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## IVF/ICSI FOR MALE INFERTILITY

The treatment of severe male infertility have been revolutionize with the important and exciting advance provided by intracytoplasmic sperm injection (ICSI). Men who were previously considered infertile and untreatable are now potentially able to achieve biological parenthood. While every man having difficulty initiating a pregnancy could theoretically have the ICSI procedure performed, not every infertile man needs to be referred for the ICSI procedure. Many men can have significant improvement in their semen quality after proper evaluation and treatment, and thus avoid the costly ICSI. Not only are there significant costs but also there are potential complications for the female partner that must be taken into consideration before this procedure us recommended as a treatment option.

### **BACKGROUND:**

In vitro fertilization (IVF) has been a major advancement in the treatment of infertility since the birth of the first IVF “test tube baby” in 1979. In conventional IVF, human eggs are removed from the female partner and mixed with the sperm in a special container. Once the egg is fertilized the embryo is transferred back into the female’s uterus. Conventional IVF was most successful in women with conditions that physically block the union of sperm and eggs such as blocked fallopian tubes. However, IVF was not applicable in couples with severe male factor infertility, i.e. those with significantly reduced number or motility of sperm.

Later microscopic manipulation of eggs and sperm made it possible to create an opening in the outer layer of the egg (or the zona pellucida) and insert a few sperm into this layer. Next, came the microscopic insertion of a few sperm between the zone pellucida and the plasma membrane of the egg. Both procedures were only partially successful in improving pregnancy rate.

Now with the use of ICSI during which only a single sperm is injected into each egg. Fertilization rate is also better and ICSI id now the procedure of choice in the treatment of severe male factor infertility. Only a few sperm are needed for each ICSI attempt.

### **INDICATIONS FOR ICSI:**

After evaluation for male factor infertility, provided that no reversible or correctable abnormalities exist, the decision to proceed with assisted reproductive technologies is discussed with the couple. Although strict guidelines for patient selection have not been established, in general, at least one million motile or moving sperm after sperm processing are required for intrauterine insemination. Previously failed attempt, with intrauterine inseminations, female factors, or severe impairments of the semen quality will certainly influence the decision to proceed with assisted reproductive technologies such as ICSI.

The decision to proceed with ICSI can be divided into female and male factors. You may proceed directly with ICSI rather than a standard IVF cycle is you meet the following criteria:

1. Failure to fertilize in a previous IVF cycle as this suggests difficulty of the sperm being able to penetrate the egg.
2. “Rescue” ICSI is the injection of eggs that have failed to fertilize after one day of IVF.
3. Antisperm antibodies have been treated traditionally with sperm washing, corticosteroid therapy and routine IVF. Now, ICSI should be the primary choice of treatment for this condition because fertilization and pregnancy rates are not significantly affected when high quantities of antisperm antibodies are present.
4. Abnormal sperm morphology may be another indication for ICSI.

5. Severe decrease in the number of sperm ejaculate or lack of movement is other indications for ICSI. When sperm densities are less than 5 million per cc, the results with the standard IVF procedure is poor. This can be significantly improved with ICSI.
6. Obstruction of the male reproductive tract will cause a condition called zoosperm. These sperm may be recovered from the testis or the epididymis, and be used successfully with ICSI. Such conditions that cause blockage of the male reproductive tract include vasectomy, failed vasectomy reversal and congenital obstruction or absence of the reproductive tracts.  
  
Sperm can be obtained from the epididymis using a technique known as microepididymal sperm aspiration (MESA) or a closed suction technique by inserting a needle through the scrotal skin into the epididymis or testis and removing a few sperm.
7. Non-obstructive azoospermia describes a condition in which sperm production is markedly abnormal, resulting in the absence of sperm in the ejaculate. Men with this condition were previously considered absolutely infertile and were referred to adoption or donor sperm insemination. Now the sperm can be extracted from the man's testes and ICSI can be performed with the sperm.
8. An ejaculation, or inability to ejaculate, represents a condition often associated with impairment of sperm function, especially in the patient with spinal cord injury. ICSI is also applicable to help these men achieve pregnancy.

#### **PROCEDURE:**

ICSI begins with egg retrieval using ultrasound-guided placement of a needle in the ovary after the female partner has been stimulated to increase the production of eggs. After a brief incubation, the eggs are prepared for ICSI. Sperm preparation consists of a sperm washing and selecting of the best sperm for the procedure. The sperm sources include fresh and frozen specimens from routine ejaculations and surgically retrieved sperm from the epididymis and testis. The ICSI procedure occurs in a special container, Petri dish, using a single sperm that is placed in a tiny hollow needle or pipette. The egg is held in place with another pipette and the single sperm is injected into the substance of the egg itself.

After 16-18 hours of incubation, the eggs are examined under the microscope for evidence of fertilization. Embryo transfer back into the female partner's uterus can be performed from 1-3 days after the eggs have been obtained for the female. Usually 3-4 embryos are placed back in the uterus. The remaining embryos are cryopreserved for subsequent pregnancy.

#### **COSTS:**

The cost may vary depending the complexity of the problem; the direct cost is \$10,000 to \$15,000 per ICSI attempt.

#### **SPECIAL CONSIDERATIONS:**

Age of the female partner has the most significant impact of the results of ICSI. Pregnancy rate following the ICSI have been consistently observed to be lower in women older than 40 years of age. There has been concern about the potential for birth defects using ICSI. A recent large series of ICSI babies revealed the incidence congenital defects is no higher than that of conventional IVF and is primarily due to higher incidence of multiple births.

#### **SUMMARY:**

There are new diagnostic and therapeutic techniques available for the infertile couple; even for men with previously considered irreversible infertility is potentially treatable. Rapid and significant changes have been provided by ICSI that allows every man a reasonable chance at fathering children. This information was modified from an article in The Journal Texas Medicine by Ed Kim and Larry Lipshultz.