

Intra - Uterine Gestation After Robotic Tubal Reanastomosis - "4 Cardinal Points" Technique

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Keywords

Fertility, *In vitro* fertilization, Tubal recanalization, Surgery.

Introduction

For women who have undergone tubal ligation and wish to return to their fertility, there are 2 forms of treatment available: *in vitro* fertilization and tubal recanalization. Among them, the last one offers a better cost-benefit ratio in women of reproductive age. However, its success rate depends on several factors: the age of the patient, the surgical technique, the location of the uterine tube in which it was made (proximal or distal segment), the duration of the ligation and the length of the remaining tube [1-4].

Tubal recanalization is the most successful reconstructive surgery to reconstitute female fertility [5]. Both laparoscopic pathway and laparotomy pathway presented results (80% x 81%, respectively) after 12 months of surgery [6]. Preliminary studies comparing the laparoscopic, laparotomy and robotics pathways, show similar success rate. However, with the advent of robotic surgery, the cost is higher [7-11].

Observational studies compared the robotic route with the minilaparotomy for tubal recanalization and concluded that the two routes were similar in regard to: intrauterine pregnancy rate within 9 to 10 months of follow-up (27 to 74%) [10,11]. Robotic surgery approach offered a faster recovery; however, surgical time was longer. In these published studies, the minimum time to evaluate the success rate of reanastomosis (by hysterosalpingography or by occurrence of pregnancy) was 6 months.

The objective of this study was to report the case of bilateral tubal reanastomosis performed by robotic route followed by pregnancy in the first postoperative month.

Case Report

CALM, 30 years old, passed from 2 previous cesarean sections and history of bilateral tubal ligation using the Pomeroy technique, in the last childbirth 6 years ago. After another marriage, the patient mentioned her desire of tubal recanalization in medical consultation. The male factor for infertility was ruled out by examinations. Hysterosalpingography revealed "non-permeable tubes with preserved trajectory and caliber, partially opacified, with ampullar segment ending in a blind bottom, due to previous surgical procedure. Negative COTTE."

Patient was submitted to robotic bilateral tubal recanalization (Da Vinci Si Robot). The surgery was performed under spinal anesthesia and general anesthesia and the duration was of 3 hours. In the trans-operative period, there were no interferences and the patient was discharged 24 hours after the procedure.

After 2 months, the patient performed ultrasonography on request, which detected cystic image within the endometrial cavity of 0.8 x 0.5 x 0.3 cm suggestive of gestational sac. Beta hcg of 167,792.50 mIU / mL, confirming gestation.

During the prenatal period, the patient developed gestational diabetes mellitus with dietary control was submitted to caesarean section on the 5th of January in 2019 with birth of newborn weighing 3500 g, length of 48 cm and apgar of 9 (1^o minute) and 10 (5 minutes). The patients were discharged 48 hours after delivery with good clinical conditions.

Technique

The patient was positioned in dorsal lithotomy position and Trendelenburg under general and spinal anesthesia. After introduction of the uterine manipulator, a 12mm trocar was

positioned in the umbilical region for insertion of a 30° camera. At this moment, an inventory of the abdominal cavity was performed, where peritubal pelvic adhesions were observed, site of proximal third of the tubal ligation and the integrity of the fimbriae. Three 8mm trocars were used, one for insertion of the first arm of the robot (DA VINCI SI), 8cm laterally to the left and caudal to the camera and another, 8cm laterally to the left and cranial to the camera; another 8mm trocar was inserted 8cm to the right and caudal to the camera and a last trocar of 5mm was inserted in the upper left quadrant for introduction of accessory instruments.

After performing the robot dock (VINCI SI Robot), vasoconstrictor vasopressin was injected into the tubes and they were resected in the areas where the tubal ligation was performed. Next, it was performed the catheterization of the proximal tubal stumps with umbilical catheter for newborn, brand Argyle, caliber 2,5 fr (Figure 1). For reanastomosis, a 4-point suture was performed on the musculature and serosa of the fallopian tubes with PDS 6.0 wire at separate points (Figure 2).



Figure 1: Catheterization of tubal stumps.

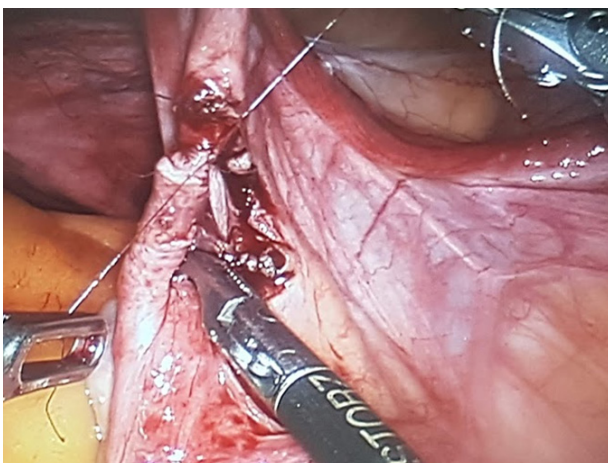


Figure 2: 4 point suture technique.

This suture consists in the first accomplishment of fixation of the bulk in the opposite portion to the mesosalpinx, without promoting the surgical node. Subsequently, another fixation by suture wire is performed at the opposite site of the tube, thus

promoting two repair points, whose main objective was to align the edges of the resected tubes so that the definitive suture would promote an exact coaptation without risk of distortion or stenosis of the tubal lumen. After suturing of the first initial points, the suture of 2 points laterally is completed, making a total of 4 cardinal points. Subsequently, the umbilical catheter was removed, and chromotube was performed, being bilaterally positive (Figure 3).



Figure 3: Tubal chromotube.

Discussion

Tubal reanastomosis surgery is usually performed by minilaparotomy using intraoperative microscope instruments or by laparoscopy [12]. Microsurgery guided by laparoscopy does not have a greater popularity, mainly due to its limitation with the conventional instruments, magnitude and non ergonomic nature for this type of surgery.

After the introduction of robotic surgery, tubal reanastomosis has been described by several authors as a new modality of tubal permeability restoration for those patients who were submitted to tubal ligation [5,7,10-12]. Most of the already published studies were observational and case series, with different tubal suturing techniques described. In these reports, the main objective was to verify the permeability of the tubes by hysterosalpingography or by occurrence of pregnancy after reanastomosis.

Shahryar KK et al, performed tubal reanastomosis in 18 patients who underwent tubal ligation through a single suture in the tube. They verified that the tubal permeability was confirmed by hysterosalpingography or confirmation of pregnancy within 6 months (mean of 2 to 22 months) [8].

In Brazil, no studies on robotic tubal recanalization were found. It is still predominantly performed by laparotomy, which demands longer postoperative recovery time and hospital stay.

The present study was the first successful case in Brazil of tubal reanastomosis via robotics for reestablishment of female fertility. In this report, we highlight the difference in the suture technique performed with "4 points", which allows a good coaptation of the borders of the uterine tubes without providing ischemia of these with numerous sutures. Most studies performed multiple suture techniques on 2 separate planes (muscular and serous) [7,11,13,14].

Only one study reports the performance of tubal reanastomosis with a single suture [8].

In addition, this study was the first that resulted in intrauterine pregnancy confirmed in the first postoperative month, in addition to having a surgical time similar to the laparoscopic technique (+/- 3 hours of surgery) [13]. In the case in question, both the surgical time and the suturing technique used may have contributed to tube regeneration and patient recovery, facilitating a rapid return of female fertility.

Conclusion

The treatment of female infertility involves a series of complementary tests in order to detect its cause. In cases of secondary sterility to tubal ligation, treatment options are *in vitro* fertilization and tubal recanalization. The latter has been performed laparotomically and laparoscopically. Compared with the robotic pathway, these two pathways present disadvantages, whether they are longer postoperative (laparotomic) recovery, lack of ergonomics and longer training and aptitude (laparoscopic).

The robotic route allows a lower cost when compared to *in vitro* fertilization and a faster return of fertility, with better postoperative recovery. However, the selection of a patient who candidates for tubal reanastomosis should be based on several factors, among them: age, previously performed tubal ligation, healthy tube remnant, type of suture performed during reanastomosis, and surgical approach procedure for the reestablishment of tubal permeability.

The present study portrayed the first case in Brazil of successful tubal reanastomosis by robotic surgery, through the occurrence of pregnancy in the first postoperative month, with surgical time similar to the other surgical approaches. In addition, the surgical treatment of female sterility of tubal cause by tubal ligation is, predominantly, less expensive than performing *in vitro* fertilization. In this way, another treatment option for these patients can be adopted, with a good success rate.

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