

# A Study of Tubal Recanalization in Era of ART (Assisted Reproduction Technology)

SOWMYA KOTESHWAR<sup>1</sup>, ANJALI SIDDESH<sup>2</sup>

## ABSTRACT

**Introduction:** Tubectomy remains one of the most popular methods of permanent contraception in developing countries. But about 10% of them regret their decision and 1% want to restore their fertility.

Out of many options open method of tubal recanalisation is one of the method of restoring fertility.

**Aim:** Primary objective was to analyse whether open tubal recanalization is a feasible option for those planning to conceive after tubectomy. Secondary objective was to evaluate the pregnancy rate and analyse the various factors affecting pregnancy rate after tubal recanalization.

**Materials and Methods:** A prospective study, follow-up of 2 year in patients treated with tubal recanalization during 2012-2013 at tertiary teaching hospital. 10 women underwent tubal recanalization procedure. Open surgery was done and the principles of microsurgery were followed meticulously throughout the procedure.

**Statistical Analysis:** All statistical analyses were performed using SPSS for Windows version 17.0 (SPSS Inc., Chicago,

IL, USA). Data were expressed as means, medians, standard deviations, and percentages. We used Student's t-test to compare group means and Fisher-exact test to compare proportions. A p-value of <0.05 was considered significant.

**Results:** Out of 10 women who went recanalization an overall 50% pregnancy rate was achieved. All pregnancies occurred within 1 year of procedure. When previous sterilisation was done by laparoscopic route, after reversal all of them (100%) conceived while in those sterilised by Pomeroy's method the pregnancy rate after reversal was only 16.6%. Following reversal pregnancy was statistically more significant in those with final tubal length of >5cm (p=0.04) and in those with Isthmo-Isthmic type of anastomosis.

**Conclusion:** Open tubal recanalisation remains a feasible option for those planning pregnancy after tubectomy. The important factors for determining the success of operation were age of the patient, time interval between sterilization and reversal, site of ligation, method used for previous ligation and the remaining length of the tube after recanalisation.

**Keywords:** Microsurgery, Pregnancy rate, Sterilization reversal

## INTRODUCTION

In India, in a desire to limit the number of children due to various socioeconomic factors and as family planning is often synonymous with tubal sterilization, without giving a thought on various spacing methods available like Intra uterine contraceptive device and also due to preconceived fears and myths about these methods, even young women in their twenties are opting for tubal sterilization [1,2]. About 10% of them later regret their decision and about 1% want to restore their fertility due to various reasons like loss of only child, loss of male child, desire to have more children, loss of children in natural calamities, remarriage and other socioeconomic factors [3]. These women have the option of either opting for artificial reproductive techniques or going for tubal recanalization.

In recent years there is a trend for using more of ART techniques and laparoscopic techniques while training in microsurgery has taken a backseat. With booming ART technology many are opting for this option but cost, ability to achieve more than one pregnancy are some of advantages of tubal recanalization surgery [4].

Although laparoscopic recanalization has taken over conventional open microsurgical recanalization in west [5]. Because of cost and technical restraints involved this procedure remains affordable to a few of privileged in India. According to US CREST study, of all women wishing for reversal only 1% actually had the procedure done [6]. This is because of the unavailability of the services, technical expertise needed, high cost, fear of surgery, fear of failure of procedure. The scenario is still worse in developing country.

## AIM

Therefore this study was done to find whether open method of tubal recanalization while following the principles of microsurgery can still be an option as it is done in minimal resource setting with minimal training in principles of microsurgery giving hope to many women who would have otherwise remained childless. The secondary objective of study was to find the pregnancy rate after tubal recanalization and also to analyse various factors which affected the pregnancy rate.

## MATERIALS AND METHODS

A observational prospective study was conducted in tertiary teaching hospital between June 2012 to June 2013. All women requesting tubectomy reversal during this study period were included in this study. A detailed history with special reference to reason for reversal, duration of sterilization, type of sterilization was taken. Before the procedure thorough counselling of husband and wife was done with regard to surgery, its outcome and success rate. All baseline investigations were done to rule out other causes of infertility in both the partners.

Before including patients in the study ethical committee clearance was taken and informed consent of the patients was obtained.

**Procedure:** Tubal microsurgery was performed by the same surgeon in all cases under general or spinal anaesthesia. Principles of microsurgery were meticulously followed throughout. Abdominal access was achieved through laparotomy incision. When peritubal adhesions were present salpingo ovariolysis

was done electro surgically. Continuous irrigation with heparinized ringer lactate solution was used to prevent formation of adhesions. The cut-ends of occluded tube were identified. The fibrosed end of medial and lateral segments of the tube was excised. Haemostasis was achieved by precise electro coagulation by bipolar cautery. Patency checked for by injecting methylene blue dye. No stent was used during the procedure. Anastomosis was done by means of 6-0 vicryl suture material for muscularis. First bite was taken at 6 O'clock position, i.e., mesentric border and later at 3, 9, and 12 O'clock positions. Mucosa was avoided. Sutures were taken in such a way that knots faced the serosa. Serosa was approximated similarly. Mesosalpinx was sutured with vicryl no. 6-0. Patency checked after anastomosis. When dye leakage was present at anastomosis site additional sutures were taken. Final length of the reconstructed oviduct was measured on each side and noted. Average duration of surgery was 40 minutes. Blood loss was minimal. Postoperative period was uneventful and patients were followed up at one, 6 month and 2 year.

## STATISTICAL ANALYSIS

All statistical analyses were performed using SPSS for Windows version 17.0 (SPSS Inc., Chicago, IL, USA). Data were expressed as means, medians, standard deviations, and percentages. We used Student's t-test to compare group means and Fisher-exact test to compare proportions. A p-value of <0.05 was considered significant.

## RESULTS

A total of 10 women undergoing sterilization reversal were included in the study. Tubotubal anastomosis was done bilaterally in all patients. Patency of tube when determined by dye test was seen in at least one tube in all 10 cases. Out of 10 women posted for tubal recanalization 5 women conceived giving a pregnancy rate of 50%. All were intrauterine pregnancies.

The main reason for sterilization reversal in our study was death of all the children in 70% followed by death of the only male child in 20%, 10% requested for reversal as they regretted their earlier decision and wished to have more issues.

In spite of successful reanastomosis and patency of at least one tube 5 of 10 did not conceive. To analyse various factors which affect pregnancy rate we divided the patients into two groups, group1 (those who conceived) numbered from 1-5 and group2 (those who did not conceive) named A-E and compared the two groups. The age of the patients ranged from 20-35 years [Table/Fig-1].

All the patients with sterilization – reversal interval of < 5 years conceived [Table/Fig-2].

Age(y)	Total no of patients (n=10)	In those who conceived (n=5) (group 1)	In those who did not conceive (n=5) (group 2)	%	Statistical analysis
20-25	3	3	-	100	p=0.006
26-30	2	2	-	100	
31-35	5	-	5	0	
Mean age				50	

[Table/Fig-1]: Age of patients.

Time (y)	Total no of patients (n=10)	In those who conceived(n=5) (group 1)	In those who did not (n=5) conceive (group 2)	%	Statistical analysis
0-<2y	2	2	-	100	p=0.06
2-<5y	2	2	-	100	
5-<10y	3	1	2	33.3	
>10 y	3	-	3	0	
Total	10	5	5	50%	

[Table/Fig-2]: Interval between sterilization and reversal.

Type of delivery	No of patients (n=10)	In those who did not conceive(n=5) (group 1)	In those who conceived (n=5)	%	Statistical analysis
FTND	9	4	5	55.5	
LSCS	1	1	-	0	

[Table/Fig-3]: Type of previous delivery.

Technique of sterilization	No of patients (n=10)	In those who did not conceive(n=5) (group 1)	In those who conceived (n=5) (group 2)	%	Statistical analysis
Pomeroy's (open)	6	5	1	16.7	p=0.01
Falope ring (laproscopic)	4	-	4	100	

[Table/Fig-4]: Sterilization technique.

Final length of tube(cm)	No of patients (n=10)	In those who did not conceive (n=5) (group 1)	In those who conceived (n=5) (group 2)	%	Statistical analysis
<5	3	3	-	100	p=0.04
>5	7	2	5	28.6	

[Table/Fig-5]: Final length of tube.

Site	No of patients (n=10)	In those who did not conceive (n=5) (group 1)	In those who conceived (n=5) (group 2)	%	Statistical analysis
Isthmus-isthmus	4	-	4	100	p=0.03
Ampulla-ampulla	2	1	1	50	
Isthmus-Ampulla	4	4	-	-	
Cornu isthmus	-	-	-	-	

[Table/Fig-6]: Site of anastomosis.

Tubal Patency	No of patients (n=10)	In those who did not conceive (n=5) (group 1)	In those who conceived (n=5) (group 2)	%	Statistical analysis
unilateral	5	2	3	60	p=0.5
bilateral	5	3	2	40	

[Table/Fig-7]: Tubal patency.

All patients with previous delivery being LSCS did not conceive. [Table/Fig-3]. When sterilization was by falope ring all the 4 became pregnant (100%) while in pomeroy's method only 1 out of six became pregnant (16.6%) [Table/Fig-4]. We also compared the various intraoperative factors like final length of tube, type of anastomosis achieved, patency of the tubes [Table Fig-5-7].

A total of 5 out of 7 patients with final tubal length >5cm conceived while none with less than 5cm conceived (p=0.05). When type of tubotubal anastomosis was isthmus-isthmus all 4 of 4 patients became pregnant, 50% of those with ampulloampullary anastomosis conceived. (p=0.04). In our study in spite of successful anastomosis in all 10 cases, patency determined by dye leakage was seen on bilateral side in 5cases. Pregnancy was achieved in 3 when unilateral and in 2 when bilateral patency was achieved.

## Characteristics of 5 patients who did not conceive

**CASE A:** 34 years, 13 years since sterilization, Pomeroy's method of sterilization, type of anastomosis isthmoampullary. Average tubal length 5 cm, unilateral dye patency present.

**CASE B:** 30 years, previous 2 lscs, 11 years since sterilization, Pomeroy's method of sterilization, Dense peritubal adhesions were present, type of anastomosis isthmoampullary. Average tubal length 4 cm, bilateral dye patency present.

**CASE C:** 30 years, 6 years since sterilization, Pomeroy's method of sterilization, type of anastomosis isthmoampullary. Average tubal length 5.5 cm, bilateral dye patency present.

**CASE D:** 32 years, 14 years since sterilization, Pomeroy's method of sterilization, type of anastomosis Ampulloampullary. Average tubal length 4.5 cm, bilateral dye patency present.

**CASE E:** 30 years, 8 years since sterilization, Pomeroy's method of sterilization, peritubal adhesions present, type of anastomosis isthmoampullary. Average tubal length 4.5 cm, unilateral dye patency present.

## DISCUSSION

In a study by Boeckxstaens et al., the cumulative pregnancy rate was 52.0% in the IVF group and 59.5% in the surgical reversal group [7]. In a study by Ribeiro SC where surgical reanastomosis was done by laparoscopic method pregnancy rate was 56.5% [5]. The overall success in terms of intrauterine pregnancy after reversal of sterilization by microsurgery reported by other authors also varies from 50-70% [8]. In our study also we had a pregnancy rate of 50% which compares favourably with other authors. Although ectopic pregnancy remains a significant risk factor, in our study all were intrauterine pregnancy.

Chances of conception significantly decreased with increasing age and duration from sterilization to recanalization as other factors for infertility also increase with age. The age of the patients ranged from 20-35 years. The pregnancy rate was higher (100%) ( $p = 0.006$ ) when the age of the patient seeking reversal was 30 years or less. Those who requested recanalization within 5 years of sterilization procedure all of them conceived. None of patients with >10 yrs of reversal conceived. Jain et al., in their study achieved a pregnancy rate of 75% when age of patients was less than 25 years [9].

Out of 5 who conceived - 4 had undergone laparoscopic sterilization and 1 had undergone Pomeroy's method of sterilization, while in those who did not conceive 80% had undergone Pomeroy's method of sterilization. In all studies reversal after laparoscopic sterilization is associated with good outcome. This is because in laparoscopic sterilization the length of damage tube is smaller [8,9].

The other factors which affected pregnancy outcome were length of tube and type of anastomosis. 5 of 7 patients with final tubal length >5cm conceived while none with less than 5cm conceived ( $p=0.05$ ). In all cases which conceived tubal length was more than 6cm. while in those who did not conceive tubal length was <4 cm. According to Yassae F tubal length >4 cm and healthy fimbriae were two main factors which influenced pregnancy outcome [10]. Similarly Eddy CA reported that, tubal length and status of fimbriae are the only factors which determine the normal functioning of tube [11].

Some studies have suggested that isthmus to isthmus anastomosis has the best chance of successful reversal. In our study also when type of tubotubal anastomosis was isthmus-isthmus all 4 of 4 patients became pregnant, 50% of those with ampulloampullary anastomosis conceived. ( $p=0.04$ ). This is because in isthmoisthmic type both tubal ends are of equal diameter [12-14].

In a study by K Jayakrishnan and Sumeet N Baheti in cases where recanalization was done bilaterally, 2 (67%) conceived, whereas for unilateral recanalization 8 (57.8%) [15]. In our study in spite of successful anastomosis in all 10 cases, patency determined by dye leakage was seen only on one side in 50%. Pregnancy was achieved in 3 (60%) when unilateral and in 2 (40%) when bilateral patency was achieved.

Several authors from our country have reported that the reason for reversal are most commonly death of all children or death of the only male child while in western countries reversal is usually sought in a desire to have more children from a new partner [16,17]. In our study also women sought reversal for two main reasons the first being death of all children (70%) and second being death of the only male child (20%). Of particular importance was the other 10% who requested recanalization as they wanted more issues, stressing the fact that better counselling about permanent nature of the procedure and the availability of reversible methods of contraception is needed.

## LIMITATION

The limitation of the study was the small group to arrive at a statistically significant result.

## CONCLUSION

When performing tubal sterilisation interval laparoscopic sterilization is better than open Pomeroy's method for tubectomy as less length of tube is damaged and reversal is easy. Also, those requesting tubal sterilization should be thoroughly counselled about availability of alternating spacing methods of contraception. In our study open method of tubal recanalisation has a pregnancy rate of about 40-50%. Thus open method of recanalization while following principles of microsurgery has a good pregnancy outcome and can be treatment of choice in resource poor setting as it is technically simpler and needs minimal resources. Future studies including RCT's comparing IVF with tubal recanalisation for those wanting to conceive after tubectomy are needed.

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### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Obstetrics and Gynaecology, J.S.S Medical College and Hospital, Mysore, India.
2. Ex Professor and Unit Chief, Department of Obstetrics and Gynaecology, J.S.S Medical College and hospital, Mysore, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sowmya Koteswar,  
No 761, E&F block, Kuvempunagar, Mysore, Karnataka-570023, India.  
E-mail : sowsheshu@gmail.com

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