Idiopathic Male Infertility Overview

Mohamed Sobhy Abd elhady, Abdalla Hasan Kandil, Waleed Mohamed Albalat
Dermatology, Venereology and Andrology Department, Faculty of Medicine, Zagazig University.
Corresponding Author: Mohamed Sobhy Abd elhady
Email: mohammedsobhi313@gmail.com

Abstract

Background: Infertility is a disease that causes a lot of trauma, emotional instability, and psychological stress, which in turn has an adverse impact on individual physiology and psychology. Infertility affects about 15% of couples trying to conceive. In about half of these cases, male infertility is the main factor or contributing factor, and more than 25% of infertile men have no clear reason. Infertility of unknown origin includes idiopathic infertility and unexplained infertility. The causes of marital infertility can be determined according to the contribution of each partner

Keywords: Idiopathic Male Infertility

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Infertility: Failure to achieve a pregnancy after a period of coitus without contraception

Primary infertility: Failure to achieve a first pregnancy after a period of coitus without contraception.
Secondary Infertility: Failure to achieve a subsequent pregnancy after a period of coitus without contraception (1).

Infertility of unknown origin includes idiopathic infertility and unexplained infertility. Male idiopathic infertility patients have no obvious history of fertility problems, and laboratory physical examination and endocrine examination are normal. Systematic analysis of semen shows that semen abnormalities may occur alone or in combination. The prevalence of unexplained semen quality decline in men is between 30% and 40% (2).

These considerations highlight the shortcomings of systematic semen analysis. Men's evaluation of fertility must go far beyond the evaluation of sperm quantity, sperm movement, and morphology. It must be supplemented by appropriate clinical examination, complete medical history, endocrinology, genetics, and other relevant studies. Andrology research aims to identify potentially fatal diseases and treat reversible diseases, such as bad living habits, subclinical infections, Hormonal disorders, and clinical varicoceles. However, questions remain, not only what is considered a comprehensive assessment, but also which tests help to assess unexplained infertile couples. (2).

Many men previously considered to be idiopathic infertile men now belong to the category of UMI, that is, infertile men with normal semen analysis and physical examination, their endocrine status is normal and there is no obvious female etiology. It is estimated that 6% ~ 27% of infertile men belong to UMI(3).
Male and female factors

The causes of marital infertility can be determined according to the contribution of each partner. Four types are usually used - female-only factor, male-only factor, bilateral factor, and unknown cause. About 50% of infertility cases are related to male factors (4).

However, if only one partner is identified as the cause of infertility, the female factor is usually the most common (42). The proportion of couples with male and female problems is 10 times higher (24%) (42). One theory that explains this finding is that many people in the general population may have low fertility, but when the fertility of both sides is low, the fertility problem is easier to be recognized. (5).

There seems to be no evidence that sperm quality generally decreases over time, but sperm quality varies by geographical region. (6). These differences may be caused by human factors, different subject selection criteria, different sample collection methods, and/or different analysis methods, but they may also be caused by climate, race, socio-economic, or other environmental factors.

Possible Risk Factors for Male Infertility

1 Smoking

Smoking plays an important role in the literature on the possible factors of male infertility. Saleh et al. (43) report that Smoking was associated with a significant 48% increase in sperm leukocyte concentration and an increase in sperm reactive oxygen species (ROS). Elevated seminal leukocyte count in smokers has also been reported by Close et al.(44). It has also been found that smoking was associated with a significant increase in catecholamine circulation rate, suggesting that this hormone trigger may be the reason for stimulating the increase of leukocyte infiltration. (7).

2 Alcohol

(Prazzini et al., 1993) found that the risk of infertility increased significantly with the increase of daily drinking. Although moderate drinking seemed to have little effect on sperm quality, the sperm of alcohol-dependent men were significantly damaged. Men who drank a lot of alcohol had significantly lower testosterone levels and higher FSH and LH levels (8).

3 Caffeine consumption

Caffeine may affect the potential of sperm fertilization because in vitro studies have shown that the addition of low-dose caffeine (3-7 mm / ml) to ejaculatory preparations can increase sperm motility by at least 25% (9).

At higher doses though, caffeine has a negative effect on motility (10). Oldereid et al., (11) found there was no significant difference in mean sperm concentration, progressive motility, and abnormal morphology between non-coffee drinkers and moderate and severe coffee drinkers.
4 Recreational drugs and anabolic steroids

A review of the harmful effects of cannabis use has shown that the use of cannabis extract in animals may impair sperm production and motility. In addition, in animal studies, cannabis has been shown to reduce the secretion of testosterone and prolactin, inhibit thyroid function, and change the function of some auxiliary reproductive organs (12).

Bracken et al., (13) also studied the cocaine use of men. They found that men with low semen concentration were five times more likely to use cocaine in the past two years than the control group, and they used cocaine more than twice as often (14).

Androgen anabolic steroids have also been shown to be harmful to male reproduction. A study of 30 bodybuilders compared the effects of anabolic steroids with and without anabolic steroids (15).

5 Diet, exercise and obesity

Vegetarians may be associated with a high intake of phytoestrogens because these natural estrogens are found in many plants and vegetables, especially soybean products as meat protein substitutes (16). Phytoestrogen is similar to estradiol in structure and function. There is strong evidence in some animal species that intake of phytoestrogen will interfere with reproductive function (17).

Theoretically, high levels of dietary estrogen will change the hypothalamic-pituitary-gonadal axis in men, which may have a negative impact on spermatogenesis. Oral zinc sulfate has been shown to improve sperm motility in infertile men (18; 19) and Oral folic acid combined with zinc sulfate can increase the number of sperm (20).

However, the benefits of zinc sulfate treatment have not been generally confirmed, as Takihara et al., (21) found no difference in sperm count or motility after the treatment of infertile men, and Netter et al., (22) found Zinc sulfate is effective only for men with low fertility and only for men with low plasma testosterone levels. In healthy men recruited by the metabolic research unit, short-term vitamin C deficiency has no adverse effect on the concentration. Sperm motility or morphology, as well as moderate supplementation, did not improve these parameters. (23).

However, these authors cite another study (4) where Vitamin C dietary supplementation for two months in infertile men can improve the number, vitality, and morphology of sperm and lead to pregnancy. Another study was conducted on infertile men taking high-dose vitamin supplements (combined with vitamins C and E) Exercise capacity and concentration did not improve (24).

However, oral vitamin E therapy has been shown to improve the exercise ability of men with previous exercise values below baseline (25) and to improve sperm function as assessed by the zona binding test (26) in men with infertility.
The change of semen quality has nothing to do with regular sports activities Oldereid et al., (11) divided men attending infertility clinics into men with normal sperm quality (concentration > 40 x 10^6 / ml), average sperm quality (20-40 x 10^6 / ml) and reduced sperm quality (less than 20 x 10^6 / ml). There was no significant difference in the proportion of regular exercise between the two groups (54%, 62%, and 63% respectively).

Research progress on the effect of endurance training on male fertility. Arce & De Souza, (27) found that only four studies tested sperm quality. Although the sperm number of endurance athletes decreased, the sperm number range was still within the normal range.

In men, obesity is associated with decreased plasma total testosterone levels, although the bioactive fraction of plasma testosterone (free testosterone) is not reduced in moderately obese men (BMI 31-35). (body mass index > 35), total testosterone and free testosterone decreased, which is called hypogonadism (28).

There is no evidence that mild hypogonadism has an adverse effect on sexual desire or potency (45). In addition, the average sperm concentration and percentage of motile sperm in obese men with mild hypogonadism were similar to the average level of the reference population of non-obese men (45). Hypogonadism can also be easily reversed, resulting in normal testosterone levels (28).

6 Heat

In men, the testicular temperature is usually 3-4 °C lower than central body temperature. (29) and from winter to summer, the change of ambient temperature is related to the change of sperm concentration and motility.

Local Testicular Heating also showed harmful effects. Two studies on high temperature exposure during work showed small changes in sperm quality, such as a decrease in the proportion of normal shaped sperm and normal sperm speed (30).

The control experiment using sauna showed that volunteers used sauna many times (31), and even those with only single use (32) have a significant decrease in sperm concentration within one week of the exposure. Concentration values return to normal levels within approximately one month, however, once the exposure to heat has stopped.

Sitting in tight underwear can cause a local temperature rise in the scrotum (33). Two longitudinal studies investigated the semen parameters of normal men wearing tight and loose underwear alternately for 3-6 months (34; 35).

Despite the small number of subjects (two subjects in the first study and nine subjects in the second study), The sperm concentration and motility of the two subjects decreased significantly under tension, and increased gradually under relaxation (35) for sperm concentration in tight versus loose conditions were 46.0 and 89.5 x 10^6/ml respectively (p<0.05), while motile sperm concentration varied from 17.4 to 53.1 x 10^6/ml (p<0.005).
For the countercurrent heat exchanger to work normally, the temperature of venous blood flowing out of the testis must be lower than that of arterial blood entering semen (36). If the temperature gradient of the heat exchanger decreases (for example, due to limited scrotal heat loss or reduced venous blood flow), the efficiency of the heat exchanger decreases, and the testicular temperature increases (37).

7 Disorders of the testes

Cryptorchidism is a congenital disease in which one or both testes (unilateral) do not descend from the pelvis to the normal position of the scrotum (38).

Infants with unilateral maldescent demonstrate a higher testicular temperature in the raised testis than in the contralateral, normally descended testis (39).

The elevated scrotal temperature has been linked to testicular atrophy (40), and therefore it is plausible that impaired fertility in adult life among formerly cryptorchid men may be related to early testicular damage due to this heating effect. A review of studies looking at the management of cryptorchidism shows that the bilateral form has more serious fertility consequences (41).

References


