

Original Article

Prospective study of open Band Ligation for Tubal Sterilisation

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Abstract

Objectives: To evaluate the technique of open band ligation for tubal sterilization with respect to age, parity, technical difficulty, operative time, intra/post operative complications, postoperative comfort and its suitability for mass sterilization during camp. **Methods:** A prospective study of tubal ligation done at a major teaching medical college and hospital from December 2007 to October 2008. Total of 68 cases operated under spinal anesthesia by minilaparotomy and tube was ligated by open band ligation technique. Operations were performed during puerperal, interval and postabortal cases. Data were analyzed with respect to age, parity, technical difficulty, operative time, intra/post operative complications and postoperative comfort. **Results:** Most of the patients (87%) were in the age group of 20-30 and 35% were below 25 years indicating long post-tubectomy period and 50% were second para. Tubal transection was seen in three patients. Febrile morbidity was seen in three patients. Most of the patients were comfortable in postoperative period within 24 hours. One patient had wound gape which required cleaning and dressing of wound and later secondary suturing. Failure of this technique has not yet been reported in this group of patients. **Conclusion:** Technique of tubal ligation with open band application was found to be easy to perform and with minimal risk and devoid of complications such as slippage of ligature, stump hemorrhage and suitable for mass sterilization in camps and also easy for teaching junior doctors or medical officers. Its also requires further study and follow up to comment on the failure rates.

Key words : tubal ligation, tubal recanalisation, fallop ring

Introduction

Female sterilization is a surgical procedure used to end woman's ability to become pregnant. This procedure in-

volves ligation with or without resection or blocking of both the fallopian tubes so that egg and sperm can not meet.

Tubal ligation was first performed by Dr. J. Blundell of London in 1823. The tubal ligation by transabdominal approach is a simple and safe procedure and can be performed in a clean room with proper aseptic care.

Amongst the major health problems in India, population explosion ranks first. In developing countries over 70% of all sterilizations are in women. But the popularity and success of tubectomy program largely depends upon the

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success of its reversal¹. Female sterilization is the most widely used contraceptive in India, second only to breast feeding². Female sterilization by tubectomy came up in the National Family Planning Program in India since 1956.

Material and Methods

Patients desiring tubal ligation during puerperal, interval and along with abortion were selected for the study. All preoperative investigations were done and consent taken for the same. Total of 68 patients were operated under spinal anesthesia by minilaparotomy and the technique used for tubal ligation was open band application which is described below.

Technique of open band ligation:

Tubal ligation by abdominal method involves

- 1 Opening of abdomen
- 2 Identification of tubes
- 3 Ligation of the tubes

In the various methods which are mentioned in literature (Pomeroy, Madlener etc) step 1 and 2 remain same while the step 3 differs in the way the tube is ligated or occluded; part of the tube may or may not be resected.

In open band ligation step one and two remain the same and after identifying the tube it is held with babcock forceps; traced till fimbrial end, the tube is occluded with silicon band with the help of band applicator which is used for the laparoscopic sterilization. The tube is grasped with the tongs of the band applicator in the avascular area approximately in the middle third or 3-4 cm lateral to the fundus; they are withdrawn inside and the band is pushed over the knuckle of the tube. Relatively thin portion of the tube is selected to avoid the transection. Tongs are released and the tube is dropped. Occluded part of the tube shows blanching and looks white and less pink as compared to the surrounding tube. The procedure is repeated on the other side.

All the patients were given antibiotic and were discharged day suture removal.

Results

Factors of age, parity, stay in hospital, and intra and postoperative complications were analyzed.

- 1 Age: Age ranged from 20 to 35 years and maximum patients (52%) were in 25-29 years age group.
- 2 Parity: Modal value of parity was two. Three patients underwent tubal ligation after one living child while 34 patients (50%) underwent tubal ligation after two living children and 29 patients (42.6%) underwent tubal ligation after three children and only two patients underwent tubal ligation after four children.
- 3 Spinal anesthesia used was used in all the patients.
- 4 Intraoperative complications: Three patients had tubal transection and required further hemostasis with catgut sutures. Tubal transection was mainly seen in patients who are operated within 72 days of delivery and having tubal edema and congestion. Three patients required extension of skin incision (>2 cm) one with tubal transection to identify the bleeding vessel in mesosalpinx and the other with interval tubal ligation where there was technical difficulty in identifying the tube. Difficulty in finding the tube was seen in the third patient who had adhesions due to previous lower segment cesarean section and had subsequent normal delivery and underwent tubal ligation.
- 5 Postoperative complication: No obvious postoperative complications were reported. Three patients had febrile morbidity out of which one had documented and confirmed UTI with E. coli and another patient had wound sepsis with gape while cause of fever in the third patient was mastitis unrelated to surgical procedure.
- 5 Stay in the hospital: Average stay in the hospital was seven days and all the patients were discharged after

Table 1.
Time of tubal ligation

	Total 68cases n=68	%
Puerperal	52	76
Postabortal	9	13.2
Interval	7	10.8

Table 2. Age and parity

Age	P1	P2	P3	P4 and >	Total	%
20-24	0	15	9	0	24	35
25-29	2	16	18	0	36	52
30-34	1	3	2	1	7	10.2
>35	0	0	0	1	1	2.8
Total	3	34	29	2	68	
%	4.4	50	42.6	3		100

Table 3. Complications in tubectomy by open band ligation

Intraoperative complication			
	Interval tubal ligation	Tubectomy with MTP	Puerperal tubectomy
Tubal transections	0	0	3
Difficulty in finding tube	1	0	1
Required extension of skin incision	1	0	2
Postoperative complication			
Fever	0	1	2
Anesthesia complication	0	0	0
Urinary tract infection	0	1	0
Mastitis	0	0	1
Failure	Not yet	Not yet	Not yet

suture removal but most of the patients were comfortable within 24 hours of operation and one who had wound sepsis required further dressing and cleaning of the wound and secondary suturing and prolonged stay.

Discussion:

In our study most of the patients undergoing tubal ligation were in the age group of 20-30 (87%) and only three patients (4.4%) underwent tubal ligation after one child and 34 patients (50%) underwent tubectomy after having two children while 29 patients (42.6%) underwent tubal ligation after three or more children. Many Indian women are undergoing tubal ligation at an earlier age with long post-tubectomy period as per our study. No technical difficulty was encountered in operation though transection of the tube was seen in three patients due to tubal edema and congestion especially in patients who are operated within 72 hours of delivery. Tubal transection required further ligation and hemostasis by catgut sutures. However transection was not seen in patients who are operated after 72 hours of delivery and also in patients where tubal edema is reduced by attempting milking of the tube before the application of band. Wound infection with wound gape was seen only in one patient who had tubal transaction and required extension of skin incision for achieving hemostasis.

Total duration of the procedure from skin incision to skin closure was less than 10 minutes without any intra-operative complication for most of the cases. Postoperatively febrile morbidity was seen in three patients out of whom one had documented urinary tract infection, the other was having mastitis unrelated to surgery and the third patient had wound sepsis with gape.

In our study most of the patients were in young age (20-30) group (87%), undergoing tubal ligation. In a keen desire to limit the family, tubectomy is being accepted comparatively earlier in the obstetric career by Indian women. In the long post-tubectomy reproductive life, the need showed failure after Pomeroy's method of only 0.12% (corrected figure), 0.25% (uncorrected figure) amongst 1550 cases.

How much to resect?

Larger the tubal segment destroyed lesser the chance for failure but simultaneously lesser the success of recanalization. Undue fear of sterilization failure should

not drive one to destroy unreasonable tubal lengths and compromise the chances of future recanalization¹.

Destroying much greater length of the tube and placing multiple ligatures in the hope of eliminating chances of failure drastically reduces the possibility of successful recanalization and does not carry sound scientific justification¹. Falope ring destroys 25mm of the tube¹. Madlener's or Pomeroy's sterilization need not destroy more than 30mm of the tube and this depends upon the skill of the surgeon and experience which varies from person to person.

Where to resect?

The requirement for effective sterilization and for recanalization is diametrically opposite but they can be satisfactorily compromised in practice by destroying not more than 30mm length of the tube and that too entirely in the isthmic region. Isthmo-isthmic anastomosis carries the highest pregnancy rate after recanalization. When done macroscopically (conventional), pregnancy rate after tubectomy reversal has been reported to be as high as 50%³. With the microsurgical technique (with microscope), term pregnancy rates of 46%⁴ and 56%⁵ have been reported. Blocking of even 4mm length of the tube by a clip (eg. Filshie clip or Hulka clip) assures effective sterilization. Incidentally, clips or falope rings are best used entirely in the isthmic region.

In laparoscopic sterilization the most common cause of failure is incorrect technique by inexperienced surgeon. Wrong structural identification and application of ring on round ligament or ovarian ligament³ is less common in minilaparotomy where tube is identified and traced till fimbrial end.

How does the Pomeroy method work?

The purpose of ligature during Pomeroy's tubectomy is to achieve hemostasis while peritonealization of the cut ends achieved by nature results in sterilization. One good ligature is as good as multiple ligatures and worse is two poor ligatures. We must trust our ability to place one good reliable ligature in any surgery. Any additional ligature is superfluous.

Summary:

Considering most of the above facts in open band ligation, abdomen is opened as in minilaparotomy and tube is identified, traced till fimbrial end but it is occluded with the falope ring causing occlusion of tubal lumen and damaging less than 25mm of tube, The resultant

blanching of the loop indicates the complete occlusion, as ligature that produces blanching, indicating blocking of blood vessels, is good enough to block the tubal lumen. Any further tightening of the ligature not only does not add to the success of sterilization but paradoxically reduce the chance of success by cutting through the tubal wall, especially if tubes are edematous as in puerperal sterilization or in sterilization concurrent with MTP and resulting in a fistula especially in Madlener's procedure¹.

Tubal sterilization by open band ligation involves the combination of both of the above methods (laparoscopy and minilaparotomy) such as opening of the abdomen by conventional method (small incision of 1.5 cm may be sufficient) and occlusion of the tube with silastic band as is done in laparoscopic method after identification of the tube till fimbrial end. It is easy and does not require special training; also the risk of stump hemorrhage following slippage of the ligature is absent. It also does not involve extensive resection of the part of the tube and uniform length of the tube is occluded, which makes it easier for the future recanalization if required. It can be performed by junior doctors in primary health centers and camps and can be used for mass sterilization for population control. Most of the complications are minor. It also does not require the special training/special costly equipments as required for laparoscopy and it is suitable for puerperal sterilization after 3-4 days interval and for postabortal period.

Difficulty can be encountered in immediate postpartum period when the tubes are edematous, congested and chances of transection are high. In such cases tubal edema can be reduced by milking of the tube in the part to be ligated or the procedure can be performed on 3rd or 4th postpartum day when the tubal edema is reduced so as to minimize the chances of tubal transaction.

Conclusion:

Technique of tubal ligation with open band application was found to be easy to perform and with minimal risk and devoid of complications such as slippage of ligature, stump hemorrhage and suitable for mass sterilization in camps and also easy for teaching junior doctors or medical officers. It also requires further study and follow up to comment on the failure rate. But proper identification of the tube till fimbrial end and application of the bands in isthmic region will help to reduce the chances of failure.

Proper screening of the patients in the family planning camps, improved skills of the surgeon, and use of tested quality of rings can reduce failure rate, to prevent defamation of National Family Welfare Program³. To make it a total success, meticulous care should be taken for proper identification of the tubes upto the fimbrial ends and adequate amount of the tube should also be excised or occluded.

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