



## RESEARCH ARTICLE

### TUBAL RECANALISATION: STUDY OF FACTORS FOR SUCCESSFUL OUTCOME

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#### ABSTRACT

**Objectives:** To study the pregnancy rate following tubal recanalisation and to analyse the factors that influence the outcome.

**Materials and Methods:** The study carried out in Jawaharlal Institute of Postgraduate Medical Education and Research, between July 2006 and August 2007 includes two group. All the patients undergoing recanalisation were included as the prospective group (40) and in the retrospective group (20) case records of those women who had undergone tubal recanalisation in the previous year were included. A detailed history was elicited; a thorough clinical examination was done followed by routine laboratory evaluation. After obtaining the informed written consent, recanalisation was done, as per the protocol and the parameters were noted. Then, they were followed-up for one year.

**Results:** Out of 60 patients, 5 patients were lost to follow up and in the remaining 55 patients, the pregnancy rate was 58.2%; all were intrauterine pregnancies - 23 delivered, 5 aborted and 4 were ongoing pregnancies. There was no case of ectopic pregnancy. The conception rate was high when the age of the patient was < 30 years (84.3%), interval between sterilisation and its reversal was <4 years (73.3%), following laparoscopic sterilisation (66.6%), site of anastomosis being isthmo-isthmic (78.5%) and the remaining tubal length was >6 cm (67.6%).

**Conclusion:** The factors associated with successful tubal recanalisation are i) age of the patient <30 years ii) interval between sterilisation and its reversal <4 years iii) site of anastomosis isthmo-isthmic and iv) remaining tubal length >6 cm. Also, improved results were obtained following laparoscopic sterilisation.

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## INTRODUCTION

Tubectomy is the most common method of female contraception among women of reproductive age. It is an important constituent of National Family Planning Programme in India. Currently in India about 4.5 million women undergo voluntary sterilization annually (Mukherjee et al., 2000). However, due to unforeseen circumstances, 1 – 3% of these women subsequently demand sterilization reversal (Brar et al., 2000). Such reversal also has a great motivational effect on population control. Although the percentage of those who seek a reversal is small, their total number is significant in view of the large numbers of sterilisations performed each year. More recently, publicity given to the new microsurgical techniques and the associated improvement in the success rate have been contributing factors for this demand (Biswas and Mondal, 2006).

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Several factors like the age of the women, type of tubectomy done, duration since tubectomy and technique of recanalisation have been considered to influence the outcome of recanalisation. The present study was undertaken to study the factors which may be associated with successful outcome following tubal recanalisation.

## MATERIALS AND METHODS

The study was carried out in the Department of Obstetrics and Gynecology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry from July 2006 to August 2007. It includes two groups as prospective and retrospective. In the prospective group women seeking reversal of sterilisation were included and in the retrospective group case records of women who had undergone tubal recanalisation in the previous years were reviewed.

### Prospective Group

Women seeking reversal of sterilisation were included in the study after considering the inclusion and exclusion criteria

### Inclusion Criteria

- Age less than or equal to 35 years.
- Normal semen parameters.

### Exclusion Criteria

Those with pelvic inflammatory disease, endometriosis or fibroid as a cause of infertility. Those with medical or surgical illnesses.

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- Those with medical or surgical illnesses.

A detailed history was elicited focusing on details of sterilisation, including the age at the time of sterilisation, parity at the time of sterilisation, type of sterilisation done, interval between sterilisation and tubal recanalisation and the reason for reversal of sterilisation. Menstrual history was recorded. Obstetrics histories including parity and the reason for the death of the child were recorded. A thorough clinical examination was done followed by routine laboratory evaluation. Semen analysis of the husband was done, patients were hospitalised and after obtaining an informed written consent, Recanalisation was done as per the protocol

### Retrospective Group

Women who have undergone reversal of sterilisation (technique used is similar) in the previous years were included as per the protocol. Their case records were reviewed for the above mentioned parameters and the details were obtained for the study.

dye (5 ml of methylene blue in 20 ml of saline) using no.22 butterfly cannula inserted at the fundus of the uterus, patency of the distal tube checked by passing splint. Mucosa on the both sides identified and stained with undiluted methylene blue. Under magnification, using microsurgical instruments, with constant irrigation of Gomel's solution (containing 1 ml of heparin sulphate and 100mg of hydrocortisone added to 500ml of 0.9% normal saline), with 6,0 proline, the submucosal layer of the tubes on the both sides approximated avoiding the mucosa and perfect haemostasis obtained using bipolar cautery. Hydrofloatation of the tubes done with Gomel's solution followed by abdomen closed in layers.

The parameters studied were condition of the tubes, ovaries and uterus, evidence of pelvic inflammatory disease or endometriosis, anatomical site of anastomosis, suture material used, final length of the reconstructed tube and use of adjuvant therapy like adhesion preventing drugs, irrigating fluids. Postoperative complications if present were recorded. Women were discharged after suture removal and were advised regarding the fertile period and the risk of ectopic pregnancy. Then they were followed for a period of one year and events such as pregnancy, ectopic pregnancy, pelvic infection were recorded.

### RESULTS

The mean age of the patients undergoing recanalisation was 27.3 years and the mean parity was para 1.2. The commonest reason for recanalisation was death of one child in 50.1%, death of all children in 33.3%. Desire for one more child and remarriage accounted for 8.3% each. Table 1, Table 2, Table 3, and Table 4 Tubal recanalisation is done at free of cost in this central government hospital.

**Table 1. Parameters correlated with pregnancy**

Age (years)	No. of patients	Percentage	No. of patients followed	No. of conceived patients	Percentage	p value
<30	51	85.0	48	27	84.3	0.089
≥30	9	15.0	7	5	15.7	
Type of sterilization						0.573
Pomeroy	50	83.3	46	26	56.5	0.163
Laparoscopic	10	16.7	9	6	66.6	
Interval from sterilisation (years)						
<4	18	30.0	15	11	73.3	0.163
≥4	42	70.0	40	21	52.5	

**Table 2. Final length of reconstructed tubes correlated with pregnancy**

Final length of the tube	No. of tubes	Percentage	No. of tubes in patients followed	No. of tubes in conceived patients	Percentage
>6 cm	73	60.8	68	46	67.6
4-6 cm	45	37.5	40	16	40.0
<4 cm	2	1.7	2	2	100.0
Total*	120	100	110	64	

p value – 0.001

\*120 anastomotic sites for 60 patients.

### Technique

Under spinal / general anaesthesia, patient in supine position, pfannensteil incision given, abdomen opened in layers, uterus held with uterine holding forceps, intra-operative findings noted. Tubectomised cut ends of the tube freshened, patency of the proximal tube checked by injecting diluted methylene blue

Out of 60 patients, 5 patients were lost to follow up and in the remaining 55 patients, the pregnancy rate was 58.2%, all were intrauterine pregnancies; 23 delivered, 5 aborted and 4 were ongoing pregnancies and there was no case of ectopic pregnancy. About 65.6% of women conceived within first three months and 93.8% conceived within first 12 months of reversal of sterilisation. In majority of the patients

Promethazine alone (81.7%) was used as adhesion preventing drug. Out of 55 women, anatomical patency of reconstructed tubes was studied by hysterosalpingogram in twenty three women, who had not conceived by the end of one year. Both bilateral and unilateral patency of the tubes was noted in 43.4% each of the patients. So, on the whole 52 patients

previous laparoscopic sterilization (Biswas and Mondal, 2006). In our study only 16.7% had laparoscopic sterilisation and the rest had undergone Pomeroy's type of sterilisation. The reason is that majority of the sterilisations was done in immediate puerperium. The present study showed a success rate of 66.6% in women who had undergone laparoscopic sterilisation as

**Table 3. Site of anastomosis**

Type of anastomosis	No of tubes	Percentage
Isthmo-isthmic	41	34.3
Isthmo-ampullary	33	27.5
Ampullo-ampullary	29	24.1
Infundibulo-ampullary	12	10.0
Cuff salpingostomy	5	4.1
Total*	120	100

\*120 anastomotic sites for 60 patients.

**Table 4. Site of anastomosis correlated with pregnancy**

Type of anastomosis	Total	Conceived	Percentage
B/L Isthmo-isthmic	14	11	78.5%
B/L Ampullo-ampullary	12	8	66.6%
Isthmo-isthmic+ Isthmo-ampullary	10	6	60%
B/L Isthmo-ampullary	7	3	42.8%
B/L Infundibulo-ampullary	4	1	25.0%
Isthmo-ampullary+ fimbrio-ampullary	2	2	100%
B/L cuff salpingostomy	1	0	0%
Isthmo-isthmic+ fimbrio-ampullary	1	0	0%
Isthmo-isthmic+ cuff salpingostomy	1	1	100%
Isthmo-ampullary+Ampullo-ampullary	1	0	0%
Ampullo-ampullary+ cuff salpingostomy	1	0	0%
Ampullo-ampullary+ fimbrio-ampullary	1	0	0%
Total	55	32	

(including those who had become pregnant) had one or both tubes patent. Only 3 patients had bilateral tubal block.

## DISCUSSION

Tubal sterilisation is currently the most popular form of birth control in India. If reversal is available easily with promising results, it would definitely increase the acceptability of sterilisation<sup>3</sup>. The factors that dictate success or failure of all varieties of tuboplasties are multiple in numbers (Seiler, 1983).

In our study, majority of women were <30 year age group (85 %) and the conception rate is higher when the age of the women was less than 30 years (84.3%). Jain et al showed a higher pregnancy rate (75%) when the age of the patient was less than 25 years<sup>5</sup>. Age has a definite effect on pregnancy rate because after the age of 35 while the incidence of genetic abnormalities and maternal complications tends to increase, this age is considered a cutoff point for any tubal reconstruction procedure (Seiler, 1983). In our study most reversal seekers (98.3 %), were para two or less. This high figure of low parity coincides with the study of Biswas and Mondal where it was 86.8%<sup>3</sup>. In the present study, death of one or all children was the commonest reason for couple to seek reversal of sterilisation (83.4 %), which coincides with the study by Jain et al where 70% of women sought reversal for death of all children (Jain et al., 2003).

The method of previous tubal sterilisation procedure is an important determining factor for success of sterilisation reversal. Biswas and Mondal found that 59.65% of women had

compared to 56.5% in women following reversal of Pomeroy's technique. The success in case of mechanical occlusion of uterine tubes with falope ring was higher as smaller amounts of tubal segments are excised (Brar et al., 2000). In the present study a higher pregnancy rate (73.3%) has been reported when the interval between sterilisation and reversal operation is less than 4 years. It may also be added that as interval increases, the age of the patient increases further reducing the fertility.

The most important factor to enhance the effectiveness of recanalisation is the length of the reconstructed tubes (Henderson, 1981; Silber and Cohen, 1984). In the present study 98.3% had final tubal length of more than 4 cm. If the critical length of the reconstructed tube is more than 4 cm, then the success rate is increased. The pregnancy was achieved in 67.6% of the women when the tubal length was more than 6 cm in comparison to 40% when the length was 4-6 cm. These results highlight the significance of the type of sterilisation procedure on the prospects for pregnancy following reversal surgery. Mechanical procedures (laparoscopic ring occlusion) that produce minimal damage to the isthmus of the tube are the most favourable. The site of tubectomy and hence the site of recanalisation is an important factor in determining the results of tubectomy reversal. It is suggested that the isthmus of the fallopian tube is an ideal site for sterilisation considering the possible need for reversal. In the present study the commonest site of anastomosis was isthmo-isthmic (34.3 %), followed by isthmo-ampullary (27.5 %) and the least was cuff salpingostomy (4.1%), which coincides with studies by Brar et al and Biswas and Mondal where the commonest type of

anastomosis was isthmo-isthmic in 48% and 49.1% respectively. In the present study, bilateral isthmo-isthmic anastomosis resulted in pregnancies in 78.5% of women, bilateral ampullo-ampullary in 66.6%. This is because in isthmo-isthmus and in ampullo-ampullary anastomosis, the tubes being anastomosed were of similar diameters, though in the latter precaution should be taken to avoid mucosal extrusion. In the present study, Gomel's solution was used for constant irrigation of the tissues. In majority of the patients Promethazine alone (81.7%) was used as adhesion preventing drug. The conception rate was 60% when Promethazine was combined with Dexamethasone. There does not seem to be any advantage of using inj. Dexamethasone. In the present study in analyzing the pregnancy outcome following sterilisation reversal, the overall conception rate was 58.2%, all of which were intrauterine pregnancy, abortion rate was 15.6% and there was no ectopic pregnancy. Biswas and Mondal showed intrauterine pregnancy rate of 66.27% (Biswas and Mondal, 2006). About 65.6% of women conceived within first three months and 93.8% conceived within first 12 months of reversal of sterilisation. In a study by Yadav et al. 50% of patients conceived within first 12 months of reversal of sterilization (Yadav et al., 1998). In the present study out of 55 women, anatomical patency of reconstructed tubes was studied by hysterosalpingogram in twenty three women, who had not conceived by the end of one year. Bilateral tubal patency was established in 43.4% (10 cases); unilateral tubal patency was seen in 43.4% (10 cases) and bilateral tubal block in 13.2% (3 cases). Since majority of pregnancies occurred within one year, it is recommended that those who do not become pregnant to be advised further test like tubal patency test etc. so that appropriate treatment can be recommended.

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