urethritis (NGU) population which may trigger near to 42% of infectious diseases of NGU cases (Stamm, Batteigeret al. 2007). There have been differing views on the *Chlamydia trachomatis* effect and reactive oxygen species (ROS) during infertility. Also, the kind of specimen and the type of detection procedure are faced with different opinions in infertility.

References

- 1- Evans, G. and W. Maxwell (1987). Handling and examination of Semen. Salamons Artificial Insemination of sheep and Goats, edited by Maxwell WMC, Butterworth, Sidney:93-1

- 2- Irvine, D. S. (1998). Epidemiology and aetiology of male infertility. Human Reproduction 13(Suppl 1):33-44.
- 3- Keck, C. C. Gerber-Schafer, et al. (1998) Seminal tract infections: impact on male fertility and treatment options. Human reproduction update 4(6):891-903.
- 4- OEHNINGER, S. (2000). Clinical and laboratory management of male infertility: an opinion on its current status. Journal of andrology 21(6):814-821.
- 5- Ollero, M., E. Gil-Guzman, et al. (2001). Characterization of subsets of human spermatozoa at different stages of maturation: implications in the diagnosis and treatment. Human Reproduction 16(9):1912-1921.
- 6- Stamm, W., E. B. Batteiger, et al. (2007). A randomized, double-blind study comparing single-dose rifaximicin with single-dose azithromycin as empirical treatment of nongonococcal urethritis in men. Sexually transmitted disease 34(8):545-552.