Male infertility

fertility NEW ZEALAND

Fertility New Zealand is a registered charity supporting people with fertility issues

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There has been a much greater interest in male infertility and sperm abnormalities since the early 1990's encouraged partly by the introduction of a revolutionary treatment, intracytoplasmic sperm injection (ICSI), and also by an increasing understanding of male reproductive health and concerns expressed about a reduction in sperm counts from some countries.

Incidence

Infertility is not an uncommon problem. As many as one in four people will experience difficulties in trying to conceive and a male factor will be present in 30-50% of heterosexual couples, either as the single major cause of their fertility problem or as part of multi-factorial problem with both male and female factors being present. Men and women are equally affected by infertility.

The number of myths surrounding male potency and fertility are reducing as we develop an increased understanding of some of the causes. Although there is evidence that sperm quantity has been declining over the past 50 years, this is unlikely to be a significant contributor to male infertility.

Causes

For at least half of sperm problems, the cause remains unknown (idiopathic) although there is a increasing understanding that genetic factors may play an important role.

Ten percent of men with absent sperm production or an extremely low count (azoospermia and severe oligospermia) will have small pieces missing from their Y chromosome (micro-deletions) as the cause for the abnormal sperm production. There are tests for Y micro-deletions.

- **Male obesity** with reduced circulating testosterone levels can influence sperm quality as can heavy alcohol intake, cigarette and marijuana smoking and certain medications.

- **Oxidative stress** related damage to sperm caused by free radicals has been shown to be an increasingly important issue. Research suggests obesity and smoking can cause oxidative stress to sperm.

- **Free radicals** are toxic metabolites that can impair the ability of sperm to fertilise and can damage the DNA contained in the head of the sperm. Blocking the free radical damage by the use of anti-oxidant preparations can be a useful management option if increased DNA damage is thought to be a contributing factor.

Regret following a vasectomy is an increasing problem and it is estimated that 10% of men will seek either reversal of vasectomy or surgical retrieval of sperm for use with micro-injection.

Although a semen analysis is essential for diagnosing male infertility, a detailed history should also be taken, including a sexual history, and also possible exposure to any environmental toxins.

Previous genital surgery, including for an undescended testicle, previous inguinal hernia repair or previous significant infections such as chlamydia or mumps orchitis will also be relevant.

Physical examination is important, looking at the size and consistency of the testicles, whether any abnormal swellings are noted and also whether the vas deferens is palpable.

If there is any abnormality on the initial semen analysis, a further analysis should be undertaken at a specialised fertility laboratory looking carefully at sperm motility and morphology (shape) and testing for anti-sperm antibodies. Hormone assays may be useful and should include an FSH level and a prolactin level. Karyotyping, to check the chromosomes, may be useful to exclude certain genetic conditions. There are tests that measure the integrity of sperm DNA (SCSA, TUNEL, Comet) and the ability of sperm to bind to the zona (HBA).

Chances of pregnancy

Unless there is absent sperm production or an extremely low count (less than 5 million/ml) it is the circumstances of infertility such as the duration of infertility, previous pregnancy history and also female partner's age (if applicable) that are the most important factors in predicting future chances of conception.

The results of the semen analysis therefore must be interpreted in the light of individual circumstances.

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Treatment options

Occasionally a hormonal imbalance will be discovered on testing which can be treated with replacement gonadatrophin injections to improve the sperm count. Unfortunately, cases where medication will improve the sperm count are relatively rare.

- **Lifestyle changes** such as losing weight if obese, reducing alcohol and cigarette intake, wearing boxers rather than tight underwear, and reducing testicular heat such as through exercise, can improve quality of sperm but may not help if there is a significant abnormality present.

- **Donor insemination** is used much less frequently now as a treatment for male infertility, mainly because of the introduction of micro-injection.

Treatment with donor sperm in an otherwise healthy woman should result in pregnancy rates of 15-20% per cycle.

- **Intrauterine insemination – IUI** (artificial insemination using partner's sperm) is used occasionally for the treatment of male infertility but is again is unlikely to be useful if a significant sperm abnormality is present.

Randomised controlled trials show that intrauterine insemination is better than timed intercourse for the treatment of male infertility, particularly when used with ovarian hyperstimulation. Nevertheless, success rates of only 5-10% per cycle are reported in most studies when IUI is performed for male fertility.

- **ICSI (micro-injection)** involves the direct injection of the sperm into an egg as part of in vitro fertilisation (IVF) treatment. It is primarily used when a major sperm defect has been identified or where there has been poor fertilisation with ordinary IVF.

There are new methods available which attempt to isolate mature, structurally-intact sperm with high DNA integrity which are then injected into the egg.

- **PICSI** selects a mature sperm which could bind to the zona.

- **IMSI** uses high magnification to select a sperm without vacuoles.

These methods may be suggested after a failed ICSI cycle. Studies are needed to confirm whether PICSI and IMSI improve outcomes over conventional ICSI.

Clinical pregnancy rates of 30-40% per cycle are usual with micro-injection so long as there is good fertilisation and the woman is aged less than 40.

Long-term follow up of children born after using ICSI has been documented. The chance of congenital abnormalities may be slightly higher with ICSI than with standard IVF, and there may be slightly more children born with X or Y chromosome abnormalities. If the male infertility is caused by a micro-deletion of the Y chromosome, it is very likely that a male child will inherit the same Y micro-deletion as his father.

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