Non-Obstructive Azoospermia and the Impact of MicroTESE

In non-obstructive azoospermia (NOA), no spermatozoa are present in the ejaculate as a result of compromised or absent spermatogenesis. NOA is distinguished from obstructive azoospermia by patient history, clinical examination and hormone profile. As much as 10% of all male infertility has been attributed to NOA. In contrast to obstructive azoospermia, men with NOA tend to have elevated FSH levels, and low testosterone levels; testicular volume tends to be significantly reduced and testicular consistency soft.

When a diagnosis of NOA is made, the couple concerned may decide to pursue an attempt at surgical sperm retrieval. If viable sperm can be found, Intracytoplasmic Sperm Injection (ICSI) treatment becomes a possibility and the use of donor sperm may be avoided.

Methods of recovering viable sperm in these patients include Testicular Fine Needle Aspiration (TESA), Percutaneous Epididymal Sperm Aspiration (PESA), Conventional Testicular Sperm Extraction (TESE) and Microdissection TESE (MicroTESE). In conventional TESE a small testicular incision is made and a biopsy is taken locally. Conventional TESE is very likely to find sperm in obstructive azoospermia, whether the situation is congenital (as in cystic fibrosis) or acquired (as after vasectomy); it is much less likely to find sperm in NOA where small areas of spermatogenesis may be scattered throughout the testicle and may be missed by random biopsy. Micro TESE was first described in 1999 and involves a targeted rather than a blind approach to biopsy in order to find small islands of functioning testicular tissue.

MicroTESE is usually carried out under general rather than local anaesthesia. The hemiscrotal compartment is opened via a midline raphe incision so that the whole of the surface of the testicle can be visualised. Although the incision is large, its location minimises vascular insult to the testes. A high powered surgical microscope is used to identify areas which appear to contain normal seminiferous tubules and these areas are selectively biopsied.

As with conventional TESE, once testicular tissue samples are obtained, they are immediately examined for the presence of sperm in the operating theatre. Subsequently, tissue samples are processed in the IVF laboratory by mechanical disruption of the tubules followed by centrifugation and washing. The resulting suspension is searched microscopically for motile sperm. If motile sperm are found, they are cryopreserved for use in a subsequent ICSI cycle.

Successful MicroTESE sperm retrieval rates of approximately 50% have been reported by centres with experience of the technique. Superior sperm retrieval rates with MicroTESE compared to other surgical
approaches have been reported, particularly in certain subgroups of azoospermic men such as those with predominantly Sertoli Cell Only Syndrome (SCOS) and Klinefelter Syndrome. A comparative study which examined 116 cases found a significantly higher retrieval rate with MicroTESE (47%) than with conventional TESE (30%) 5. Similar findings have been described by others6. When low sperm yields result after MicroTESE in NOA the sperm may not survive freeze-thaw3. Where such concerns exist it may be wise to consider the option of donor sperm back-up for the ICSI cycle and to discuss possible outcomes with the couple concerned.

It is difficult to predict which men with NOA will be successful with MicroTESE. Although it is routine to send tissue obtained at MicroTESE for histological examination in order to try to ascertain aetiology it is felt that diagnostic histological biopsy prior to MicroTESE is unwise7. Even when such prior biopsy diagnoses SCOS, patchy spermatogenesis can still exist and sperm retrieval may be successful2. Similarly, the degree of elevation of serum FSH levels and testicular volume are poorly predictive with regard to successful sperm retrieval. It is therefore difficult to advise couples concerned about the wisdom of pursuing MicroTESE.

The general consensus is that MicroTESE results in higher sperm yields with less negative effects on testicular function and fewer post-operative complications. However, couples need to consider a number of factors before making a final decision to pursue this treatment option. For example, there is currently a lack of clinical predictors that can quantify the chances of finding usable sperm. The procedure is more complicated and expensive than conventional TESE and it is a procedure that should only be considered if a suitably experienced surgeon is available. As further data about outcomes after MicroTESE emerges it will become easier to provide information about the relative advisability of MicroTESE versus conventional TESE versus use of donor sperm.

The advent of MicroTESE, in conjunction with ICSI, has revolutionised the management of men with NOA who desire a child which is genetically their own.

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2. Deruyver Y, Vanderschueren D and Van der Aa F. Outcome of microdissection TESE compared with


