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Case Series

Tubal re-anastomoses through a mini-laparotomy incision

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ABSTRACT

To assess the feasibility and reproducibility of tubal anastomosis through a mini-laparotomy incision. Study design is descriptive case study at Academic Medical Center. Sixteen patients with previous tubal sterilization requesting for tubal re-anastomosis. Systematization of the operative steps for tubal re-anastomosis using a mini-laparotomy incision. Primary outcome measures were feasibility and reproducibility; secondary measures were tubal patency, operative time, complications, and ergonomic qualities. The 31 tubes were successfully re-anastomosed and patency was confirmed. The mean surgical time was 15 minutes per tube. Tubal re-anastomosis after tubal sterilization can be performed through a mini-laparotomy incision. Systematization of the operative steps allowed the performance of the operation at speed. More extensive series and follow-ups are needed to assess post-operative pregnancy rates.

Keywords: Microsurgery, Tubal anastomosis, Mini-laparotomy, Tuboplasty

INTRODUCTION

Female sterilization is the most accepted method of birth control. Out of permanent sterilizations, 98% are female sterilizations. It is an essential constituent of The National Family Planning Program in India. According to NFHS-5 (2019-2020), female sterilization accounted for 37.9% of all methods of family planning used in the country.¹ Due to unforeseen circumstances like the death of a child or re-marriage, 1-3% of these women eventually seek for reversal of sterilization.² Tubal anastomoses through a mini-laparotomy incision is a minimally invasive, cost-effective, and safe technique.

CASE SERIES

Sixteen women aged between 28 and 36 (mean age 30.6 years), parity 1–3, who requested reversal of tubal sterilization were included in the study. This study was conducted at Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai in the year 2022. Detailed

counseling of husband and wife was done regarding the procedure of recanalization and that the results will depend on many factors such as type of tubal ligation done, site of tubal ligation, condition of fimbria, length of the tube after anastomoses. Along with routine investigations for major operations, husband semen analysis was done in a few cases where the husband's age was more than 35 years. They were also counseled regarding the complications after recanalization and the alternative option of in-vitro fertilization. Written valid informed consent was taken from all the patients. The surgery was performed post-menstrual. Microsurgical tuboplasty was performed under spinal anesthesia. Cervical catheterization is done with foley's catheter no 8 and bulb inflated. A suprapubic transverse incision of 2-2.5 cm was taken. The principles of microsurgery were meticulously followed throughout. One side fallopian tube was traced with the help of Babcock's forceps and delivered outside the abdomen. The occluded segment of the tube was identified and resected till there was complete excision of pathological tissue. The medial and lateral edges were freshened and dilute

methylene blue was pushed through intra-cervical foleys, staining the mucosa blue. No probes were used. Tissue planes were precisely aligned using an atraumatic technique by vicryl 6-0 (braided polyglactin) mounted on an atraumatic spatulated micro-point needle. The first suture was taken at 6 o'clock in the mesosalpinx following which four sutures at 6', 3', 9', and 12 o'clock were taken in the muscular layer and serosa to achieve end-to-end tubal anastomoses. The mucosa was avoided. Continuous irrigation with heparinized ringer lactate solution was done to visualize the operative field and prevent adhesions. Electrocoagulation with bipolar cautery was done to achieve hemostasis. Mopping was avoided. The tubal re-anastomoses were completed and chromopertubation was performed by injecting methylene blue dye from the cervical catheter to look for leakage of dye through the anastomosed site thereby confirming patency. 200 ml of Ringer lactate solution with 5000 IU heparin, 100 mg hydrocortisone, and 1500 IU hylase kept for hydro-flotation. The abdomen was closed in layers. On postoperative day 5, hydrotubation with antibiotics, hylase, hydrocortisone, and heparin was done to promote healing and prevent adhesion formation. Patients were advised to use contraceptive measures for a period of 3 months to allow for the restoration of tubal condition after re-anastomosis.

Case 1

28 years old, P2L2E1, with a history of right salpingectomy in view of ectopic pregnancy. She had undergone tubal ligation by laparoscopy and requested reversal in view of remarriage. Microsurgical tuboplasty was performed as per the method described above. Intraoperatively, the site of tubal ligation was seen at the isthmic-ampullary junction and after procedure, the tube length was 7 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present on the left side.

Case 2

30 years old, P1L1, with a history of tubal ligation by laparoscopy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-ampullary on left side and ampullary-ampullary on right side. The residual tube length of right and left tubes was 7 and 8 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally. She conceived spontaneously within 1 year of the procedure.

Case 3

33 years old, P2L1D1, with a history of tubal ligation by mini-laparotomy, requested reversal in view of death of an only male child. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-ampullary on both sides. The residual tube length of right and left tubes was 7 and 8 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present on right side.

Case 4

32 years old, P2L1D1, with a history of tubal ligation by laparoscopy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-ampullary on left side and isthmic-isthmic on right side. The residual tube length of right and left tubes was 8 and 9 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 5

36 years old, P2L2A1, with a history of tubal ligation by mini-laparotomy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-isthmic junction in both tubes. The residual tube length of both tubes was 7 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 6

28 years old, P3D3, with a history of tubal ligation by mini-laparotomy, requested reversal in view of death of all children. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-ampullary junction in both tubes. The residual tube length of both tubes was 7 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally. She conceived spontaneously within 6 months of the procedure.

Case 7

28 years old, P2L1D1, with a history of tubal ligation by laparoscopy, requested reversal in view of death of a child. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-ampullary junction in both tubes. The residual tube length of both tubes was 8 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 8

30 years old, P2L2A1, with a history of tubal ligation by mini-laparotomy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmic-isthmic on left side and ampullary-ampullary on right side. The residual tube length of both tubes was 6 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present left side.

Case 9

29 years old, P2L1D1, with a history of tubal ligation by mini-laparotomy, requested reversal in view of death of an only male child. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the

isthmio-ampullary junction in both tubes. The residual tube length of both tubes was 76 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 10

32 years old, P2L2, with a history of tubal ligation by laparoscopy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on left side and isthmio-isthmio on right side. The residual tube length of right and left tubes was 8 and 7 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 11

30 years old, P3L3, with a history of tubal ligation by mini-laparotomy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on both sides. The residual tube length of right and left tubes was 7 and 6 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present on right side.

Case 12

28 years old, P2L1D1A1, with a history of tubal ligation by laparoscopy, requested reversal in view of death of a child. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary junction on right side and cornual isthmio on left side. The residual tube length of both tubes was 8 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 13

28 years old, P2L2, with a history of tubal ligation by mini-laparotomy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on both sides. The residual tube length of right and left tubes was 6 and 7 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 14

31 years old, P2L2, with a history of tubal ligation by laparoscopy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on right side and isthmio-isthmio on left side. The residual tube length of right and left tubes was 7 and 8 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

Case 15

29 years old, P2L2, with a history of tubal ligation by laparoscopy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on right side and ampullary-ampullary on left side. The residual tube length of right and left tubes was 7 and 8 cm respectively. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally. She conceived spontaneously within 2 months of the procedure despite advising contraception.

Case 16

34 years old, P2L2A1, with a history of tubal ligation by mini-laparotomy, requested reversal in view of remarriage. Microsurgical tuboplasty was performed. Intraoperatively, the site of tubal ligation was at the isthmio-ampullary on both sides. The residual tube length of both tubes was 7 cm. Postoperatively, hydrotubation was performed on day 4 and spill was present bilaterally.

DISCUSSION

Tubal sterilization is currently the most accepted form of birth control in India. However, due to unforeseen events such as the death of a child or re-marriage, women eventually seek reversal. Estimating how many of these women would be candidates for reversal, if adequate facilities are available, is difficult. In our study, the women sought reversal for two reasons, the first being a desire to have children with a new husband and the second being the death of one or more children. Similar figures are also reported by others from our country.^{3,4} Our study included 16 women who requested tubal recanalization, out of which one woman had a history of salpingectomy in view of ectopic pregnancy, therefore, a total of 31 tubes were operated upon. The most common site was isthmio-ampullary. The tubal length was more than 7 cm in 27 tubes while the length of 4 tubes was less than 7 cm. With the reversal of sterilization, there is an increased risk of ectopic pregnancy. Rates of 7% and 16% ectopic pregnancies after sterilization have been reported in some studies.^{5,6} However, further follow-up is required in our study to assess the risk of ectopic pregnancy.

Before undertaking tubal surgery for infertility, a thorough investigation of the couple is mandatory to exclude other factors which may be responsible for infertility. Pre-operative HSG was avoided as all patients had a history of tubal ligation.

Garcia reported the first microsurgical re-anastomosis of the fallopian tube, and the techniques of tubal microsurgery were advanced further by Winston and Gomel.⁷⁻⁹ Consequently, the postoperative outcomes after microsurgical re-anastomosis have improved in

comparison with those of macroscopic conventional reversal.

Principles of microsurgery such as use of fine non-inflammatory suture material, use of bipolar cautery, continuous irrigation, avoidance of contamination, minimum tissue damage, meticulous hemostasis and microsurgical instruments were used. As we could visualize the tube with the naked eye, we did not use any loupe or microscope, but one can always use them for magnification. We did not use any probe to identify the two cut ends as we believe they cause tubal mucosal damage. Instead, methylene blue dye was injected which stained the mucosa blue, thereby aiding in easy identification. Intra-operatively, we found that if the tube length is sufficient, re-anastomoses are done easily. Cornual ligation was slightly difficult for re-anastomosing due to lack of mobility. Although ligation was easy at the fimbrial end, functional results are awaited.



Figure 1: Patency of dye confirmed with methylene blue dye.



Figure 2: Incision line of microsurgical tuboplasty (2 to 2.5 cm).

No patient experienced perioperative or postoperative complications. Patients were discharged from the hospital

after a mean stay of 3 days in good general condition. Out of those who followed up, 3 women conceived. One woman conceived within 2 of months' surgery despite of being advised contraception for 3 months post-operatively.

As compared to conventional laparotomy access, the mini-laparotomy technique is associated with decreased risk of tissue injury, foreign body contamination of the peritoneal cavity, adhesions, decreased post-operative pain and early rehabilitation. Later with the advancement of laparoscopy, laparoscopic tuboplasty started, although it is associated with minimal tissue injury, fewer adhesions, and faster recovery, it requires longer operative time, risk of visceral injury and need for general anesthesia with expertise in the laparoscopic technique.

CONCLUSION

Mini-laparotomy tuboplasty done through a mini-laparotomy incision offers combined advantages of both conventional and laparoscopic recanalization. The surgeon must use an effective technique for the reversal of sterilization to minimize the failure rates and a method that causes minimal trauma and aim at preserving the length of the tube so that reversal is more likely to be successful. Tubal bypass through in-vitro fertilization is a costly affair that not all can afford, hence the need for tuboplasty is rising. Therefore, one can try and master tuboplasty through a mini-laparotomy incision.

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