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# The outcome of vasectomy reversal with microsurgical one-layer technique at King Chulalongkorn Memorial Hospital

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**Background** : Vasectomy reversal with microscopic one-layer technique was one of the method tore-anastomosis vasectomized tube.

**Objective** : To evaluate the effectiveness of vasectomy reversal with microscopic one layer technique.

**Setting** : King Chulalongkorn Memorial Hospital.

**Research design** : Descriptive study

**Material and Method** : Data were collected from OPD cards, IPD cards and operative note. We conducted a retrospective review of 108 patients who underwent vasectomy reversal with microscopic one-layer technique between 2004 and 2014. The effectiveness was interpreted by pregnancy and patency rate. Patient's age, underlying diseases, alcohol consumption, smoking, history of STD, wife's age, duration after vasectomy, history of prior vasovasostomy, operative findings, and complications were collected and interpreted for influence of pregnancy by using statistic t-test, Mann Whitney U test and ROC curve with  $P < 0.05$  considered statistic significant.

- Result** : *Sixty-eight patients were included in this study. The pregnancy rate was 33.8 % (23/68) and the patency rate by semen analysis 3 months after surgery was 75.5 % (40/53). Patients' age, history of alcohol consumption, smoking, STD, prior vasovasostomy, their wife's age, operation time and intraoperative findings were not significant. Duration after vasectomy, normal post-semen analysis and the patent of lumen were statistically significantly associated with pregnancy rate. In the group that had time after vasectomy less than 9.5 years had pregnancy rate significantly higher than the other group (46.7%, 23.7%, respectively).*
- Conclusion** : *Microscopic one-layer technique of vasectomy reversal provides good outcomes if the time after vasectomy is less than 9.5 years. The patency rate and pregnancy rate are similar to other techniques. Nowadays, this technique seems to be a good option for vasectomy reversal.*
- Keywords** : *Microscopic vasectomy reversal, continuous one-layer technique, patency rate, pregnancy rate.*

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วรารท ลำไย, กวีรัช ตันติวงษ์, จุลินทร์ โอภาณรุักษ์. ประสิทธิภาพของวิธีการต่อหมันแบบการเย็บชั้นเดียวด้วยกล้องจุลทรรศน์ของหน่วยศัลยศาสตร์ระบบทางเดินปัสสาวะ โรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย. จุฬาลงกรณ์เวชสาร 2559 มี.ค. - เม.ย.; 60(2): 133 - 41

**วัตถุประสงค์** : เพื่อประเมินประสิทธิภาพของวิธีการต่อหมันแบบการเย็บชั้นเดียวด้วยกล้องจุลทรรศน์ของหน่วยศัลยศาสตร์ ระบบทางเดินปัสสาวะ โรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย

**วัสดุและวิธีการ** : ทำการวิจัยแบบย้อนหลังในผู้ป่วยที่เข้ารับการผ่าตัดต่อหมันแบบการเย็บชั้นเดียวด้วยกล้องจุลทรรศน์ที่โรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย ตั้งแต่ปี พ.ศ. 2547 - 2557 ซึ่งมีจำนวนทั้งหมด 108 คน โดยประสิทธิภาพของการต่อหมันจะแปลผลออกมาในรูปแบบของอัตราการเปิดโองของท่อนำสุจิ และอัตราการตั้งครรภ์หลังการผ่าตัดอายุผู้ป่วย, โรคประจำตัว, ประวัติการดื่มสุรา, สูบบุหรี่, การติดเชื้อทางเพศสัมพันธ์, อายุภรรยา, ระยะเวลาหลังการทำหมัน, ประวัติเคยต่อหมัน, สภาพท่อนำเชื้อที่เห็นขณะผ่าตัด และ ผลแทรกซ้อนหลังการผ่าตัด ได้ถูกบันทึกและศึกษาถึงปัจจัยใดส่งผลต่อการตั้งครรภ์โดยใช้สถิติ T-test, Mann Whitney U test และ ROC curve โดย  $P < 0.05$  จะมีนัยสำคัญทางสถิติ

**ผลการศึกษา** : ผู้ป่วยที่เข้ารับการผ่าตัดต่อหมันแบบชั้นเดียวด้วยกล้องจุลทรรศน์ 68 คน พบอัตราการตั้งครรภ์ 33.8 % (23/68) และอัตราการเปิดท่อโองโดยการตรวจนำสุจิหลังผ่าตัดที่ 3 เดือน 75.5 % (40/53) ข้อมูลถูกเก็บรวบรวมจากประวัติเวชระเบียนผู้ป่วยนอก, ผู้ป่วยใน และใบบันทึกการผ่าตัดอายุผู้ป่วย, โรคประจำตัว, ประวัติการดื่มสุรา, สูบบุหรี่, การติดเชื้อทางเพศสัมพันธ์, อายุภรรยา, ระยะเวลาในการผ่าตัด และสภาพท่อนำเชื้อที่พบขณะผ่าตัดไม่มีผลต่อการตั้งครรภ์ในทางสถิติ ส่วนระยะเวลาหลังการทำหมัน, ท่อนำเชื้อที่ปกติและสุจิที่ปกติหลังการผ่าตัด พบว่ามีความสัมพันธ์กับการตั้งครรภ์อย่างมีนัยสำคัญ นอกจากนั้นการศึกษายังพบว่ากลุ่มที่ระยะเวลาหลังการทำหมันน้อยกว่า 9.5 ปี มีอัตราการตั้งครรภ์สูงกว่ากลุ่มที่ระยะเวลาหลังการทำหมันมากกว่า 9.5 ปี อย่างมีนัยสำคัญทางสถิติ (46.7 % และ 23.7% ตามลำดับ)

**สรุป** : การต่อหมันแบบชั้นเดียวด้วยกล้องจุลทรรศน์ให้ผลการผ่าตัดที่ดี โดยเฉพาะในกลุ่มผู้ป่วยที่มีระยะเวลาหลังการทำหมันน้อยกว่า 9.5 ปี โดยผลของการเปิดท่อนำสุจิและผลการตั้งครรภ์ มีค่าใกล้เคียงกับวิธีอื่น ๆ ดังนั้นในปัจจุบันวิธีดังกล่าวจึงน่าจะเป็นตัวเลือกที่ดีต่อการต่อหมัน

**คำสำคัญ** : การต่อหมันด้วยวิธีการเย็บต่อเนื่องแบบชั้นเดียว, อัตราการที่ท่อสามารถนำน้ำเชื้อ, อัตราการตั้งครรภ์.

Vasectomy is the most effective and permanent method of male contraception. About 175,000 to 354,000 vasectomies were performed in USA each year.<sup>(1)</sup> The popularity of vasectomy as a method of birth control combined with the increasing frequency of divorces has inevitably resulted in a growing number of men requesting for vasectomy reversal. Other reasons for vasectomy reversal include the death of children, a wish for further children within the same relationship and altered financial circumstances.<sup>(1)</sup> The incidence rate of vasectomy reversal is 3 - 6% of all vasectomized men.<sup>(1,2)</sup> The rate of vas patency and postoperative pregnancy following vasectomy reversal vary wildly in the literature. Reports of vaspatency range between 71% and 97% while postoperative fertility rates are lower, ranging between 26% and 67%.<sup>(2,3,5)</sup>

From previous studies<sup>(6 - 10)</sup> it is shown that surgical technique, duration after vassal obstruction, presence of sperm granuloma and intraoperative semen quality impacted the effectiveness of VR. Microsurgical technique remains the procedure of choice that allows accurate approximation of vasal mucosa, resulting in improvement in the outcomes.<sup>(3,5,16)</sup> There are many ways to re-anastomosis the vasectomized tube. Nevertheless, most surgeons perform a two-layer anastomosis technique.<sup>(11,12)</sup> However, many reported series show the simpler and faster of one-layer technique that yields similar results.<sup>(4,13,14)</sup>

Our study was designed to show the effectiveness of microsurgical one-layer technique VR via patency rate and pregnancy rate and found the factors that influence the pregnancy rate.

## Material and Methods

Our study was conducted at King Chulalongkorn Memorial Hospital in 2004 - 2014. A retrospective review of 68 patients who underwent microscopic VR with interrupted one-layer technique by three surgeons were recorded. We recorded data of patients from OPD cards, intraoperative data and operative note. Patient's age, underlying disease, alcohol consumption, smoking, history of STD, their wife's age, duration after vasectomy, history of prior vasovasostomy, operative findings, complications and pregnancy were written down to patient's database. Exclusion criteria were patients who didn't have complete data and didn't want to have a child. The effectiveness of this technique was interpreted by pregnancy rate and patency rate. Pregnancy rate and patency rate were considered as primary outcomes and the predictive factors correlated with pregnancy rate and secondary to the outcomes of interest. The patent of the lumen was defined as the presence of sperm in postoperative semen analysis or the achievement of pregnancy. Postoperative semen analysis was done at 3 - 6 month after surgery.

## Operative technique

We performed bilateral high incisions on the scrotal. Ligated stump of vas deferens was identified, prepared and trimmed. A healthy portion of vas deferens was isolated for about 1 cm away from the vasectomy site without stripping the adventitia and eliminating blood supply to the anastomosis. The fluid from the proximal part was recorded. Both lumens were checked for patency by saline flushing.

The vasovasostomy was performed with an end to end techniques using 9 - 0 Nylon. All layers of vas deferens were approximated with interrupted one-layer technique with microscope. About 6 – 7 sutures was used to re-anastomosis both sides.

The vasoepididymostomy was performed when the proximal part of vas deferens looked unhealthy or not patent lumen. The epididymis was identified and used microknife to create a window. Vas deferens was re-anastomosis with epididymis by 9-0 nylon. Interrupted one-layer end-to-end fashion was done.

#### Statistic analysis

We used T-Test and Mann Whitney U test to interpret factors that influence pregnancy rate;  $P < 0.005$  was considered statistic significant; and, receiver operating characteristics (ROC) curve was used to find the cutting point of time after vasectomy that affects pregnancy rate.

#### Result

In all, 108 patients who had vasectomy reversal by 3 professors in 2001 to 2014 were included to this study but 37 patients didn't have complete data; 2 patients did not have any wife and 1 patient had never met a wife. Therefore, 68 patients were recruited into this study. Their demographic and clinical data are summarized in Table 1. Mean patients age were 44 years and their partner's age were 33 years. Regarding the operation, 63 patients received bilateral VV; 2 patients received unilateral VV; 2 patients received unilateral VV + unilateral EV and 1 patient unilateral EV. We also had 5 patients who received previous vasovasostomy. The mean duration after vasectomy was 11 years.

Post-operative semen analysis did not done in every case because several patients lost follow up. And we assumed that patients that have child, they have patent lumen. The pregnancy rate was 33.8 % (23/68) and patency rate was 75.5 % (40/53).

**Table 1.** Clinical characteristic of patients  $\pm$  4.

Number of patients	68
Patient' s age (year)	
Mean $\pm$ SD	44.8 $\pm$ 7.11
Partner' s age (year)	
Mean $\pm$ SD	33.4 $\pm$ 5.08
Pt have underlying disease (%)	22.05%
Time after vasectomy (year)	
Mean $\pm$ SD	10.97 $\pm$ 6.12
Hx STD (%)	19.1%
Hx smoking (%)	44.1%
Hx alcohol (%)	61.8%
Previous vasectomy reversal (%)	7.4%

The second outcome of this study, we collected possibly factor of the patients that were led to fail pregnancy. The factors which impact to pregnancy were duration after vasectomy, patent of lumen and post-operative semen analysis normal ( $p = 0.038$ ,  $p = 0.000$ ,  $p = 0.014$ ) respectively. When we had bring the duration after vasectomy to find the cut point that influence pregnancy rate by Roc curve. We discovered that 9.5 years were sensitivity 60.9 % and specificity 64.4%. We divided patients to 2 group (before 9.5 yr, after 9.5 yr) and use the

pearson chi-square to check statistic significant between the two groups. We found that that patients had time before 9.5 year was significant pregnancy rate more than after 9.5 yr (46.7% , 23.7%, respectively  $p = 0.047$ ). Thirty-nine patients had post semen analysis and the results werenormal and statistic significant with pregnancy ( $p = 0.014$ ). Most abnormal semen analyses were as the nospermia 36.3% (12/33), as the nospermia with abnormal morphology 66.67% (8/12) and azoospermia 27.2 % (9/33).

**Table 2.** Intraoperative finding.

<b>Operative time (hr)</b>	
<b>Mean <math>\pm</math> SD</b>	<b>1.04 <math>\pm</math> 0.55</b>
Gross appearance (%) n = 44	
Fibrosis	45.5 %
Granuloma / semen efflux	47.8 %
No efflux	6.7 %

**Table 3.** Outcomes of vasectomy reversal.

Patency rate (%)	75.5 % (40/53)
Pregnancy rate (%)	33.8 % (23/68)
Sperm analysis (n = 39)	
Normal	15.38 %
Abnormal	84.32 %
Complication	1.4%

**Table 4.** Correlation of pre and intra-operative finding with pregnancy rate.

Factor	Fertility		
	pregnancy	Non-pregnancy	p-value
Age	43.09 ± 6.94	45.73 ± 7.10	0.148
Partner's age	32.43 ± 5.71	33.98 ± 4.68	0.055
Underlying dz	2/15	13/15	0.059
Hx smoking	23/30	7/30	0.104
Hx STD	8/13	5/13	0.694
Hx alcohol	30/42	12/42	0.245
Previous VR	3/5	2/5	0.762
Time after vasectomy	9.02 ± 6.82	11.97 ± 5.55	0.038
Operative time	1.00 ± 0.60	1.07 ± 0.53	0.767
Gross appearance (n = 44)			
Fibrosis and no efflux	6/23	17/23	
Granuloma and efflux	4/21	17/21	0.588
Postop SA normal	4/39	2/39	0.014
Patent of lumen	23/40	17/40	0.000

## Discussion

Nowadays, they have many technique for vasectomy reversal but they don't have the best way technique to improve pregnancy rate.<sup>(3-10)</sup> In general, it is accepted that the microsurgical VR is superior to the macrosurgical technique.<sup>(17)</sup> Many studies<sup>(3, 5, 16)</sup> comparing microsurgical, loupe magnification, and macrosurgical VR shown that microsurgical had better outcome than other techniques. The disadvantage of microsurgical was skilled techniques and long operative time.<sup>(3,5)</sup> Some studies<sup>(15)</sup> reported that microsurgical used 150 min compare with macroscopic 90 min. Regarding the technique for re-anastomosis, from our recent meta-analysis<sup>(4)</sup> we found no statistically significant difference in single vs multiple VR techniques. Most surgeons prefer two-layer technique because of the

accuracy of anastomosis but the disadvantage of this technique was its difficulty, time consumption and many knots left outside the lumen can induce fibrosis and stricture.<sup>(13-15)</sup> On the other hand, one-layer anastomosis has few sutures outside so it decreases the risk of fibrosis and this technique is simpler and faster than the two-layer technique. In our study, it is shown that the patency rate of this technique was 75.5% and pregnancy rate was 33.8%, similar to other studies. The technique of re-anastomosis used in our study was the same as in the Human's Atlas of Urologic Surgery.<sup>(18)</sup>

However, our study has some limitations. Due to the fact that this study was retrospective, we have lost information about pre-operative data, intra-operative findings and post-operative semen analysis. Moreover, several patients after receiving the



operation were lost to follow up. The others limitations were the number of case in this study was small group and not all of case done post-operative semen analysis. About factors that influence to pregnancy rate. Several studies<sup>(6-11)</sup> show that it depended on several factors such as time after vasectomy, prior vasectomy reversal, partner's age, sperm granuloma and gross and microscopic vasal fluid during VR. Most patients go for In Vitro Fertilization (IVF) if they want to have a child. The factors that statistically significant in our study were time after vasectomy, patent lumen and post-operative semen analysis normal. We found that patients had less than 9.5 years, they could have 46.7% chance to be pregnant and if the time was longer than 9.5 years the opportunity decreased to 23.7% ( $p = 0.047$ ). However, there were many factors that influence the pregnancy. Intraoperative microscopic vasal fluid was not done at our institute. In general, complications of VR are rare. Most common complication from other studies were postoperative scrotal hematoma. In our study had only one case. He complaint about orchalgia after surgery and the symptom resolved by itself after 12 months. Orchalgia is rare and mostly occurs after vasectomy and relieved by VV.<sup>(19)</sup>

### Conclusion

Microscopic one-layer techniques vasectomy reversal provides good outcomes if the time after vasectomy was less than 9.5 years. The patency rate and pregnancy rate are similar to other techniques. Nowadays, this technique seems to be good option for vasectomy reversal.

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