

นิพนธ์ต้นฉบับ

อัตราการเปิดโล่งของท่อนำสุจิ และอัตราการตั้งครรภ์ ของวิธีการผ่าตัดต่อหมันชาย โดยการใช้กล้องจุลทรรศน์ ร่วมกับการเย็บท่อนำสุจิโดยวิธีเย็บต่อเนื่องชั้นเดียว

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บทคัดย่อ

วัตถุประสงค์: ศึกษาอัตราการเปิดโล่งของท่อนำสุจิและอัตราการตั้งครรภ์ของวิธีการผ่าตัดต่อหมันชายโดยการใช้กล้องจุลทรรศน์ร่วมกับการเย็บท่อนำสุจิโดยวิธีเย็บต่อเนื่องชั้นเดียว

ผู้ป่วยและวิธีการศึกษา: การศึกษาแบบย้อนหลัง ในผู้ป่วย 43 ราย ซึ่งได้รับการผ่าตัดต่อหมันชาย โดยการใช้กล้องจุลทรรศน์ร่วมกับการเย็บท่อนำสุจิโดยวิธีการเย็บต่อเนื่องชั้นเดียว โดยศัลยแพทย์ท่านเดียว ระหว่าง พ.ศ. 2548 ถึง 2555 โดยศึกษาอัตราการเปิดโล่งของท่อนำสุจิ และอัตราการตั้งครรภ์ คำนวณเป็นอัตราร้อยละและเปรียบเทียบอัตราการเปิดโล่งของท่อนำสุจิ และอัตราการตั้งครรภ์ กับปัจจัยก่อนผ่าตัด ระหว่างผ่าตัด และหลังผ่าตัด โดยวิเคราะห์โดยวิธี Fisher's exact test and t test กำหนด $p < 0.05$ มีความสำคัญทางสถิติ

ผลการศึกษา: อัตราการเปิดโล่งของท่อนำสุจির้อยละ 93 อัตราการตั้งครรภ์ร้อยละ 43.2 อายุเฉลี่ยของผู้ป่วยและภรรยา คือ 44.6 ± 6.5 และ 32.8 ± 5.0 ปี ตามลำดับ เวลาเฉลี่ยตั้งแต่ทำหมันถึงวันที่ผ่าตัดต่อหมัน 129.8 ± 78.6 เดือน เวลาในการผ่าตัดเฉลี่ย 133.5 ± 21.7 นาที ภาวะแทรกซ้อน ได้แก่ แผลติดเชื้อ ร้อยละ 4.7 การตีบตันของท่อนำสุจิหลังการผ่าตัด ร้อยละ 7

สรุป: วิธีการผ่าตัดต่อหมันชายโดยการใช้กล้องจุลทรรศน์ร่วมกับการเย็บท่อนำสุจิโดยวิธีเย็บต่อเนื่องชั้นเดียวให้ผลที่น่าพอใจ โดยอัตราการเปิดโล่งของท่อนำสุจิและอัตราการตั้งครรภ์เทียบเคียงได้กับการศึกษาอื่น และเทคนิคการผ่าตัดนี้สามารถเป็นอีกทางเลือกในการผ่าตัดต่อหมันชาย

คำสำคัญ: การผ่าตัดต่อหมันชายโดยการใช้กล้องจุลทรรศน์ การเย็บท่อนำสุจิโดยวิธีเย็บต่อเนื่องชั้นเดียว อัตราการเปิดโล่งของท่อนำสุจิ อัตราการตั้งครรภ์



Original article

Patency and Pregnancy Rates of Microscopic Vasectomy Reversal using a Continuous One-layer Technique

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Abstract

Objective: To evaluate the patency and pregnancy rates of microscopic vasectomy reversal using a continuous one-layer technique.

Material and Methods: We undertook a retrospective analysis of 43 patients who underwent a microscopic continuous one-layer vasectomy reversal performed by a single surgeon between 2005 and 2012. Patency and pregnancy rates were calculated as a percentage. The comparison of patency and pregnancy rates with preoperative, intraoperative, and postoperative factors was analyzed statistically using Fisher's exact test and t test, with $p < 0.05$ indicating statistical significance.

Results: The patency rate was 93% and the pregnancy rate was 43.2%. Patient and partner age were 44.6 ± 6.5 and 32.8 ± 5.0 years, respectively. Mean time interval since vasectomy was 129.8 ± 78.6 months. Mean operative time was 133.5 ± 21.7 minutes. Complications were wound infection 4.7% and late vasal stricture 7%.

Conclusion: Microscopic vasectomy reversal using a continuous one-layer technique provides acceptable outcomes. The patency and pregnancy rates are comparable with other studies. This technique seems to be a promising option for vasectomy reversal.

Keywords: microscopic vasectomy reversal, continuous one-layer technique, patency rate, pregnancy rate.

Introduction

Increase in remarriage after vasectomy is a major cause of vasectomy reversal (VR). Patency and pregnancy rates after VR range from 80% to 96 % and 31% to 57%, respectively¹.

Surgical technique, duration of vasal obstruction, presence of sperm granuloma, prior VR, and intraoperative semen quality all impact the outcome of VR^{2,3}. There are several techniques of VR, such as macroscopic, optical loupe assisted, microscopic, one-layer and two-layer anastomosis. Although several studies show acceptable patency and pregnancy rates after macroscopic or optical loupe assisted VR, the microsurgical technique remains the procedure of choice because it allows for the accurate approximation of the vasal mucosa, resulting in an improvement in the outcome^{2,4,5}. Most surgeons perform a two-layer anastomosis technique. However, many reported series show that the simpler and faster one-layer technique provides similar results^{2,6-8}.

In practice, the author prefers microscopic VR using a continuous one-layer technique to an interrupted two-layer technique because it is performed readily and also provides watertight anastomosis.

The objective of this study is to evaluate the patency and pregnancy rates of microscopic VR with a continuous one-layer technique by a single surgeon.

Materials and Methods

We undertook a retrospective analysis of 52 patients who underwent microscopic VR using a continuous one-layer technique performed by a single surgeon between 2005 and 2012. Patients were excluded from the study if they did not have postoperative semen analysis or pregnancy data.

Forty-three patients with the data available were analyzed.

Indications for surgery were prior vasectomy (n = 42) and prior unsuccessful VR (n = 1). A microscopic continuous one-layer technique was performed on all the patients. Intraoperatively, characteristics of the vasal fluid were recorded; fluid appearance was scored as clear, cloudy, creamy, toothpaste-like, or no fluid. Subsequently, microscopic examination of the vasal fluid was performed. A drop of fluid was placed on a slide and diluted with normal saline. Semen quality was assessed as no sperm, non-motile sperm or motile sperm. Patency and pregnancy rates were considered the primary outcome. The operative time, complications, and predictive factors that correlated with patency and pregnancy were secondary outcomes. Postoperative semen analysis was performed approximately every 2-3 months until either pregnancy or loss of contact with the patient. Patency was defined as the presence of sperm in the postoperative sperm analysis at least one time or the achievement of pregnancy.

Postoperative pregnancy data were available for 37 of 43 patients. If pregnancy was not achieved within one year of VR, we provided the patient with information about alternative treatments and assisted reproductive technology (ART).

Information, including preoperative, intraoperative, and postoperative data, was collected from medical records and telephone interviews.

Operative technique

Bilateral high vertical scrotal incisions were performed. Ligated stumps of the vas deferens were identified, prepared and trimmed. The fluid from the vas deferens was examined intraoperatively by microscopic analysis. We flushed the vasal

lumen with normal saline solution to encourage the evidence of patency of the lumen.

The vasovasostomy was performed using an end-to-end technique with 9-0 nonabsorbable suture material. All layers of the vas deferens were approximated with the continuous one-layer technique using a microscope.

We performed vasoepididymostomy (VE) when there was no sperm in the vasal fluid and an obstruction in the distal part of vasal lumen was suspected. Intussusception with a microscopic continuous one-layer technique was performed.

Statistical Analysis

The comparisons of patency and pregnancy rates with preoperative, intraoperative, and postoperative factors were analyzed statistically using Fisher's exact test and t test, with p-value less than 0.05 indicating statistical significance. We used a receiver operating characteristic (ROC) curve for the subgroup analysis of the postoperative semen analysis predicting pregnancy after VR. All statistical calculations were performed using SPSS, version 11.5 for Windows.

Results

Patient clinical characteristics are shown in Table 1. Mean patient's age was 44.6 years, and mean partner's age was 32.8 years. Time interval since vasectomy ranged from 24 to 288 months, with an average of 129.8 months. One patient had history of previous VR for 4 years before the redo operation. The operative time ranged from 100 to 210 minutes, 133.5 minutes on average. Intraoperative, gross appearance of vasal fluid, and sperm appearance are shown in Table 2.

Table 3 shows a patency rate of 93% (40/43) and a pregnancy rate of 43.2% (16/37). One case in

the pregnancy group required assisted reproductive technology for pregnancy. There was one patient in the non-pregnancy group who was not ready to have children after VR. The complication rate was 4.7% (n = 4) for wound infection. Three patients (7%) had a late vasal stricture.

Table 4 demonstrates the correlation of preoperative, intraoperative, and postoperative factors with postoperative patency and pregnancy. There was a statistically significant correlation between postoperative sperm analysis and pregnancy rate (p < 0.05). The mean of postoperative sperm count in the pregnancy and non-pregnancy group were 43.4 and 15.2 x 10⁶/ml, respectively.

Table 5 depicts the subgroup analysis of the postoperative sperm analysis predicting pregnancy after VR. The pregnancy rate was 15.8% (3/19) among patients with a sperm count less than 30 x 10⁶/ml compared with 88.9% (8/9) among those with a sperm count of more than 30 x 10⁶/ml (OR = 42.67, 95% CI = 3.81-478.42). Pregnancy rates of 17.6% (3/17) vs. 66% (8/12) for sperm motility <30 vs. ≥30% (OR = 9.33, 95% CI = 1.65-52.68) and 21.7% (5/23) vs. 100% (6/6) for sperm normal ≤20% vs. >20% (OR = 35.0, 95% CI = 1.7-738.7).

There were 3 cases of VE (unilateral VE 2 cases, bilateral VE 1 case). All cases had patency after VR. One patient who underwent bilateral VE achieved pregnancy but the pregnancy data of 2 unilateral VE cases were not available.

Discussion

Several techniques of VR have been developed^{4,9,10}. Many studies with different techniques and outcomes have been reported^{1,2,4-15}. In general, it is accepted that microscopic VR is superior to the macroscopic technique. An accurate

alignment of the vasal mucosa is achieved by microscopic surgery.¹⁶ Many studies comparing microsurgical, loupe magnification, and macroscopic VR have shown that microscopic techniques have better outcomes than the other techniques^{1,12,15}. Lee and McLoughlin¹⁵ reported their comparison of macroscopic and microscopic vasovasostomy techniques: patency rate of 90% vs 96% and pregnancy rate of 46% vs 54% in macroscopic and microscopic group, respectively. Sang Hyun Jee et al.¹ comparing the outcomes of microscopic versus optical loupes-assisted VR reported that patency rates were 96% in the microscopic group and 72% in the loupe-assisted group, showing a statistically significant difference in both groups. Pregnancy rates were 40% in the microscopic group and 28% in the loupe-assisted group. There was no significant difference in the pregnancy rates between the two groups. Disadvantages of the microscopic technique include the need of more technical skill and operative time. Some studies reported that the operative time of the microscopic technique versus the macroscopic technique was 150 minutes and 90 minutes, respectively⁶.

While most surgeons perform two-layer anastomosis^{9,17}, some surgeons prefer one-layer anastomosis⁸. The advantage of the two-layer technique is an accurate approximation of anastomosis. A potential disadvantage is that many suture knots are left just outside the lumen, which may induce fibrosis and stricture. Moreover, the two-layer anastomosis is more difficult and time consuming. In contrast, one-layer anastomosis requires fewer sutures, which possibly lowers the risk of subsequent fibrosis and stricture. It is also simpler and faster to perform than the two-layer technique. Its disadvantage is that the mucosal

approximation is less precise than in a two-layer anastomosis. Several studies show that the patency and pregnancy rates of one-layer and two-layer vasovasostomy are similar.^{2,6-8}

In practice, the authors have been performing the microscopic continuous one-layer technique because it is simple and also provides watertight sutures, preventing the leakage of sperm.

A review of the VR literature reported patency rates ranging from 80% to 96% and pregnancy rates ranging from 31% to 57%¹. In our study, the patency and pregnancy rates were 93% and 43.2%, respectively; the results are comparable with other studies.

However, it is difficult to compare the results of many reports because several series have different time intervals. Rates of patency and pregnancy depend on the time interval since vasectomy². Many studies reported a time interval of 2.9 to 8.8 years^{2,6,11,13,14}. There was a time interval of 10.8 years (129.8 months) in our study, which is longer than in other reports, and thus affected the results. In general, complications of VR are rare. Postoperative scrotal hematoma is the most common complication. The present study showed a wound infection rate of 4.7% and a late vasal stricture rate of 7%, but no patient had scrotal hematoma. Comparing other studies, Goldstein M. et al.²⁵ reported a series of 2500 operations in which scrotal hematoma occurred in 7 patients while wound infections were not encountered. Kolettis et al.¹⁸ reported a recurrent vasal stricture of 2.9%-5.3%.

Although several studies showed that the rate of patency and pregnancy varies depending on several factors, such as the time interval since vasectomy, prior vasectomy reversal, and partner's age¹⁹⁻²⁴, the present study demonstrated that only



postoperative semen analysis is significantly associated with pregnancy rate. This finding could be the result of a small sample size. This is one of our study's limitations.

Other limitations: data of intraoperative sperm examination were available in only 34 of 43 cases, and many patients were lost to follow-up. These factors may have influenced the results due to a potential selection bias.

Conclusion

Microscopic VR using a continuous one-layer technique provides good patency and pregnancy rates. The authors also found that the complication rates are low. The results are comparable to other studies. This technique seems to be a promising option for VR.

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