

Fertility Investigations Patient Information

Natural Conception

In order to understand why conception might not be occurring in couples with infertility, it is useful to look at what happens in natural conception. Each month, in a woman with a regular cycle, one healthy egg is released into the fallopian tube around mid-cycle. The egg develops in response to a hormone called follicle stimulating hormone (FSH) secreted by a gland in the brain in the early part of the cycle. The egg destined to ovulate is selected from a pool of several immature eggs within the ovary and matures in a small sac of fluid called a follicle. Once the follicle reaches about 18 mm in diameter, another hormone called luteinizing hormone (LH) also produced by the brain releases the egg into the fallopian tube. Pregnancy occurs when sperm deposited in the vagina during intercourse swims through the cervix and uterus (womb) into the fallopian tube and penetrates the egg, a process called fertilisation. The fertilised egg then divides into two, then four, then eight cells as it becomes an embryo and travels down the fallopian tube towards the uterus, which it reaches about five days after fertilisation. At this stage, the embryo is called a blastocyst and hatches out of its outer shell, called the zona pellucida, to bury itself within the thickened lining of the uterus, a process called implantation. The cyst left behind in the ovary after ovulation is called the corpus luteum and secretes a hormone called progesterone. We measure this hormone in the blood seven days after ovulation to see if ovulation has occurred.

What investigations are necessary?

In order to find out why a couple are not conceiving, we have to check whether the ovary has a good number of eggs left (ovarian reserve measurement), whether these are being released each month (ovulation test) and whether the fallopian tubes are open to allow the egg and sperm to meet and fertilise (test of tubal patency). Finally we need to know if there are sufficient sperm and whether they function normally (semen analysis). We recommend that both partners are investigated as we find that in a third of cases the infertility is due to a female factor, a further third is due to a male factor and in the remaining third a combined problem is identified.

Ovarian Reserve Measurement

An important point to understand is that women are born with all their eggs. There are about 2 million eggs present at birth and these lie dormant in the ovaries until puberty when hormone signals leads a single egg each month to develop and be released into the fallopian tube. This is in contrast to men who make sperm continuously throughout their lives. This means that women are only able to conceive using their own eggs from puberty until their egg supply starts to dwindle (the reproductive years). The menopause is when the egg supply has run out and occurs at around the age of 50 for most women. From birth to menopause there is an exponential loss of eggs, irrespective of whether a woman has regular periods, receives fertility treatment or takes the oral contraceptive pill. In addition there is a loss in the quality of the eggs with time with an increasing number of eggs becoming chromosomally abnormal as women become older. What this means in terms of fertility is that a woman's chances of conceiving declines as she gets older and for most women a more rapid decline occurs from the age of 37. We refer to a woman's fertility potential as her 'ovarian reserve' and measure this by performing an ultrasound scan of the ovaries and measuring hormone levels of FSH, LH and Oestradiol on day 2 or 3 of her cycle. We often measure two additional hormones, Anti-Mullerian hormone and Inhibin B to get a more accurate picture.

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Ovulation test

This involves a simple blood hormone test measuring Progesterone levels seven days after ovulation. In women with irregular cycles we sometime need to combine this test with a series of scans of the ovaries to see if a follicle is growing (called follicle tracking).

Tests of Tubal Patency

The fallopian tubes are attached to either side of the uterus. The open ends of the tubes have finger like processes called fimbriae which lie very close to the ovaries. These help to pick up the egg when it is released and transport it towards the uterus.

Tubal damage is a cause of infertility in 15-20% of couples. It can be due to previous pelvic infection e.g. Chlamydia, endometriosis or pelvic surgery. The patency of the tubes can be checked with either an X-ray method called a Hysterosalpingogram (HSG) or ultrasound method call Hysterosalpingo-contrast sonography (HyCoSy). These are both out-patient procedures used when we feel the chances of tubal blockage is relatively low. A more invasive technique called a laparoscopy and dye (keyhole surgery) is preferable if we feel the chances of tubal damage is higher, as it provides us with more detailed information and offers an opportunity to perform any necessary corrective surgery e.g. laser treatment of endometriosis. Your consultant will discuss these options with you so that you can make an informed choice about which form of tubal assessment is best for you.

Semen Analysis

There are four main factors we analyze in a sperm sample - the number of sperm present (the concentration), the number of sperm that are moving (the motility), the number of sperm that are normally formed (the morphology) and whether or not there are antisperm antibodies present. Some men produce a defence mechanism against their own sperm called anti-sperm antibodies which can prevent the sperm from fertilising the egg.

In a normal sample we would expect the following results:

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| Concentration: | 20-200million/ml |
| Motility: | ≥ 50% |
| Progression: | 2 or 2-3 out of 4 |
| Abnormal forms: | < 70% |
| Agglutination: | ≤ 10% spermatozoa sticking together |
| MAR (antibody) test: | < 15% spermatozoa showing particle adhesion |
| Volume: | 2-6 ml |
| Liquefaction: | Complete after 30 min |
| Viscosity: | Normal after 30 min |
| White blood cells: | < 1.0 mill/ml |
| Precursors: | < 1.0 mill/ml |

Commonly used terms when there are abnormalities with the sperm sample

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| Normozoospermia: | Normal ejaculate |
| Oligozoospermia: | Sperm concentration < 20 mill/ml |
| Asthenozoospermia: | Reduced motility and/or poor forward progression |
| Teratozoospermia: | < 30% spermatozoa with normal morphology |
| Oligoastheno-teratozoospermia: | Disturbances in all three variables |
| Azoospermia: | No spermatozoa in the ejaculate |