International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 16; Issue: 2; February 2026
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Outcome After Successful Fallopian Tube Recanalization in a Rural Tertiary Care Hospital and Medical College: A Retrospective Study

Nilofer Angadi Rajasab[1], Kalpana Basany[1], Syed Ahmed Zaki[2]

[1]Department of Obstetrics & Gynecology, MediCiti Institute of Medical Sciences, [2]Department of Paediatrics, All India Institute of Medical Science, Bibinagar

Corresponding Author: Syed Ahmed Zaki

DOI: https://doi.org/10.52403/ijhsr.20260236

ABSTRACT

Objectives: To evaluate the reproductive outcomes following successful fallopian tube recanalization (FTR) in women with a previous history of tubal sterilization.
Methods: This observational retrospective study was conducted at Medciti Institute of Medical Sciences (MIMS), Hyderabad, between 2016 and 2024. Clinical records of women who underwent microsurgical tubal recanalization were reviewed. Outcomes assessed included pregnancy rates and factors influencing success, such as method of prior sterilization, type of tubal anastomosis, and post-reversal tubal length.
Results: Of the 16 women who underwent tubal recanalization, 50% achieved conception. Women with a history of laparoscopic sterilization had a higher conception rate (62.5%) compared to those sterilized by Pomeroy's method (37.5%). A higher pregnancy rate (75%) was observed in women with a post-reversal tubal length greater than 4 cm. Isthmo–isthmic and isthmo–ampullary anastomoses were associated with a success rate of 25%.
Conclusion: Microsurgical tubal recanalization is an effective method for restoring tubal patency and achieving pregnancy in selected women, with acceptable success rates and low complication risk. It remains a viable fertility-restoring option, particularly in resource-limited settings.

Keywords: Sterilization; Tubal recanalization; Microsurgical technique, ectopic pregnancy

INTRODUCTION

Female sterilization continues to be the most commonly practiced method of permanent contraception in India. According to the National Family Health Survey-4 (NFHS-5, 2019–2021), female sterilization accounts for nearly 48.6% of all contraceptive methods used, making it the predominant method of family planning in the country.[1] A significant proportion of women undergo sterilization at a young age, often during the early reproductive years of 20–25 years, usually following completion of a small family or due to social and economic pressures.[1,2] However, changes in personal circumstances such as remarriage, death of one or more children, improved socioeconomic status, or altered reproductive desires may later prompt women to seek reversal of sterilization. In such situations, tubal recanalization provides an opportunity for natural conception and restoration of fertility.

Microsurgical tubal recanalization through laparotomy is considered the gold standard technique for reversal of sterilization, particularly in settings where advanced laparoscopic or robotic expertise is not widely available.[3] Although assisted reproductive techniques such as in vitro fertilization (IVF) are effective alternatives, they are often expensive, require repeated cycles, and may not be easily accessible to couples from rural and resource-limited backgrounds. As a result, microsurgical tubal recanalization remains a preferred and cost-effective option for fertility restoration in many parts of India. The success of tubal recanalization is influenced by several factors, including the woman's age, duration since sterilization, method of sterilization, site of tubal occlusion, type of anastomosis, and the final length of the reconstructed tube.[4] This study aims to evaluate the outcomes of microsurgical tubal recanalization performed at a rural tertiary care hospital and medical college and to analyze the factors influencing its success. The study also aims to evaluate the outcome of tubal recanalization in terms of pregnancy rate, and complications.

MATERIALS & METHODS

Study Design and Setting: This observational retrospective study was conducted at the Department of Obstetrics and Gynecology, MediCiti Institute of Medical Sciences, Hyderabad, a rural tertiary care hospital and teaching institute.

Study Population: Sixteen women who underwent microsurgical tubal recanalization between 2016 and 2024 were included in the study.

Inclusion Criteria: Following were the inclusion criteria:

1. Women seeking reversal of previous tubal sterilization
2. Normal semen parameters of male partners
3. Willingness for follow-up for at least one year

Exclusion Criteria: Following were the exclusion criteria:

1. Evidence of pelvic inflammatory disease
2. Endometriosis
3. Uterine fibroids
4. Contraindications to pregnancy or surgery

Data Collection: Clinical records were reviewed for demographic details, parity, indication for sterilization reversal, method of sterilization, interval between sterilization and recanalization, intraoperative findings, postoperative outcomes, and pregnancy outcomes.

Surgical Procedure

Preoperative Evaluation: All women were selected based on inclusion and exclusion criteria. Detailed counseling was provided regarding the nature of surgery, expected success rates, possibility of ectopic pregnancy, and need for follow-up. Semen analysis was performed for male partners.

Operative Technique: Tubal recanalization was performed during the post-menstrual phase. A transverse suprapubic incision was used to access the abdomen. Under magnification, microsurgical instruments were employed, and constant irrigation was maintained using heparinized Ringer's lactate solution. The tubectomized segments were identified, and the blocked ends were freshened. Tubal anastomosis was performed using 5.0 proline sutures. The first suture was placed at the 6 o'clock position at the mesenteric border, followed by sutures at the 3, 9, and 12 o'clock positions. The serosa was approximated similarly. Tubal patency was confirmed intraoperatively using methylene blue dye. Hemostasis was achieved using bipolar cautery. The final length of the reconstructed tube was measured, and hydroflotation was performed with normal saline.

Intraoperative parameters such as tubal condition, site and type of anastomosis, type of prior sterilization, and reconstructed tubal length were recorded.

Postoperative Follow-up: Patients were discharged after suture removal and advised regarding the fertile period. They were counseled to report early in case of missed periods or symptoms suggestive of ectopic pregnancy. Follow-up was conducted for one year. Pregnancy outcomes, miscarriages, ectopic pregnancies, and pelvic infections were recorded.

Statistical Analysis

Categorical variables were summarized as frequencies and percentages. Due to the small sample size, associations between categorical variables and conception were assessed using Fisher's exact test or the Fisher–Freeman–Halton exact test where appropriate. Odds ratios (OR) with 95% confidence intervals (CI) were calculated for 2×2 comparisons to estimate effect size. All tests were two-sided, and a p-value <0.05 was considered statistically significant.

RESULT

A total of 16 women underwent microsurgical tubal recanalization during the study period. Overall conception occurred in 8 women (50%). Intrauterine pregnancies were achieved in 6 women (37.5%). Among those who conceived intrauterine, 3 (50%) resulted in live births, 3 (50%) ended in abortions. 2 (25%) were ectopic pregnancies.

Age Distribution: Most women who conceived belonged to the 20–29-year age group (75%). A similar age distribution was observed among women who did not conceive (Table 1).

Parity and Indications for Reversal: Overall, 87.5% of women were para 2 or less. The most common reason for seeking reversal of sterilization was the death of one or all children (81.25%).

Table 1: Comparison of age distribution of patients studied

Age in years	Conceived		Not Conceived	
	Number	%	Number	%
20–25	4	50	2	25
26–29	2	25	3	37.5
30-35	2	25	3	37.5
Total	8		8	

Type of Sterilization: Higher pregnancy rates were observed among women who had undergone laparoscopic sterilization (62.5%) compared to those who had puerperal or concurrent sterilization procedures (Table 2).

Table 2: Comparison of type of sterilization in two groups of patients studied

Type of Sterilization	Conceived		Not Conceived	
	Number	%	Number	%
Puerperal	2	25%	2	25%
Concurrent with Lower Segment C.S.	1	12.5%	3	37.5%
Laparoscopic	5	62.5%	3	37.5%
Total	8		8	

Type of Anastomosis: Bilateral isthmo-isthmic anastomosis was the most common type associated with successful conception (50%) (Table 3).

Table 3: Comparison of anastomosis in two groups of patients studied

Anastomosis	Conceived		Not Conceived	
	Number	%	Number	%
B/L Isthmo-isthmic	4	50%	1	12.5%
B/L Ampulloampullary	1	12.5%	2	25%
B/L Isthmo-ampullary	1	12.5%	3	12.5%
Isthmo-isthmic + Isthmo-ampullary	2	25%	2	25%
Total	8			

Tubal Length: Pregnancy was achieved in 75% of women with a reconstructed tubal length greater than 6 cm. No pregnancies occurred when the tubal length was less than 4 cm (Table 4).

Table 4: Final length of reconstructed tube in conceived group

Final length of reconstructed tube	Conceived No	Percentage (%)
>6 cm	6	75
4-6 cm	2	25
<4 cm	0	
Total	8	

Interval Between Sterilization and Recanalization: Women who underwent reversal within four years of sterilization had a significantly higher pregnancy rate (75%) compared to those with longer intervals (Table 5).

Table 5: Comparison of interval from sterilization in 2 groups of patients studied

Interval from Sterilization [years]	Conceived		Not Conceived	
	Number	%	Number	%
<4	6	75%	2	25%
4-6	2	25%	3	37.5%
>6	0		3	37.5%
Total	8		8	

Table 6 - Univariate Analysis of Factors Associated with Conception Following Tubal Recanalization (n = 16)

Variable	Conceived n/N (%)	Odds Ratio (OR)	95% CI	p-value*
Age				
20–25 years	4/6 (66.7%)	3.0	0.40–22.5	0.28
≥26 years	4/10 (40%)	Reference	—	—
Type of Sterilization				
Laparoscopic	5/8 (62.5%)	2.78	0.38–20.2	0.32
Others (Puerperal/LSCS)	3/8 (37.5%)	Reference	—	—
Type of Anastomosis				
Isthmo–isthmic	4/5 (80%)	7.0	0.60–81.6	0.11
Others	4/11 (36.4%)	Reference	—	—
Final Tubal Length				
>6 cm	6/8 (75%)	**9.0**	**1.16–69.7**	**0.03**
≤6 cm	2/8 (25%)	Reference	—	—
Interval from Sterilization				
<4 years	6/8 (75%)	**9.0**	**1.16–69.7**	**0.03**
≥4 years	2/8 (25%)	Reference	—	—

Inferential statistical analysis - On univariate analysis [Table 6], an interval of less than 4 years between sterilization and recanalization was significantly associated with higher conception rates compared to an interval of ≥4 years (75% vs 25%; OR 9.0, 95% CI 1.16–69.7; p = 0.03). Similarly, women with a final reconstructed tubal length greater than 6 cm had significantly higher odds of conception compared to those with tubal length ≤6 cm (75% vs 25%; OR 9.0, 95% CI 1.16–69.7; p = 0.03). Although higher conception rates were observed among women aged 20–25 years (66.7%) compared to those aged ≥26 years (40%) (OR 3.0, 95% CI 0.40–22.5; p = 0.28), this association was not statistically significant. Laparoscopic sterilization showed higher odds of conception compared to other methods (OR 2.78, 95% CI 0.38–20.2; p = 0.32), but this did not reach statistical significance. Isthmo–isthmic anastomosis was also associated with higher conception rates (OR 7.0, 95%

CI 0.60–81.6; p = 0.11), though the difference was not statistically significant.

Reasons for Non-conception: Among the eight women who did not conceive during the follow-up period, identifiable reasons for non-conception were documented. Two women had dense pelvic adhesions noted intraoperatively, which could have contributed to failure of conception. Three women were still attempting conception at the time of analysis and were undergoing ovulation induction. One woman was lost to follow-up, one participant's spouse expired within two months of the procedure, and one woman underwent marital separation within three months of recanalization. These non-biological factors limited adequate assessment of reproductive outcome in these cases.

DISCUSSION

Tubal recanalization remains an important fertility-restoring procedure in women who have previously undergone sterilization, particularly in developing countries where female sterilization is widely practiced and access to assisted reproductive techniques may be limited.[3,4] In the present study, the overall pregnancy rate following microsurgical tubal recanalization was 50%, which is comparable to pregnancy rates reported in previous studies ranging from 50% to 60%.[5,6] Several factors have been shown to influence the outcome of tubal recanalization, with age being one of the most significant determinants. In our study, the majority of women who conceived were below 30 years of age. Younger women are known to have better ovarian reserve, improved oocyte quality, and higher fecundity, which contribute to improved pregnancy outcomes after recanalization. Similar findings have been reported by Jain et al. and Shilpa *et al.*, who demonstrated higher conception rates in women younger than 25–30 years.[7,8] The interval between sterilization and reversal surgery also plays a critical role in determining success. In the present study, women who underwent recanalization within four years of sterilization had higher pregnancy rates compared to those with longer intervals. With increasing time, fibrosis at the site of ligation, shortening of the remaining tubal segments, and age-related decline in fertility contribute to poorer outcomes. Shilpa *et al*. reported that pregnancy rates were highest when reversal was performed within one to two years of sterilization and declined significantly with longer intervals.[7]

The method of prior sterilization is another important determinant of outcome. In this study, women who had undergone laparoscopic sterilization demonstrated higher pregnancy rates compared to those who had puerperal or Pomeroy's sterilization. Laparoscopic sterilization typically involves minimal damage to the fallopian tube, preserves tubal length, and causes less peritubal scarring, thereby improving the likelihood of successful recanalization. Similar observations have been made in studies by Jain *et al.* and other authors, who reported better outcomes following laparoscopic sterilization using rings or clips.[7,8,9,10] The site and type of anastomosis significantly influence postoperative tubal function. In the present study, bilateral isthmo-isthmic anastomosis was associated with the highest pregnancy rates. The isthmic portion of the tube has a relatively uniform lumen and better muscular integrity, facilitating precise anastomosis and restoration of normal tubal function. Previous studies have also demonstrated higher pregnancy rates with isthmo-isthmic anastomosis compared to ampullary anastomosis.[7,8,9] Final reconstructed tubal length emerged as one of the strongest predictors of success in this study. Pregnancy rates were highest when the final tubal length exceeded 6 cm, while no pregnancies occurred when the length was less than 4 cm. Adequate tubal length is essential for normal gamete transport, fertilization, and embryo transport. Similar findings have been consistently reported in the literature, emphasizing the importance of preserving maximum tubal length during

sterilization and recanalization procedures.[7,8,9,10]

Ectopic pregnancy remains a known complication following tubal reconstructive surgery. In the present study, ectopic pregnancies accounted for 25% of conceptions.[11] This underscores the importance of meticulous surgical technique, careful patient selection, and close postoperative follow-up. Patients should be counseled regarding early detection of pregnancy and the need for prompt evaluation to rule out ectopic gestation. The limitations of this study include its retrospective design, small sample size, and limited follow-up period. Incomplete HSG data in women who did not conceive further limited assessment of postoperative tubal patency. Larger prospective studies are required to validate these findings. In rural and resource-limited settings, tubal recanalization offers several advantages over assisted reproductive techniques. It allows for natural conception, avoids repeated hormonal stimulation, and is more cost-effective. For many women, especially those from rural backgrounds, the psychological satisfaction of conceiving naturally is an important consideration. Despite its benefits, tubal recanalization requires significant microsurgical expertise and careful handling of tissues. Proper counseling at the time of sterilization is essential, as every woman undergoing sterilization remains a potential candidate for reversal in the future.

CONCLUSION

Microsurgical tubal recanalization is a safe, effective, and economical method of fertility restoration in carefully selected women, particularly in rural settings. Favorable outcomes are associated with younger age, shorter sterilization-reversal interval, laparoscopic sterilization, isthmo-isthmic anastomosis, and reconstructed tubal length greater than 6 cm. Proper surgical technique and patient counseling remain essential to optimize outcomes.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Panda SN, Barik M, Acharya AS, Kanungo S, Pati S. Spatial distribution and factors influencing modern contraceptive practice among tribal married women in India: evidence from National Family Health Survey 5 (2019-2021). BMC Womens Health. 2023 Jun 20;23(1):318.
2. Sivaram S, Singh S, Penn-Kekana L. Understanding the role of female sterilisation in Indian family planning through qualitative analysis: perspectives from above and below. Sex Reprod Health Matters. 2021;29(2):2080166.
3. Jayakrishnan K, Baheti SN. Laparoscopic tubal sterilization reversal and fertility outcomes. J Hum Reprod Sci. 2011 Sep;4(3):125-9.
4. Ramalingappa A, Yashoda. A study on tubal recanalization. J Obstet Gynaecol India. 2012 Apr;62(2):179-83.
5. Koteshwar S, Siddesh A. A Study of Tubal Recanalization in Era of ART (Assisted Reproduction Technology). J Clin Diagn Res. 2016 Feb;10(2): QC01-3.
6. Yadav R, Reddi R, Bupathy A. Fertility outcome after reversal of sterilization. J Obstet Gynaecol Res. 1998;24(6):393–400.
7. Shilpa MN, Shilpa Shivanna B, Gopal N. Correlation of prognostic factors and outcome of microsurgical tubal recanalisation. IOSR J Dent Med Sci (IOSR-JDMS) 2014;13(9 Ver. V):13–15.
8. Jain M, Jain P, Garg R, et al. Microsurgical tubal recanalization: a hope for hopeless. Indian J Plast Surg 2003
9. Godin PA, Syrios K, Rege G, Demir S, Charitidou E, Wery O. Laparoscopic Reversal of Tubal Sterilization; A Retrospective Study Over 135 Cases. Front Surg. 2019 Jan 9; 5:79.
10. Rathna A, Sharma N. Effect of tubal recanalization on functional and fertility

outcomes in previously sterilized women: A prospective study. J Neonatal Surg [Internet]. 2025 Jun. 12 [cited 2026 Feb. 8];13(1):262-8. Available from: https://www.jneonatalsurg.com/index.php/jns/article/view/7311

11. Practice Committee of the American Society for Reproductive Medicine. Electronic address: ASRM@asrm.org. Role of tubal surgery in the era of assisted reproductive technology: a committee opinion. Fertil Steril. 2021 May; 115(5): 1143-1150.

How to cite this article: Nilofer Angadi Rajasab, Kalpana Basany, Syed Ahmed Zaki. Outcome after successful fallopian tube recanalization in a rural tertiary care hospital and medical college: a retrospective study. *Int J Health Sci Res.* 2026; 16(2):325-331. DOI: *https://doi.org/10.52403/ijhsr.20260236*

******