

SPERM MAPS YOUR GPS TO FATHERHOOD



In this day and age of Google and the MAPS, information, and access to what we want to see and where we want to go is a walk in the park. A search is a necessity on a hand held before we venture out on our quest. As we take this fact for granted, we fail to realize that this simple dogma can be applied across the board, especially in medical sciences. Andrology, a field in Reproductive medicine which deals with Male Fertility issues is very much in need of this. To become a biological father of a child is the greatest gift a man can have. Though traditionally motherhood is glorified in India, spare a penny for the men who suffer, albeit silently, in the absence of a child.

Sperms- A numbers game?

The World Health Organization (WHO) in its latest (2010) manifesto states that about 15 million sperm/ml is considered essential for normal conception to occur. This means that a good number of men would not become biological fathers as sperm numbers are falling like crazy bested only by the fall of the Indian Rupee. If this is not enough, a fraction of men can be Azoospermic. Azoospermia is the complete absence of sperm in a man's ejaculate. It can be the result of obstruction of the reproductive tract, Obstructive Azoospermia (OA) or could be result of the testes failing to produce sperms, Non Obstructive Azoospermia (NOA). Lifestyle, stress, smoking, alcohol, lack of sleep, genital infection, lack of hormones and genetic predispositions to name a few can cause azoospermia. Luckily, for men with Azoospermia, the advent of ICSI in 1992, a path breaking invention, reduced the numbers required for fertilization from hundred thousand to a single sperm. ICSI helped even spermatozoa with limited fertilizing capacity to fertilize eggs. The real challenge then, is to locate the sperm!

Conventional Techniques of Retrieving Sperms

In OA, when the ejaculate does not reveal sperm it is easy to retrieve sperm from the testis or epididymis as these structures will almost always contain sperm. However, in NOA, sperms are found only in 1 out of 2 individuals as NOA is due to testicular failure and sperm production in these men is typically focal or patchy. The current techniques for sperm retrieval in NOA are 1) Testicular Sperm Extraction (TESE) 2) Micro TESE. However, early experience with TESE shows that multiple blind biopsies are required and this may result in testicular atrophy and vascular compromise. Also as chances of finding sperm increase with the number of biopsies involved there is a grave danger of lowering hormone (testosterone) levels with more testicular tissue being lost. In Micro TESE, testis is bivalved and everted to look for bulky tubules which will harbor sperm under the microscope. In addition to vascular compromise and hypogonadism other problems like blood clots and infections can be expected. Hence it is obvious a testis sparing approach for locating sperms was very much the need of the hour.

What is Sperm Mapping?

The technique of Fine Needle Aspiration (FNA), for 100 years has been applied in different parts of the body. FNA of the testis was reported as early as 1965. However only in 1997, Dr. Paul Turek emulating some of his earlier colleagues refined the technique of mapping spermatozoa in the testis of infertile men. FNA mapping or Sperm mapping involves making multiple punctures in the testis and mapping the presence or absence of mature sperms. Data is clear on the fact that sperm mapping is at least as sensitive as TESE in locating the presence of mature spermatozoa. Two types of maps are currently employed. One in men with OA where four punctures are made and the other in men with NOA where a compound map with eighteen punctures are made.

Technique and Safety

Sperm mapping can be done as a day care procedure in the office under Local Anesthesia or under mild sedation in an anxious patient. The procedure involves making multiple punctures with a 23 gauge needle which is held by means of a special FNA syringe holder. A total of 36 punctures are made from both testis. The number of punctures may vary depending on the size of the testis. The contents of the needle are transferred onto a slide and a smear is made. The slides are then sent to the pathologist for review. The entire procedure takes about 20-25 min. The patient is sent home in a couple of hours with an ice pack that can be placed on the testicles. Pain killer medicines are prescribed for two days. Ultrasound data available shows that there is very minimal chance of blood clot formation after the procedure. In rare cases pain may last more than 2 days.

Why and Where a Sperm Map?

As sperm production is typically patchy in a testis with NOA, the chance that a blind TESE will reveal sperm is left to a coin toss! A negative TESE does not mean the rest of the testis does not have sperm. Also the other testis may contain sperm. Hence in order to avoid the complications associated with multiple random TESE, and increase the chance of retrieving sperms, a map is necessary to navigate and locate mature sperms. This involves diligent scrutiny and review of the smears prepared by the pathologist and the clinician with special microscopes. Once a map is made, and the presence of sperms confirmed, the most appropriate technique to retrieve sperms can be conceived. This might just mean a simple needle aspiration as opposed to a Microdissection TESE.

Men, who are Azoospermic, are often told after a single TESE/Biopsy that the tissue did not reveal the presence of sperms and hence they cannot become the biological father of the child. They are pushed towards adoption/donor IUI. This is a shame as there is a good chance that sperm can be retrieved in these men with the necessary navigation tools. Many a time an FNA mapping has changed the modality of treatment for a young couple from adoption to having their own baby. A GPS/Sperm Map for the testis is the need of the hour!