

The facts about: Semen Analysis

Introduction

Semen analysis is the main component of male factor infertility investigation and involves a laboratory assessment of a man's ejaculated semen sample.

Male factor infertility is most commonly defined by abnormalities in the number of sperm present in the ejaculate and/or the proportion of progressively motile and morphologically normal sperm. The World Health Organisation (WHO) has defined normal values for the human ejaculate. These are outlined in the table below.

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| VOLUME | >2.0ML |
| pH | 7.2-7.8 |
| CONCENTRATION | >20x10 ⁶ /ml |
| MOTILITY | >50% progressively motile |
| MORPHOLOGY | >15% with normal morphology (strict criteria) |
| White Blood Cells | <2x10 ⁶ /ml |

Where and when should a sample for semen analysis be produced?

So that we can ensure that samples reach the laboratory in optimum condition, we request attendance at the clinic to produce a sample for analysis in a private, designated room adjacent to the laboratory. In some circumstances it can be arranged for samples to be brought into the clinic for analysis, providing that they are presented within one hour of production.

Samples are generally produced by masturbation or on occasion by intercourse using a special condom without a spermicide (provided by the clinic).

A semen analysis should be carried out following two to five days of abstinence from intercourse or masturbation. Shorter or longer periods of abstinence could result in a misrepresentative result.

Typically two semen analyses are obtained prior to making any final conclusion regarding baseline sperm quality or quantity. However, if the first semen analysis is normal, a repeat test is not generally required. Recent febrile illness or exposure to gonadotoxic agents may affect spermatogenesis for up to three months, so a repeat semen analysis may sometimes have to be postponed.

What is assessed in a semen analysis?

Volume: The normal ejaculate volume is between 2 and 6 ml (about a teaspoonful).

Number of sperm present: The concentration of sperm is evaluated in a counting chamber - commonly a 'Makler' chamber. A normal or normozoospermic specimen contains more than 20×10^6 sperm per millilitre of ejaculate.

Motility: This describes the proportion of the sperm in the sample that are swimming. The progression describes how well the motile sperm are moving. The proportion of progressively motile sperm is normally >50%.

Morphology: Sperm morphology refers to the shape of spermatozoa. Several techniques have been described to evaluate sperm morphology. In IVF programs, strict criteria are often used to measure sperm morphology. Men with fewer than 4% normal forms usually fail to fertilise without micromanipulation.

Antisperm antibodies: Sperm agglutination, reduced sperm motility, an abnormal postcoital test (now rarely used) prompts suspicions of the presence of antisperm antibodies.

Types of Male Factor Infertility

The results of a semen analysis are evaluated by the doctor along with the couple's history and the results of investigations of the female. These are all taken into consideration when making diagnoses and recommendations for treatment.

A general outline of the main types of male factor infertility that may be identified in a semen analysis is outlined below. It is not uncommon for more than one of these characteristics to be seen in the same semen analysis.

Oligozoospermia - Low sperm count.

When the number of sperm in the ejaculate is low, the chances of a sperm reaching and fertilising the egg following intercourse may be reduced. In cases of mild oligozoospermia, intrauterine insemination (IUI) might be the appropriate treatment, as the sperm can be concentrated before placing in the uterus. More commonly however, IVF or in severe cases ICSI, may be recommended as fewer sperm are required and fertilisation can be achieved in the laboratory.

Asthenozoospermia - Reduced motility and/or impaired progression.

When the number of actively swimming sperm in the ejaculate is very low, or if the way the sperm are swimming is impaired, the chances of a sperm reaching and fertilising the egg following intercourse may be reduced. When it is just the number of motile sperm that is low, IUI or IVF may be recommended as the motile sperm can be extracted from the ejaculate and concentrated in the laboratory. However, if progressive motility is severely impaired, the chances of fertilisation through IVF may also be low, so ICSI may be recommended.

Teratozoospermia - Raised levels of abnormal sperm.

Abnormal sperm have a reduced capacity to fertilise eggs or form viable embryos. When the number of normal sperm in the ejaculate is below normal, the chance that a normal sperm will reach and fertilise the egg may also be reduced. In cases of mild teratozoospermia, IVF may be the appropriate treatment, because a preparation enhanced for normal sperm can be prepared in the laboratory and used to achieve fertilisation in vitro. When the number of normal sperm is very low however, ICSI may be recommended because the embryologist can examine individual sperm and identify the most normal sperm for injection into the egg to achieve fertilisation.

Azoospermia - No sperm present in the ejaculate.

There are various reasons for complete absence of sperm in the ejaculate. In some cases, the cause of azoospermia may be 'Obstructive' which means that it is caused by a blockage in the route between the site of sperm production (the testes) and ejaculation. In other cases the cause of azoospermia may be 'Non obstructive', which means that it is caused by a partial or complete failure in sperm production in the testes.

Obstructive azoospermia may be caused by a blockage in the epididymis, the area where the sperm are held after production or perhaps in the vas deferens, the tubes through which sperm leave the testicles. In some cases the tubes may be completely absent, a condition called congenital bilateral absence of the vas deferens (CBAVD). In other cases, the blockage may be caused by a previous vasectomy or failed vasectomy reversal. In cases of obstructive azoospermia it is usually possible for a urologist to surgically extract sperm from the epididymis or the testes by PESA or TESA and for the embryologist to use such sperm to achieve fertilisation in the laboratory through ICSI. In cases of non-obstructive azoospermia, an exploratory TESA can be carried out to confirm if sperm is being produced. Occasionally, although the ejaculate is azoospermic, there may be small pockets of sperm production within the testis and if these can be extracted, the sperm can be used to achieve fertilisation through ICSI.

If sperm cannot be identified through testicular exploration, the option of using donor sperm in combination with IUI or IVF/ICSI can be explored.

Retrograde ejaculation – Sperm ejaculated into the bladder.

This is commonly seen in patients with diabetes, after transurethral surgery for the prostate, retroperitoneal lymph node dissection usually in the treatment of cancer, and spinal cord injuries. The patient may present with low semen volume, low motility and sperm concentration.

Urinalysis is performed immediately after ejaculation and the specimen is examined for sperm under the microscope. If sperm are present, the specimen is processed further to evaluate concentration, motility and morphology of the sperm. This sperm can be used for assisted reproduction most often with ICSI.

Immunological Infertility – significant antisperm antibodies bound to the sperm.

Anti-sperm antibodies are large protein molecules that are detected bound to sperm in the ejaculates of some men. These antibodies can have quite varied effects on fertility, and in some men no effect at all. They can be caused by testicular trauma, genital infections and previous vasectomy, although in most cases their cause is unknown. In some cases the antibodies cause the sperm to stick to one another and so effectively reduce the number of free swimming sperm available to fertilise the egg. In some cases, the antibodies seem to slow the sperm's swimming, and in other cases they appear to directly interfere with their ability to bind to and fertilise the egg. Depending on the level of antibodies detected on a semen analysis and their effects on the sperm, IUI, IVF, or ICSI may be recommended.

What causes abnormalities in a semen analysis?

Abnormalities in the semen are primarily due to a defect in sperm production in the testes. The cause of this is usually unknown. Occasionally abnormalities may be associated with previous infections, surgery, or excessive drinking. In addition, certain drugs, radiation and radiotherapy may have a detrimental effect on the production of sperm. The presence of a varicocele (a condition where there is an increase in the blood flow around the testicles due to dilated veins) may lead to a rise in the temperature around the testicles, which may adversely affect sperm production and motility. Complete absence of sperm in the ejaculate as a result of testicular failure, may be the result of a chromosomal disorder, or previous infections such as the mumps. It may also be associated with the history of maldescent of the testes into the scrotum.

Is there anything I can do to improve my semen analysis?

There is some evidence that for some men, dietary and lifestyle changes can have a positive effect on their semen analysis. It seems that these modifications will tend to enhance rather than dramatically alter the characteristics of the sample. The effects seem to vary between men. Details of these recommendations can be provided by your clinician.

SOURCE: "Life Fertility Clinic" www.lifefertility.com.au