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Original Research Article

## Clinical profile and pregnancy outcome following tubal recanalisation

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### ABSTRACT

**Background:** Female sterilization by tubal ligation accounts for 36% of all methods of family planning used in our country. Almost half of tubal ligations are done in women younger than 25 years. These women want reversal of tubectomy subsequently, in circumstances like death of children, remarriage. This study aims to evaluate various factors affecting the outcome of pregnancies following microsurgical tubal recanalisation.

**Methods:** It is a prospective observational study carried out at Govt Kilpauk Medical College for a total number of 50 patients who have undergone tubal recanalisation during 2011 and 2012. They were followed up till December 2016.

**Results:** 84% of women (n=42) opted for recanalisation were in young reproductive age (<30 years) group. Conception rate was higher in younger age group (52.9% in 21-25 years). Death of children (n=37, 74%) and remarriage (n=12, 24%) were the common indications for tubal recanalisation. Outcome is better if reversal surgery is done within 4 years after sterilization (69.6%, n=16 out of 23) than after 4 years (30.4%, n=7 out of 23). Conception rate (55.3%, n=21) was higher and statistically significant in subjects with final length of tube more than 4 cms (P value =0.0193). Conception rate was higher within 1 year of recanalisation (n=13, 26%), followed by 16% (n=8) in 2<sup>nd</sup> year and statistically significant (p= 0.00001). Overall pregnancy rate in our study was 46% (n=23). Out of the 23 women who conceived, 14 (61%) resulted in live birth, 3 (13%) abortions and the remaining 6(26%) had ectopic pregnancies.

**Conclusions:** Proper selection of patients and meticulous tuboplasty technique can yield successful pregnancy outcome comparable to ART.

**Keywords:** Tubal recanalisation, Tuboplasty, Tubectomy reversal

### INTRODUCTION

Although wide ranges of contraceptive options are available, female tubal sterilization is currently the most common form of birth control. It is an important constituent of national family planning programme in India. According to NFHS-4 (2015-2016) female sterilization accounted for 36% of all methods family

planning used in the country.<sup>1</sup> More than 45.5% of women undergoing sterilization belong to young reproductive age group of 20-25 years. Approximately 1% of these women subsequently see reversal of procedure due to unforeseen circumstances like loss of child, remarriage and other socio economic factors.<sup>2</sup> Patients who desire reversal of previous sterilization are served best by tubal anastomosis at laparotomy or by

laparoscopic approach or by ART (assisted reproductive techniques). Microsurgical recanalisation procedures would bring hope to those in need of these services and would improve the confidence of clients who are acceptors of voluntary sterilization. Microsurgery remains an important operative technique for the management of tubal obstruction. In essence it involves magnification, the use of gentle tissue handling, fine sutures, meticulous hemostasis and copious irrigation with heparinised saline.<sup>3</sup>

Operative laparoscopy prevents drying of tissues, provides a degree of magnification, avoids use of packs and requires fewer days of postoperative hospitalisation<sup>3</sup>. Laparoscopic recanalisation has taken over conventional open microsurgical technique in west. Because of cost and technical restraints involved in laparoscopy, open method still remains a useful surgical option in developing countries like India. The Art of tubal surgery is in accurate diagnosis, careful case selection and meticulous surgical technique. The RCOG has recognised the value of tubal surgery and recommended that it should only be done in a few tertiary care centres.<sup>4</sup>

Recently there is an increasing trend of using ART techniques, but the cost factor restricts affordability by all. Tubal recanalisation is relatively cheap and also restores ability to achieve more than one pregnancy. This study is done to find whether open microsurgical tubal recanalisation can still be an option in the era of ART.

**Objectives**

This study aims to evaluate various factors affecting outcome of pregnancies following microsurgical tubal recanalisation.

**METHODS**

It is a prospective observational study carried out in a tertiary care centre, Govt Kilpauk Medical College for a total number of 50 patients who have undergone tubal recanalisation during 2011 and 2012. They were followed up till December 2016.

**Procedure**

Patients selected for sterilisation reversal were given counseling about surgery, its associated risks and outcome. For the subjects beside basic investigations, Diagnostic laparoscopy was done prior to reversal surgery to assess the pelvic anatomy. Semen analysis was done for male partners. Informed written consent was taken from both partners. Recanalisation surgery was done in follicular phase. Intra- operatively microscope is used for magnification, adhesions released electrourgically, bipolar cautery used under continuous irrigation using heparinised saline , fibrosed ends were excised and re-anastomosis done taking sutures at 12', 6',

3' and 9' O clock positions using 8-0 ethilon. Tubal patency was checked by methylene blue dye injection, followed by thorough peritoneal saline wash. Then 32 mg of injection Dexamethasone instilled in the peritoneal cavity as an adhesion barrier. Abdomen closed in layers. Careful monitoring was done in post operative period. Sexual intercourse was allowed after 2 months of surgery and if necessary induction of ovulation done.

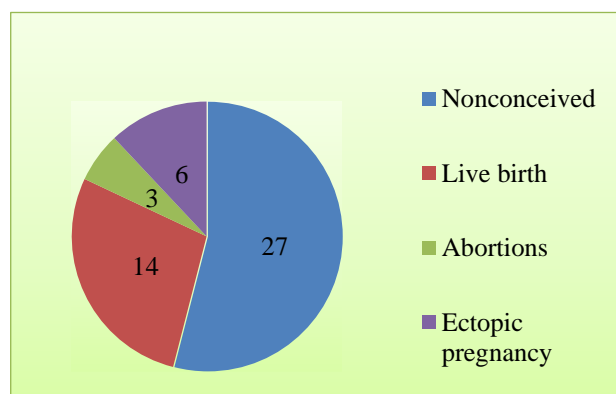
**Inclusion criteria**

Inclusion criteria were death of one or more children; remarriage.

**Exclusion criteria**

Exclusion criteria were >40 years; medical (or) Surgical problems that endangers life during pregnancy; B/L Hydrosalpinx (>3 cm) / severe adhesions; pelvic tuberculosis; severe endometriosis.

**RESULTS**



**Figure 1: Surgical outcome.**

50 women who underwent reversal of sterilization surgery were followed up for a period of 4-6 years. Most of the subjects (n-42, 84%) opted for recanalisation, were in young reproductive age (<30 years) group. Conception rate was higher in younger age group (52.9% in 21-25years, 48% in 26-30 years), compared to advanced age (25% in >30 years). Death of children (n-37, 74%) and new marital relation (n-12, 24%) were the common reasons for tubal recanalisation. 48 patients had undergone open laparotomy previously for sterilization, puerperal sterilization in 28 patients(56%), concurrent sterilization with LSCS in 15 patients(30%) and interval transabdominal tubectomy in 5 patients(10%). Only 2 of patients (4%) had laparoscopic sterilization previously. Conception rate was higher (66%, n-10) in reversals who had concurrent sterilization with LSCS, followed by laparoscopic sterilization (50%, n-1) previously. Time interval between sterlisation and reversal has no statistical significance on pregnancy outcome in our study, but outcome is better if reversal surgery is done

within 4 years after sterilization (69.6%, n-16 out of 23) than after 4 years (30.4%, n-7out of 23). None out of 11 patients in isthmo-isthmic anastomosis, 3 patients out of 4 in bilateral cuff salpingostomy (75%), 20 patients out of 35 in isthmo-ampullary anastomosis(57.1%) conceived.(p value-0.0019, statistically significant). Conception rate (55.3%, n-21) was higher and statistically significant in subjects with final length of tube more than 4 cms (p=0.0193), compared to only

16.7% conceptions (n-2) if length of tube was less than 4 cms. Observed conception rate was higher in the first year of recanalisation (n-13, 26%), followed by 16% (n-8) in 2<sup>nd</sup> year and statistically significant (p=0.00001). Overall pregnancy rate in our study was 46% (n-23). Out of the 23 women who conceived, 14 (61%) resulted in live birth, 3 (13%) abortions and the remaining 6 (26%) had ectopic pregnancies.

**Table 1: Age of the patients undergone tubal recanalization.**

Age (yrs)	Total no. Of patients (n) (%)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
21-25	17	5	1	3	9 (52.9)	8 (47.1)	$\chi^2$ -1.7903, p=0.40855 not significant
26-30	25	8	2	2	12 (48)	13 (52)	
>30	8	1	0	1	2 (25)	6 (75)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 2: Parity of the patients undergone tubal recanalization.**

Parity	Total no. Of patients (n) (%)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
P2	49	14	3	5	22 (44.9)	27 (55.1)	$\chi^2$ -1.1979 P=0.2737, not significant
P3	1	0	0	1	1 (100)	0 (0)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 3: Indications for tubal recanalization.**

Indications for recanalisation	No of patients (%)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
Death of child	37 (74)	10	2	4	16 (43.2)	21 (56.8)	$\chi^2$ -1.699 P-0.4274, not significant
Remarriage	12 (24)	4	1	2	7 (58.3)	5 (41.7)	
Severe health problem in the child	1 (2)	0	0	0	0 (0)	1 (100)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 4: Previous sterilisation method.**

Previous surgery	Total no. of patients (n) (%)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
Puerperal sterilisation (Pomeroy's)	28 (56)	8	1	2	11 (39.3)	17 (60.7)	$\chi^2$ -4.4609, p=0.2158, not significant
Interval trans abdominal tubectomy (Pomeroy's)	5 (10)	1	0	0	1 (20)	4 (80)	
LSCS With sterilisation (Pomeroy's)	15 (30)	4	2	4	10 (66.7)	05 (33.3)	
Lap sterilisation	2 (4)	1	0	0	1 (50)	1 (50)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 5: Interval between sterilisation and reversal.**

Time interval (months)	Total no of patients (n)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
0-12	5	1	0	0	1 (20)	4 (80)	$\chi^2$ -3.9254, P-0.4161, not significant
13-24	11	2	1	2	5 (45.4)	6 (54.6)	
25-36	12	4	0	2	6 (50)	6 (50)	
37-48	5	0	2	2	4 (80)	1 (20)	
>48	17	7	0	0	7 (41.2)	10 (58.8)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 6: Site of anastomosis.**

Site	No of patients	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
Isthmus-isthmus	11	0	0	0	0 (0)	11 (100)	$\chi^2$ - 12.4741, P-0.0019, statistically significant
B/l cuff salphingostomy	4	2	0	1	3 (75)	1 (25)	
Isthmus-ampulla	35	12	3	5	20 (57.1)	15 (42.9)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 7: Final length of the tube.**

Final length of tube	Total no of patients(n)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	not conceived N (%)	Statistical analysis
≤4 cm	12	0	0	2	2 (16.7)	10 (83.3)	$\chi^2$ -5.4694, P-0.0193, statistically significant
>4 cm	38	14	3	4	21 (55.3)	17 (44.7)	
Total	50	14	3	6	23 (46)	27 (54)	

**Table 8: Time of conception since tubal recanalization.**

Time since recanalisation ( in months)	Live births	Abortion	Ectopic pregnancy	Conceived N (%)	Not conceived N (%)	Statistical analysis
0-12	6	2	5	13 (26)	0 (0)	$\chi^2$ -42.5037 P-0.00001, statistically significant
13-24	6	1	1	8 (16)	0 (0)	
>24	2	0	0	2 (04)	27 (54)	
Total	14	3	6	23 (46)	27 (54)	

**Table 9: Outcome of conceptions following tubal recanalization.**

Total conceptions	Live birth	abortion	Ectopic pregnancy
23	14 (61%)	3 (13%)	6 (26%)

## DISCUSSION

Tubectomy is the most commonly accepted sterilization procedure in Indian women. Most of the tubectomies are carried out in young reproductive mothers after completion of family. Government of India promotes sterilisation through national post partum family planning

programme. Some women regret sterilisation in situations like death of children, remarriage and severe medical disorders in living children.

Reversal of tubectomy by tubal microsurgery gives hope for these women to have their biological children. Success of this tubal recanalisation depends on various

factors i.e. age of the patient, final length of tube, type of anastomosis, previous surgical method used for

sterilization, latency between tubectomy and reversal surgery, pelvic adhesions and co-morbid conditions.

**Table 10: Comparing present study with other observers.**

Factors	Present study	Rizvi <sup>5</sup>	MN <sup>2</sup>	Jain <sup>6</sup>	Ramalingappa <sup>7</sup>
Conception rate	46	34.5	55.5	75	44
Ectopic pregnancy rate	26	15.8	12	3.33	9
Conceptions in Tubal length>4cm	55.3	46.1	64.8	74.3	50
Conceptions in Tubal length<4cm	16.7	4.8	12.5	9.09	-
conception in post lapster recanalisation	50	3.38	62.9	68.5	50
Conceptions in pomeroys ligation recanalisation	45.8	96.6	44.4	40	30
Conceptions in isthmo-ampullary anastomosis	57.1	42.1	38.8	20	50

In the present study 84% of the women who underwent tuboplasty were in <30 years age. Conception rate shows decreasing trend towards advancing age (52.9% in 21-25years, 48% in 26-30 years & 25% in >30 years). Death of children (74%) and willingness to have biological child through remarriage (24%) were the common reasons to seek tubectomy reversal.

In our series, 48 women (96%) had sterilization through open laparotomy by Pomeroy's technique – i.e. minilaparotomy for puerperal sterilization (56%), interval sterilization (10%) and concurrent sterilization with LSCS (30%) and lapsterilisation were only in 2 patients (4%). We observed 66% conception rate in reversals who had concurrent sterilization with LSCS, followed by 50%conception in reversal of laparoscopic sterilization. We are not able to see statistical significance since number of patients (n-2, 4%) undergone post lapsterilisation reversal is less. Though it is statistically not significant, reversal done earlier within 4 years of sterilization surgery had higher conception rate (69.6%) than after 4 years (30.4%). Contrary to other observers, conception rate was higher in isthmoampullary anaestomosis (57.1%) and no conceptions observed in isthmo-isthmic anaestomosis where others had high conception rate.

We had 3 conceptions (75%) in 4 women who underwent cuff salphingostomy, higher than other observers. In our series also outcomes were comparable with others, when tubal length was more than 4 cms and statistically significant. Overall pregnancy rate in our study was 46% (n-23). Out of the 23 women who conceived, 14 (61%) resulted in live birth, 3 (13%) abortions and the remaining 6 (26%) had ectopic pregnancies. Of the 23 conceptions, 13 were observed in 1<sup>st</sup> year, 8 conceptions in 2<sup>nd</sup> year and remaining 2 in 3<sup>rd</sup> year showing significant success in earlier years following surgery. Our live birth rate (61%), abortion rate (13%) was comparable with other studies. Our ectopic pregnancy rate (26%) was higher than other studies.

Proper selection of patients and meticulous tuboplasty technique can yield successful pregnancy outcome comparable to ART.

This marvelous technique of tubal recanalisation refined by Winstone and Gomel should not be lost in the wake of ART.<sup>8</sup> Since there is a possibility of every sterilized woman to seek reversal of tubectomy, we have to strictly adhere to guidelines on standards of sterilisation issued by Govt. of India, for better outcome.<sup>9</sup>

## CONCLUSION

Microsurgical tubal recanalisation should be offered as first option for properly selected desperate couples. Meticulous surgical technique and tissue respect will definitely yield outcome comparable to ART at a much lower cost. Though microsurgical technique has its own limitation, it has brought a ray of hope to women seeking sterilization reversal.

Tubal microsurgery and ART techniques are complimentary approaches to optimize a women's reproductive potential. Tubal microsurgery technique should be made available in all tertiary care institutions and adequate training should be imparted to gynaecologists interested in fertility enhancing surgeries.

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