

The Genetic and Phenotypic Basis of Infertility in Men With Pediatric Urologic Disorders

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Male factor is a major component of infertility for many couples. The presence of congenital genitourinary anomalies in male partners can cause male infertility. We reviewed the state-of-the-art treatment and outcomes for male infertility caused by pediatric urologic disorders. Disorders were classified by whether they led to infertility through pre-testis, testicular, or post-testis effects. Despite the complexity of pediatric urologic disorders that can affect fertility, natural paternity and paternity through assisted reproductive technology are common. Given the significant recent advances in infertility treatments, paternity with many currently untreatable pediatric disorders is likely in the future. *UROLOGY* 76: 25–31, 2010. © 2010 Elsevier Inc.

Of infertile couples, approximately one-third feature male factor issues. A subset of male factor infertility is attributable to congenital or acquired pediatric urological conditions, and patients with these disorders are often challenging to treat. Before the development of in vitro fertilization (IVF) in the 1970s and intracytoplasmic sperm injection (ICSI) in 1992,¹ many forms of infertility caused by pediatric urological conditions were untreatable. These technologies have enabled many previously infertile men to father children, but the effectiveness of these techniques in men with pediatric urological disorders has never been systematically examined. In this review, we provide a contemporary survey of the fertility status of men with pediatric urological disorders in light of advances in assisted reproductive technology (ART). We examine currently available treatments as well as developing technologies and discoveries that may apply to pediatric urological disorders.

The Society for Assisted Reproduction (SART) defines assisted reproductive techniques as any procedure requiring manipulation of gametes or embryos in vitro. By this definition, IVF is included but intrauterine insemination (IUI) is excluded.

IVF involves controlled ovarian stimulation followed by egg retrieval, in vitro fertilization, and embryo transfer

to the uterus. The goal of hormonal stimulation during IVF is to develop multiple mature follicles so that enough eggs are retrieved to counteract the inherent inefficiencies of fertilization, and the limitations of in vitro embryo culture. The process by which the menstrual cycle is regulated during ART procedures is controlled ovarian stimulation. After ovarian stimulation and ovulation induction, egg retrieval is performed transvaginally by ultrasound-guided follicle aspiration. On the same day, a semen sample is obtained and washed, and sperm co-incubated with retrieved oocytes. After co-incubation, the eggs are observed for evidence of fertilization. Fertilized embryos are allowed to cleave and are transferred to the uterus from 1–5 days after fertilization. During embryo transfer, the embryo is transferred to the uterine fundus. In general, more than 1 embryo is transferred because the implantation rate is not 100%.

ICSI, a revolutionary adjunct to IVF, was described in 1992. With this technique, the numerical sperm requirement for egg fertilization with IVF decreased from hundreds of thousands of viable sperm per egg to 1 viable sperm. This approach allows viable sperm with limited intrinsic fertilizing capacity to reliably fertilize eggs, including “immature” sperm obtained surgically from men with azoospermia. ICSI has become so popular that more than 56% of IVF cases performed in North American clinics routinely use this technique to increase fertilization rates during IVF (<http://www.cdc.gov/reproductivehealth/art.htm>). In addition, the ability of ICSI to improve egg fertilization with reproductive tract sperm has allowed urologists to retrieve sperm from the vas deferens, epididymis, and testicle for this technique.

These powerful ART techniques have proved invaluable to help men with pediatric urological disorders father biological children. However, it is unclear what the long-term effects of ICSI, if any, have on the children

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