

Advances of Surgical Treatment of Male Infertility

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Introduction

Approximately 15% of couples cannot conceive a child after 1 year of regular, unprotected intercourse. Male factor infertility is contributory in another 30% to 40%.¹

Most causes of male infertility are treatable and the goal of many treatments is to restore the ability to conceive naturally. The dramatic recent improvements in the management of male infertility are largely attributable to improved surgical techniques and assisted reproductive technology (ART).² Specifically in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) allow us to overcome even the most severe defects in spermatogenesis in which only a few are available.³

Separate parts on three topics are related: [1] Varicocelectomy, [2] Management of obstructive azoospermia, [3] Management of nonobstructive azoospermia.

1. Varicocelectomy

Varicoceles are present in 15% of normal men and in approximately 40% of men presenting with infertility.⁴ Varicocele repair may be considered as the primary treatment option when a man with a varicocele has suboptimal semen quality and the female partner is normal.⁶

Repair of varicocele for treatment of male infertility is controversial⁶ however, any studies that have not shown an improved pregnancy rate after varicocele repair were small, were not stratified by grade of varicocele, and did not control for type of repair technique.⁷ Varicocele repair can reverse a pathologic condition and halt further damage to testicular function, and improve spermatogenesis.⁸ Preferred approaches of most experts are microsurgical inguinal and subinguinal operations.²

The advantages of microsurgical techniques are the reliable identification and preservation of arterial and lymphatic vessels, while reducing the risk for persistence or recurrence of varicocele.^{2,5} The application of microsurgical techniques to varicocele repair has resulted in a substantial reduction in the incidence of hydrocele formation because the lymphatic vessels can be more easily identified and preserved.⁹

Studies have shown that varicocele repair can improve semen parameters, testicular function and pregnancy rates in couples with male-factor infertility associated with varicocele.¹⁰ Also varicocele repair can result in sperm in the ejaculate of azoospermic men when severe hypospermatogenesis or maturation

arrest spermatid stage is present.^{11,12}

2. Management of obstructive azoospermia

Obstructive azoospermia may result from epididymal, vasal or ejaculatory duct abnormalities. Microsurgical reconstruction remains the safest and most cost-effective treatment option for these patients.¹³⁻¹⁵

1) Vasovasostomy

After vasovasostomy, 70% to 95% of patients have return of sperm to ejaculate, and pregnancies are obtained without ART in 30% to 75% couples.^{5,16} The factor that influences the rate of sperm returning and pregnancy is the number of years between vasectomy and vasovasostomy.¹⁶ The age of the female partner also greatly influences the rate of pregnancy.

2) Vasoepididymostomy

After this microsurgical reconstruction, 20~40% of couples achieve pregnancy naturally. Sperm retrieval and cryopreservation may be performed at the time of vasoepididymostomy to avoid a second procedure in the event of surgical failure.^{17,18}

3) Sperm retrieval techniques in obstructive azoospermia

It is controversial that the technique of sperm retrieval (open or percutaneous) or the source of sperm (testicular, epididymal, vasal or seminal vesicular) affects pregnancy rate. Each technique and sperm source usually provides sufficient sperm for ICSI and may provide enough viable sperm for cryopreservation.^{5,17}

Sperm extraction or aspiration for IVF via ICSI is needed in cure of surgically uncorrectable azoospermia or failed microsurgical reconstruction¹⁹ and the majority of patients with congenital bilateral absence of the vas deferens (CBAVD).^{20,21} Also sperm retrieval with IVF/ICSI is preferred to surgical treatment when the advanced female partner age, female infertility requiring IVF.⁵

3. Management of nonobstructive azoospermia

Nonobstructive azoospermia (NOA) is the most challenging type, but no specific treatment was available previously. With advent of ICSI in conjunction with sperm retrieval via testicular sperm extraction (TESE), many of nonobstructive azoospermic patients are able to father own babies.²² Also TESE/ICSI is successful in intervention in Klinefelter syndrome.²³

However, 20~50% of NOA patients are not able to have sperm retrieved for ART.^{24,25} Microsurgical TESE is an advanced type of TESE that applies microsurgical techniques.²⁶ This microsurgical TESE is an effective sperm retrieval from men with NOA for ICSI. The advantages of this technique are minimally invasive technique, removal of minimal amount of testicular tissue and minimizing negative impact on testicular function. Microsurgical TESE is more effective in men with NOA than conventional TESE.²⁷

Conclusion

Treatment strategies for male infertility have changed as dramatically over the past decade. These advances are largely contributable to microsurgical varicocele repair, microsurgical reconstructive techniques, and microsurgical techniques for surgical sperm retrieval and ART specifically ICSI.

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