

Microsurgical End to Side Vasoepididymostomy in Obstructive Azoospermia

A thesis

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By

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Abstract

Our study included forty patients recruited from the Andrology clinic Kasr El-Aini hospital. Semen analysis showed repeated normal volume azoospermia, serum FSH was in the normal range, local examination showed normal sized testes, full epididymis or the presence of epididymal nodules with palpable vasa, testicular biopsy(if previously done) showed normal spermatogenesis. The patients were divided into three groups according to surgical technique. **Group A:** included 20 patients treated by conventional vasoepididymostomy, **Group B:** included 10 patients treated by microsurgical vasoepididymostomy by triangulation end to side technique and **Group C:** included 10 patients treated by microsurgical vasoepididymostomy by simultaneous double needle placement end to side technique. The highest patency was accomplished in group **(B)** 40% (4 cases out of 10), followed by patency in group **(A)** as 25% (5 cases out of 20), the lowest patency was achieved in group **(C)** as 20% (2 cases out of 10). Although the patency rate was higher in group **(B)** there was no statistical significant difference of patency between groups **(B)** and **(C)**, ($P= 0.4$). Patency was reported to be higher in the microsurgical (30%) versus the conventional group (25%), but there was no statistical significant difference of patency between both groups, ($P=0.7$). Pregnancy rate in group **(A)** was 20% while in group **(B)** it was 25%, natural pregnancy was not achieved in relation to group **(C)**. Regarding the duration of infertility patency was higher (46.2%) in cases with < 4 years duration of infertility compared to patency rate of 18.5% in cases of > 4 years duration infertility. (P value = 0.1). Patency was reported to be higher in obstructive cases due to infection (38.5%) (10 cases out of 26) compared to patency rate of 7.1% (1 case out of 14) in idiopathic cases. ($P=0.06$) The mean total count in group **(A)** was 6.4 millions/ml (mean motile count=1.9 millions/ ml). In group **(B)** the mean total count was 9.2million/ml (mean motile count=2.3millions/ ml). In group **(C)** the mean total count was 4.0 million/ml (mean motile count=1.1millions/ ml). The mean operative time in conventional EV was 78.25 minutes while in triangulation group it was 173 minutes and in double needle placement technique it was 196 min. Late failure of EV: was noticed in a 12 months duration of follow up in 2 out of 5 cases (40%) of group **(A)**, while in group **(B)** it was 1 out of 4 cases (25%), in group **(C)** 1 of 2 cases (50%). **Key Words:** Azoospermia, vasoepididymostomy, Triangulation, Double needle.

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Aim of the work

The aim of this study is to evaluate the role of triangulation end to side vasoepididymostomy and double needle placement tubulotomy and tubular invagination as compared to conventional vasoepididymostomy in the management of azoospermia due to epididymal obstruction.

Conclusion

Patency rate of the new invagination microsurgical vasoepididymostomy is comparable to the results of the conventional technique. Improvement of the results of the microsurgical techniques relies basically on improvement of the microsurgical setup including adequate surgical microscope, proper suture material, good instruments, keeping and upgrading the microsurgical skills by continuous practice. In our experience, microsurgical reconstruction does not provide a pregnancy rate comparable to ICSI, so, patient counseling is crucial in these cases.

DISCUSSION

Microsurgical vasoepididymostomy is the procedure of choice for treatment of male infertility secondary to epididymal obstruction. It is among the most difficult microsurgical procedures (**McCallum et al., 2002, O'Brien and Jarvi, 2004 Schiff et al., 2005 and Chan et al., 2005**). (**Thomas, 1987**) described microsurgical methods as quite tedious to perform, and a good deal of laboratory and clinical experience is necessary in order to achieve the best results. The microsurgical end-to-side vasoepididymostomy technique was first described in the 1980s by Wagenknecht from Germany (**Wagenknecht et al., 1980**) and later popularized by Thomas in the United States who reported a patency rate of bilateral microsurgical vasoepididymostomy between 39% to 100% (**Thomas, 1987**).

The original technique involved using a single arm needle to approximate the epididymal tubule and vas. Goldstein first reported using 10-zero double armed sutures for vasovasostomy and vasoepididymostomy (**Goldstein, 1986**). This approach enabled inside out placement of the needles in the epididymal and vasal lumina, thus, reducing the chance of back walling the mucosa. Several other modifications for handling the epididymal tubule have been described. Marmar proposed pre-placement of an epididymal tubule fixation suture and placement of double armed microsutures through the epididymal tubule before attaching it to the vas deferens (**Marmar, 1995**). **Shekarriz and Pomer** described invagination of the epididymal tubule into the lumen of the vas deferens in a rat model using

a single suture placed through the epididymal tubule (**Shekarriz and Pomer, 1991**).

The patency rate of conventional microsurgical end-to-side vasoepididymostomy is 50% to 85%. Conventional end-to-side vasoepididymostomy has several major technical disadvantages. Sutures are placed in an open and collapsed epididymal tubule, resulting in a higher chance of mucosal back walling. Positive identification of the correct level at which to form the anastomosis can only be confirmed after the epididymal tubule is open. The number of sutures used is limited by the small size of the collapsed tubule. Furthermore, significant discrepancy in the diameters of the collapsed epididymal tubule and vasal lumen makes it extremely difficult to achieve a watertight and leak proof anastomosis (**McCallum et al., 2002**).

In the innovative Berger intussusception or triangulation end-to-side technique, Vasoepididymostomy was performed bilaterally in 12 patients, and sperm was found in the postoperative ejaculate of 11 (92%) (**Berger, 1998**). Berger reported that, double armed sutures are easily placed in a distended epididymal tubule before it is opened which allows greater distance between the front and back wall, and may help prevent catching the back wall of the tubule. After opening the tubule 3 double armed sutures provide 6 points of fixation with less mucosal trauma than placing 6 individual sutures, as in conventional microsurgical end to side vasoepididymostomy. Intussusception of the epididymal tubule into the vasal lumen adjusts the discrepancy in luminal sizes and enables formation of a watertight and leakproof anastomosis. Extreme care must be taken when making the small opening in the epididymal tubule in the center of the

triangle to avoid cutting out the previously placed sutures. A specific disadvantage of the intussusception technique is limited ability to evaluate the epididymal fluid for sperm before placement of all 3, 10-zero sutures. If no sperm is found in the fluid after opening the tubule, the setup must be taken down to search for a more proximal location for anastomosis **(McCallum et al., 2002)**. A specific disadvantage of the intussusception and conventional techniques is limited ability to evaluate the correct level of obstruction before evaluating the epididymal tubule fluid for sperm. However, in intussusception end-to-side vasoepididymostomy, placing the first suture often results in the leakage of small amount of fluid that can be assessed for sperm before the epididymal tubule is opened. The clinical study of Brandell and Goldstein using the triangulation technique in humans showed a patency rate of 78% at a mean followup of 6 months with 39% achieving patency 1 month postoperatively **(Brandell and Goldstein, 1999)**.

Although these data were encouraging, some technical problems were noted with the triangulation technique. After placing the first suture there was often tubular leakage and collapse, the tubulotomy was difficult and in some cases a suture was inadvertently cut. A modified technique is presented for vasoepididymostomy with tubular invagination using 2 sutures with simultaneous double needle placement. The 2-suture technique was used on 19 men who had undergone at least 1 vasoepididymostomy. Patency was demonstrated in 7 of 9 men (77.7%) who underwent modified bilateral vasoepididymostomy and 6 of 7 (85.7%) who underwent unilateral vasoepididymostomy and unilateral vasovasostomy during vasectomy reversal procedures **(Marmar, 2000)**.

In our study patency rate was higher in the triangulation group (**40%**) compared to patency rate of the double needle group (**20%**), although, there was no statistical significant difference between both groups (**p=0.4**).

As regards the conventional or fistula technique the average patency rate in the best cases reported in literature between 1903 to 1980's was less than 50%. Scarring with either partial or complete closure of the fistula is the major cause of failure of this procedure. (**Lee, 1987**) reported a patency rate of 31% and a pregnancy rate of 12% using the fistula technique.

We consider our lower patency rate (**30%**) in the microsurgical group including both triangulation and double needle techniques compared to most published data ranging from (78-92%) to be due to: while most published studies address the results of epididymovasostomy following vasectomy reversal, our study focuses on post-inflammatory or idiopathic obstruction. Post-vasectomy cases should be associated with better prognosis considering that the epididymis is healthy by default and that the site of obstruction is clearly identifiable.

Our study is a pilot study that examines the results of our novice experience with the technique in 20 cases, compared to the profound experience reported upon by several authors where the number of cases ranged from 60-324 cases. In studies with higher numbers of subjects, the initially low success rate due to the rising learning curve will be statistically diluted.

The nature of the operation which is described to be one of the most demanding and technically challenging operations that necessitates cutting edge equipment and consumables that were extremely deficient in our setting e.g, the criteria of suture material including length and shape of the needle which was in the literature 2.5-cm in length compared to 15 cm in our study, the needle had bicurve in contrast to 3/8 of a circle in our study.

In our work, all cases operated upon by the microsurgical technique underwent unilateral vasoepididymostomy mostly due to lengthy operative time compared to other studies in which bilateral anastomosis was the the basis of their work which may account for the higher patency rate. **Kim et al., 1998** reported patency rate of 87% in bilateral epididymovasostomy compared to 69% in the unilateral cases.

Regarding the duration of infertility patency was higher (46.2%) in cases with < 4 years duration of infertility compared to patency rate of 18.5% in cases of > 4 years duration infertility, Although there was no statistical significant difference between both groups (P value = 0.1). This is in agree with **(Matsuda et al., 1994)** who reported that patients with an obstruction for < or = 15 years, caused by epididymitis or post-vasectomy epididymal blow-out, achieved a higher impregnation rate than the others (8 of 9 vs. 2 of 11, p = 0.0019). **Schoor et al., 2002** observed that patency rate for the short obstruction interval was 58%, compared to 15% for the longer duration of obstruction (P<0.01). In conclusion, they observed that patency rates worsened with obstructive interval greater than 15 years.

Concerning the pregnancy rate in our study, it was achieved in one case of the conventional group out of five successful cases (20%), in relation to the microsurgical groups, pregnancy occurred in one couple out of four who represent the successful cases of the triangulation technique (25%), natural pregnancy has not been accomplished in the double needle group. As regards the discrepancy between the patency rate and the pregnancy rate, a study performed by **(Matsuda et al., 1994)** reported an overall patency rate following surgery of 80.8% and impregnation was achieved by 10 patients (41.7%). Factors affecting the postoperative impregnation rate were etiology and duration of obstruction. Patients with an obstruction for ≤ 15 years, caused by epididymitis or post-vasectomy epididymal blow-out, achieved a higher impregnation rate than the others ($p = 0.0019$). The motility of epididymal sperm or the presence of serum antisperm antibodies had no apparent effect on postoperative fertility. They concluded that microsurgical epididymovasostomy is particularly effective in patients with epididymitis or vasectomy patients with a short-term obstruction. **(Pasqualotto et al., 1999)** reported that inability to establish pregnancy with a followup longer than 18 months may be due to epididymal dysfunction or partial obstruction and subsequent poor sperm quality. Many studies demonstrated that the pregnancy rate decreases as the anastomosis is performed more proximally on the epididymis **(Thomas, 1987; Silber, 1989; Jarow et al, 1997, Kolettis, 2002)**.

Introduction

Aim of the work