

Male fertility: A case for more or less science?

I had spent almost an hour of surgery with an operating microscope searching for sperm to aspirate from a man's testis. My colleague wryly observed the irony of the task. 'Sperm must be one of the most abundant commodities yet what on earth are you are doing?'

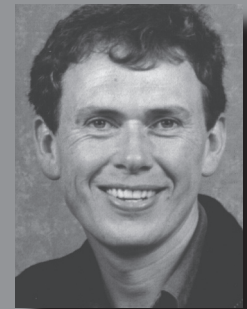
The science of male andrology has advanced, yet surprisingly wide gaps in our knowledge persist in this fundamental area of human biology.

For most clinicians, male fertility is synonymous with a semen analysis. However, the value of this test could easily be questioned. Just as the Post Coital Test confirms satisfactory intercourse but has little value in modern management of the infertile couple, the standard WHO semen analysis confirms the production of sperm but little more. The semen analysis report may even include a laboratory comment describing the result as 'a fertile specimen'. However, the WHO definitions of percentage motility, sperm concentration per ml and proportion of acceptable sperm morphology are based upon observed values from the general population. Although they may be statistically meaningful, a more pragmatic clinical approach is required. Male fertility assessment requires clinical assessment. Seldom does a semen analysis alone provide a diagnosis. The identification of female factors and the duration of fertility delay modify the significance of the semen quality.

Whereas there were once few treatments available, assisted reproductive clinics now offer services that can dramatically alter the chance of conception. With the advent and availability of IVF and intracytoplasmic sperm injection (ICSI), pregnancies can be achieved for couples in whom the man produces less than a 100 sperm.

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The prognostic value of semen analysis is limited. Clinical decisions are based upon quite different criteria. If natural conception has not occurred in the absence of female factors likely to compromise fertility then intrauterine insemination (IUI) combined with ovarian stimulation with clomiphene or gonadotrophin injections is usually advised. This is supported by evidence from systematic reviews of published clinical trials. If fewer than two million motile sperm can be recovered from a sperm washing procedure, the likelihood of pregnancy with IUI is almost nil. Although treatment independent pregnancies occur with low sperm morphology percentages (<five per cent), almost no pregnancies occur with IUI treatment if less than ten per cent normal sperm are evident on strict morphology testing, even if the sperm concentration is satisfactory.



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Conventional IVF is generally successful in achieving fertilisation if at least 500,000 motile sperm are recovered from semen washing. ICSI technically requires only one sperm for each oocyte. However, the use of dead, immotile or morphologically abnormal sperm are unlikely to achieve satisfactory fertilisation rates, nor acceptable pregnancy rates, and may result in miscarriage. In severe oligospermia, the morphological assessment of sperm quality is more important than sperm concentration.

Newer techniques of sperm analysis and computer aided sperm assessment have been advocated to improve the prognostic value of semen analysis. Sperm DNA damage assay as an independent variable has not been subjected to robust clinical trials to evaluate its role in prediction of treatment independent pregnancy or as part of IVF management. The sperm chromatin structure assay (SCSA) has suggested clinical cut off levels but there remains variability in the DNA fragmentation that limits clinical application.

With this in mind, ICSI has achieved vast improvement in success rates of male factor fertility treatment. An unfortunate effect of this success has been the reduction in research into the biology of sperm migration in the genital tract and sperm oocyte interaction. Pragmatism and the increased success rates of IVF techniques have encouraged clinicians and couples to focus on their goal of achieving a pregnancy rather than establishing a diagnosis or understanding of the underlying pathophysiology. The lack of understanding of the complex factors of sperm production, transport and fertilisation remain. Fortunately, these areas are still the focus of several Australian researchers.

The probable worldwide reduction in observed sperm counts, plus the increased incidence of hypospadias and testis cancer, suggests that ongoing research is definitely required to improve male health and understand male fertility. The pragmatic hunt for usable sperm continues in Andrology and ICSI laboratories every day in most Australasian cities. Regrettably, the same enthusiasm for understanding spermatogenesis and sperm function may be fading.