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Case Series

Restoring fertility through open tubal recanalization: A case study of success after sterilization

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Abstract

Tubal sterilization is a widely used permanent contraception method. However, many women later seek fertility restoration due to life changes such as remarriage or the loss of a child. Tubal recanalization offers a less invasive and more cost-effective alternative to assisted reproductive technologies (ART) like in vitro fertilization (IVF).

We report the cases of three young women who underwent open tubal recanalization including stent replacement in situ for seven days and removed via hysteroscopy contributing to the success of the procedure.

This case series illustrates the success of open tubal recanalization in restoring fertility after sterilization. The use of a stent in the fallopian tubes for seven days, followed by removal via hysteroscopy, was crucial in maintaining tubal patency and ensuring successful outcomes. Tubal recanalization remains a valuable option for women desiring natural conception, particularly when ART is less accessible or preferred. Careful patient selection, individualized surgical approaches, and stent placement are key factors in achieving successful results.

Keywords: Tubal recanalization, Sterilization reversal, Fertility restoration, Natural conception, Assisted reproductive technology (ART).

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1. Introduction

Tubal recanalization is an important surgical option for women who wish to restore their fertility after undergoing sterilization. The basic principal of Tubal ligation involves, preventing eggs from reaching the uterus, thus, eliminating the possibility of pregnancy. Tubal ligation is highly favored due to its effectiveness, safety, and minimally invasive nature, with techniques such as laparoscopic surgery offering additional benefits. It does not interfere with hormonal balance or sexual function, which adds to its attractiveness as a permanent contraceptive choice for women worldwide.[1]

Tubal recanalization, provides hope for these women, especially where assisted reproductive technologies (ART), such as in vitro fertilization (IVF), are less accessible or prohibitively expensive.[2] IVF, while effective, can be financially burdensome, and many women prefer the natural conception route that tubal recanalization offers. This surgery is also more cost-effective and accessible in low-resource settings.[3,4]

Initially, the procedure was performed using more invasive surgical methods, but the advent of microsurgery and laparoscopic techniques has made it possible to restore fertility with less trauma. Studies indicate that the success rate of recanalization largely depends on factors such as method of previous sterilization, condition of the remaining tube, and duration between sterilization and recanalization.[1,5] For patients who were sterilized using laparoscopic techniques, the chances of conceiving post- recanalization are significantly higher compared to those who underwent traditional methods such as the Pomeroy technique.[2,6]

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The technical aspects of tubal recanalization involve reconnecting the severed ends of the fallopian tubes through microsurgical techniques. This delicate process requires precise suturing to ensure that the tubes are patent, allowing eggs to pass through once again. In some cases, stents are temporarily placed inside the fallopian tubes to maintain their patency during the healing process, which enhances the chances of success. The stents are typically kept in situ for seven days and removed by hysteroscopy on the eighth day. Studies have shown that keeping the stent in place for this period results in improved outcomes, as it helps maintain tubal patency during the critical early phase of healing.[1,7] After stent removal, methylene blue dye tests are conducted to confirm tubal openness. Factors such as the length of the remaining fallopian tubes and the patient's age play a crucial role in determining the success of the procedure. Studies have shown that younger women with longer remaining tubal lengths tend to have better outcomes.[8,9]

One of the major concerns associated with tubal recanalization is the risk of ectopic pregnancies, where the fertilized egg implants outside the uterus, typically in the fallopian tubes. This underscores the importance of careful patient selection and thorough preoperative counseling to discuss potential risks and benefits. Tubal recanalization offers a viable and effective means of achieving pregnancy, with success rates ranging from 40% to 60%, depending on various factors.[6,8] Additional measures such as anti-adhesion agents can be used to prevent the formation of scar tissue, which could compromise the success of the procedure.[9]

We present a three-case series that illustrates the success of tubal recanalization in restoring fertility to women who previously underwent sterilization wherein the use of a stent in the fallopian tubes for seven days allowed maintenance of tubal patency. For many women, the ability to conceive naturally after sterilization offers a sense of hope and fulfilment, making tubal recanalization a critical option in the field of reproductive health.[5,10]

2. Case Series

2.1. Case 1

A 35-year-old woman with a history of previous full-term normal vaginal delivery (FTND) and laparoscopic tubal ligation 10 years ago, presented to the Obstetrics and Gynaecology Outpatient Department at Dr. D Y Patil Medical College with a desire to conceive after her second marriage. Her obstetric history included a spontaneous abortion 15 years ago, after which she underwent dilation and evacuation (D&E), followed by an FTND 14 years ago. When her child was five years old, she opted for permanent contraception in the form of laparoscopic tubal ligation. Two years ago, she tragically lost her first husband in a motorbike accident. After her second marriage, she desired to have children again and sought advice on fertility restoration. The patient was informed of the option of open tubal recanalization, and she was counselled regarding the risks, including potential failure, ectopic pregnancy, and complications arising from the procedure. She opted to proceed after being fully informed.

After undergoing a thorough preoperative evaluation, the patient was scheduled for surgery. Written informed consent was obtained, and the patient was admitted. Open tubal recanalization was performed under spinal anesthesia. A 5 cm transverse curvilinear incision was made 2 cm above the pubic symphysis. The abdomen was opened in layers, and the uterus was exteriorized. Both fallopian tubes were visualized and found to be healthy. The fibrotic portions of the fallopian tubes, along with the Fallope rings from the previous ligation, were excised. A stent was carefully inserted through the fimbrial end of the tubes and passed across the lumen to the cornua using prolene 1-0 sutures. The tubes were sutured in layers along with the mesosalpinx with 6-0 prolene. Hemostasis was achieved, and the abdomen was closed in layers using Vicryl sutures, the skin closed subcutaneously using monocryl 3-0 in a subcuticular manner.

Postoperatively, the patient tolerated the procedure well and had an uneventful recovery. The stent was left in situ for seven days. On the seventh day, the stent was removed via hysteroscopy. The patient was advised to avoid conception for six months. But, two months later patient came to OPD with delayed menses and with UPT suggestive of positive results; After which intrauterine pregnancy was confirmed on ultrasound. Ultimately, she had a successful vaginal delivery of a healthy baby at term.

2.2. Case 2

A 30-year-old woman, G2P2L2, presented to the ObGyn OPD with a desire for fertility restoration after the tragic loss of her younger child due to pneumonia one year ago. She had two previous FTND, with her first child born seven years ago (female) and her second child born four years ago (male). After the birth of her second child, the patient opted for puerperal tubal ligation. However, following the unexpected death of her son, she wished to conceive again. She sought medical advice on reversing the effects of her tubal ligation and was counselled on the option of tubal recanalization. She was informed of the risks, and possible complications, and opted to proceed with recanalization.

The patient was admitted after undergoing a preoperative assessment at. She underwent open tubal recanalization under spinal anesthesia. The surgical approach mirrored that of the first case: a 5 cm transverse incision was made above the pubic symphysis, and the abdomen was opened in layers. Both fallopian tubes were inspected and found to be healthy. The fibrotic portions of the tubes from the previous ligation were excised. A stent (prolene 1-0) was placed through the fimbrial end, and the tubes and mesosalpinx were anastomosed using prolene 6-0 sutures. Hemostasis was achieved, and the abdomen was closed in layers with subcuticular sutures.

The patient had an uneventful postoperative course. The stent was left in situ for seven days and was removed via hysteroscopy. She was advised to avoid conception for six months and to use barrier method. Six months after the surgery, HSG confirmed tubal patency with free spillage of contrast. Two months later, the patient presented with a positive UPT, confirming a spontaneous conception. Her antenatal course was uncomplicated, and she delivered a healthy baby at term.

2.3. Case 3

A 27-year-old woman, G2P2L2, presented to the Obgy OPD with a desire for fertility restoration after her second marriage. Her obstetric history included one FTND and one lower segment caesarean section (LSCS). Her first child, a girl, was born five years ago, and her second child, a boy, was born via LSCS three years ago. Six months after the birth of her second child, the patient underwent tubal ligation, believing her family was complete. However, after personal circumstances changed, including a divorce and subsequent remarriage, she wished to conceive again.

The patient was counselled about the risks and benefits of tubal recanalization. After a preoperative assessment, she was admitted and underwent open tubal recanalization. The procedure followed the same steps as the previous cases. A 5 cm transverse incision was made, and the fallopian tubes were visualized. The fibrotic segments from the previous ligation were excised, and a stent (ethilon 1-0) was placed in situ for seven days to maintain patency. The tubes were sutured with prolene 6-0, and methylene blue dye confirmed tubal patency. The patient tolerated the procedure well and had an uneventful recovery.

The stent was removed after seven days via hysteroscopy, and the patient was advised to use barrier contraception for six months. But, three months later, she presented with a positive UPT report and pregnancy confirmed with ultrasound. Her antenatal course was uneventful, and she successfully conceived and delivered a healthy baby at term.

3. Discussion

The three cases presented in this series highlight the effectiveness of open tubal recanalization for restoring fertility in women who have undergone previous sterilization, each with unique circumstances leading to the need for fertility restoration.

Case 1 involved a 35-year-old woman who initially opted for permanent sterilization after completing her family. Her successful outcome exemplifies the possibility of natural conception even after a decade of sterilization. The patient's age, though slightly advanced for optimal fertility, did not preclude a successful outcome. Studies have shown that while younger women typically achieve higher pregnancy rates post-recanalization, women over 35 can still experience favorable results if other factors, such as the condition of the fallopian tubes and previous reproductive history, are favorable.[11,12] In this case, her history of a previous full-term delivery likely contributed to the positive outcome. The use of a stent during surgery, left in situ for seven days and removed by hysteroscopy on the eighth day, was key in maintaining tubal patency during the critical healing phase, improving the likelihood of conception.[1,7] Patient conceived spontaneously within 2 months after recananlisation even before going for HSG.

Case 2 involved a 30-year-old woman who sought fertility restoration after the loss of her second child due to pneumonia. This case highlights the psychological and emotional factors that can influence the decision to undergo fertility restoration. The patient's relatively younger age and good reproductive history (two FTND) were favorable factors, contributing to the success of the procedure. Similar to the first case, the use of a stent, left in place for seven days, played a crucial role in maintaining tubal patency, which was later confirmed through HSG. This case underscores the importance of tailored patient counseling, as her desire for fertility restoration was motivated by a personal tragedy.[13,14]

Case 3 involved a 27-year-old woman who, after remarrying, sought to conceive following a previous tubal ligation performed after her second LSCS delivery. This case underscores the effectiveness of tubal recanalization in younger women, who generally have a higher likelihood of success due to better ovarian reserve and less tubal damage.[11,15] The patient had a history of both vaginal and LSCS deliveries, but her relatively young age contributed to the positive outcome. The use of a stent for seven days ensured that the healing process occurred without blockages. Three months post- procedure, she conceived and delivery was uneventful.

In all three cases, the use of stents for seven days followed by removal on the eighth day through hysteroscopy contributed significantly to the success. Stent placement is a recognized technique to maintain tubal patency during the healing process, preventing post-surgical adhesions that could otherwise impede the passage of eggs through the tubes. Studies support the idea that leaving the stent in place during the critical period of recovery helps reduce the risk of early blockage, a factor that can lead to failure or complications such as ectopic pregnancy.[7,16]

Each case also highlights the importance of intraoperative methylene blue dye testing to confirm tubal patency immediately after surgery. This method is widely recognized as a reliable technique to detect any potential leaks or blockages during the procedure, ensuring that the anastomosis is successful before closing the abdomen.[17] The methylene blue dye test played a crucial role in confirming that the tubes were patent, significantly reducing the risk of postoperative complications like ectopic pregnancy, which is a well-known risk following tubal recanalization.[11,18]

The postoperative management in all cases involved regular follow-ups, including HSG at six months to confirm long-term tubal patency. HSG is an essential part of the postoperative care process, providing a clear assessment of whether the tubes have remained open after recanalization and allowing timely intervention if issues arise.[19] In two cases, HSG confirmed free spillage of contrast, but first patient conceived before going for HSG.

These cases align with broader findings in the literature, which report pregnancy success rates of 40% to 60% following tubal recanalization, depending on factors such as the patient's age, the length of the remaining tubes, and the method of previous sterilization.[14,16] In all three cases, the use of open surgery allowed for precise handling of the fallopian tubes, especially where extensive fibrotic tissue from previous ligations needed to be excised. While laparoscopic and robotic-assisted surgeries are minimally invasive and offer quicker recovery, open surgery remains valuable for complex cases requiring direct access to the tubes.[15,17]

4. Conclusion

This case series demonstrates the effectiveness of open tubal recanalization in restoring fertility after previous sterilization, even after a decade and despite the patient's advanced reproductive age. The use of a stent in the fallopian tubes for seven days, followed by removal via hysteroscopy, played a crucial role in maintaining tubal patency. Further, tubal recanalization is a cost-effective alternative to IVF, particularly when individualized surgical approaches and proper postoperative care are applied. With techniques like stent placement, tubal recanalization offers a reliable option for natural conception, providing renewed hope to women seeking future pregnancies.

5. Source of Funding

None.

6. Conflict of Interest

None.

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