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## Original Article

## Tubal reanastomosis results of our clinic: A tertiary-center experience

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### ABSTRACT

**Objective:** In our study, it was aimed to determine the clinical results of 42 patients who underwent tubal reanastomosis for various reasons. **Materials and Methods:** Our study included 42 patients at fertile age who presented to our clinic for tubal reanastomosis between 2017 and 2019. Demographic information and surgery notes of the patients were accessed through the hospital files and hospital archive system. For retrospective screening, patients were contacted by phone and their pregnancy status was learned. **Results:** Of the patients, 47.6% (n=20) were operated on due to a wish for fertility, 53.4% (n=22) because of other reasons. The mean age of the patients was 36.2 and the mean number of children of the patients was 4.85. Laparotomy was performed in 23.8% (n=10) of the patients, and laparoscopic surgery in 76.2% (n=32). Our intrauterine pregnancy rate after tubal reanastomosis was calculated as 9.5%. **Conclusion:** Tubal reanastomosis can be performed by both laparoscopic and mini-laparotomy methods. We recommend performing bilateral reanastomosis if possible. We think that it would be appropriate to prioritize laparoscopic surgery because it is minimally invasive and provides high pregnancy success.

**Keywords:** tubal reanastomosis; fertility; laparoscopic surgery

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## Introduction

Tubal sterilization, also known as tubal ligation, is one of the common methods of contraception. The incidence of post sterilization regret has been reported to be 3–8% [1]. Young maternal age at the time of sterilization is one of the major risk factors for subsequent regret of sterilization [2]. Women aged 18 to 24 years were almost four times as likely to request reversal information as were women ≥30 years of age [3]. Change of marital status is the most common reason for the request for fertility restoration [1,4]. Death of a child, and desire to have another child because of improvement of the socio-economic condition of the family are other potential factors for reversal [2].

Two choices, including surgical approach or in vitro fertilization (IVF), can be offered as an alternative treatment to these patients [5].

IVF is the only treatment option for women whose Fallopian tubes have been extensively damaged, markedly shortened, or large portions of their distal segment removed during the sterilization procedure and/or the presence of another important fertility factor, such as male factor infertility [5].

The live birth rate per cycle with IVF is 28%, but only 65.8% are singletons; 31.0% are twins and 3.2% triplets or more. Microsurgical tubal anastomosis yields a birth rate that exceeds 55%, without an increased risk of multiple pregnancies [5].

Treatment for tubal reversal via microsurgical tubal reanastomosis through a laparotomy is the traditional method, and results of tubal reversal dramatically improved with the introduction of microsurgical techniques and the principle of gentle tissue handling in the early 1970s [1,2].

The result at the transition of the surgical process from traditional laparotomy under the microscope re-pass to laparoscopic tubal anastomosis is reducing pelvic tissue interference and unnecessary damages, thereby significantly reducing postoperative adhesion formations [6].

No difference was found in pregnancy rates and no difference in the chance of pregnancy between laparotomy and laparoscopic surgery [7].

In our study, it was aimed to determine the clinical results of 42 patients who underwent tubal reanastomosis for various reasons.

## Material and methods

This study aimed to retrospectively investigate the clinical outcomes of tubal reanastomosis cases performed in Diyarbakır Gazi Yaşargil Training and Research Hospital, which was a tertiary center in Turkey, between January 2017 and December 2019. Our study was approved by the Ethics Committee of our hospital, and the ethical principles of the Declaration of Helsinki were followed in its design and implementation.

Patients over 45 years of age, patients with irreparable fibrillary defect, and those who could not be operated on due to poor general condition or dense adhesions in the surgical field were excluded from the study.

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Demographic information and surgery notes of the patients were accessed through the hospital files and hospital archive system. For retrospective screening, patients were contacted by phone and their pregnancy status was questioned.

Our study included 42 patients at fertile age who presented to our clinic for tubal reanastomosis between 2017 and 2019. All patients had a history of tubal ligation (39 of them had experienced during cesarean section, and three patients had undergone elective mini-laparotomy) performed with the Pomeroy method.

Of the patients, 47.6% (n=20) asked for the operation due to a wish of fertility, 28.5% (n=12) because of pelvic pain, 21.4% (n=9) because of menstrual disorders, and 2.5% (n=1) due to their beliefs. The mean age of the patients was 36.2 years and the mean number of children was 4.85.

If a patient had a wish for fertility, she underwent a preoperative ultrasound examination. At the beginning of menstruation, sex hormone levels (follicle-stimulating hormone, luteinizing hormone, estradiol, prolactin, and thyroid hormones) and progesterone levels in the mid-luteal phase were measured. After 3 days of sexual abstinence, a semen sample was collected from the spouses to confirm the male fertility and the results of these analyses were reported as normal [8-10].

The operations were performed by 16 different surgeons working in our clinic who had experience in atraumatic tubal reanastomosis using microsurgery methods. All reanastomosis surgeries were performed similarly and microsurgical methods were used, various variations of which have been described in the literature and essentially minimizing tubal damage.

Surgeries were performed 76.2% by laparoscopic methods and 23.8% by laparotomy.

The surgical procedure was standardized over two stages (carefully removing the ligated tubal stumps to create safe ends suitable for reanastomosis, followed by the application of 2 to 3 re-anastomotic sutures containing the serosa and myometrial layers while protecting the mucosa using 6-0 Ethilon suture).

The tubal passage was visualized in all patients using intraoperative methylene blue solution.

None of the patients developed complications and they were discharged after 24 hours. The patients were followed up for a minimum of 24 months and a maximum of 48 months. Patients who became pregnant following tubal reanastomosis operation and reached at term of pregnancy were delivered at our hospital. The delivery route was determined by standard obstetric indications [11,12].

#### Statistical analysis

We used IBM SPSS 21.0 for Windows (SPSS Inc., Chicago, IL, USA) statistical package program for statistical evaluation of our research data. A descriptive analysis of the records was performed following the completion of the audit. Categorical variables were presented as frequencies and percentages.

## Results

We presented the demographic features of the participants in Table 1. Of the patients, 47.6% (n=20) were operated due to a wish of fertility, 28.5% (n=12) because of pelvic pain, 21.4% (n=9) because of menstrual disorders, and 2.5% (n=1) due to their beliefs.

While the mean age of the patients was 36.2, the mean age of those operated for demanding fertility was 34.7. The mean age of the patients who were successful in getting pregnant was calculated as 33.75 years.

While the mean number of children of the patients was 4.85, this number was calculated as 4.1 in those demanding fertility.

While the mean time between tubal ligation and reanastomosis was 5.57 years, it was calculated as 4.95 years in patients with the demand of fertility and 3.75 years in patients with successful conception.

We summarized the surgical procedures and pregnancy success rates of the patients in Table 2. Laparotomy was performed in 23.8% (n=10) of the patients, and laparoscopic surgery in 76.2% (n=32).

Table 1. Demographic Features

	Percentile /Number	Age, years	Parity	Mean time *
Wish of fertility	47.6% (20)	34.7	4.1	4.95
Others	52.4% (22)	37.6	5.5	6.13
Total	100% (42)	36.2	4.8	5.57
Pregnancy success	9.5% (4)	33.7	5	3.75

\*The mean time between tubal ligation and reanastomosis, years

While bilateral reanastomosis was performed in 86% (n=36) patients, unilateral reanastomosis could be performed in 14% (n=6) of the patients due to residual tubal tissue being shorter than 4 cm.

All of the successful pregnancies came out of the group in which bilateral reanastomosis could be performed via laparoscopy. Our intrauterine pregnancy rate after tubal reanastomosis was calculated as 9.5%.

Table 2. Surgical Procedure and Pregnancy Success

	Total Patients (n=42)	Pregnancy (n=4)
Laparotomy	10 (23.8%)	0
Laparoscopy	32 (76.2%)	4(100%)
≤35 y		2 (50%)
>35 y		2 (50%)

While a total of 7 conceptions occurred in 4 of the patients who were followed up for a minimum of two years after the operation, 3 of them reached term and were delivered by cesarean section. Two abortions developed in 1 patient and one abortion in 2 patients. There was no ectopic pregnancy. As shown in Table 2, while 50% of the patients who had pregnancy success were under 35 years old, 50% were over 35 years old. The mean duration of pregnancy after the operation was 3 months.

## Discussion

Sterilization is a method that aims to definitively eliminate the ability to reproduce naturally. In addition to methods such as removing a part of the tube (Pomeroy technique), clips (Filshie technique), or ring (Yoon ring technique), different electrocautery techniques have also been described [13].

Most women who undergo voluntary sterilization for permanent contraception are satisfied with their choices [13]. However, although it varies by country, 2-10% of women undergoing sterilization change their minds due to changes in their lives [14-16].

In a review article by Deffieux et al., the most common reason for the change of opinion was reported as a new marriage (70-75%) followed by the desire for a new child (15-19%), the loss of a child (3-6%) and the loss of a spouse (1-4%) [13].

In another study by Şentürk MB et al., 43 (72.8%) cases wanted a new child, 5 (8.4%) cases thought that it was against their religious beliefs, 9 (15%) cases saw it as the cause of pelvic pain. It was observed that 2 (3.3%) people presented because they made a new marriage and wanted a child. The total of the patients who were operated on for the desire for fertility was reported as 81.1% [17].

Previous studies reported the probability of symptoms, including abnormal bleeding, premenstrual symptoms, heavy and longer bleeding periods, chronic pelvic pain, are increased in sterilized women and labeled these symptoms as post-tubal syndrome [18]. Similarly, in our study cohort, the indications of tubal reanastomosis were a wish of fertility (47.6%), chronic pelvic pain (28.5), menstrual disorders (21.4%), and religious beliefs (2.5%).

Reanastomosis is performed by applying the microsurgery method by laparotomy or laparoscopy. In a literature search, it was reported that tubal reanastomosis via laparoscopy or laparotomy did not show a significant difference in terms of success in being pregnant and ectopic pregnancy rates [13]. In the current approach, it has been reported that laparoscopic tubal reanastomosis surgery is more preferable compared to laparotomy operations due to minimal tissue damage, detailed surgical field viewing angle, and patient comfort [19]. In our study, most of the reanastomosis procedure was performed with the laparoscopic method (76.2%), and all of our pregnancy success came from this group.

The microsurgery method applied after classical mini-laparotomy has been performed for more than 40 years [20]. Intrauterine pregnancy rates after reanastomosis via laparotomy are between 60-91% in the literature [21,22].

As a result of the development of technology and therefore the equipment used, the first pregnancy after laparoscopic reanastomosis was reported in 1989 [22]. With the current surgical procedure, the lowest fertility rates after laparoscopic reanastomosis were reported by Dubuisson and Chapron [23] as 53.1%, and the highest by Yoon et al. as 77.6-84.9% [24,25].

Laparoscopy is the preferred method today because it reduces the risks of laparotomy due to its superior visual angle and minimal invasiveness during reanastomosis. However, it should not be forgotten that reanastomosis performed by laparotomy in the experienced hands will provide more benefit to the patient than reanastomosis performed by laparoscopy in inexperienced hands [7]. The treatment method should not be more important than the success after the surgery and the benefit of the patient.

Age is one of the most important factors predicting the chance of pregnancy after reanastomosis. In the study of Gordts S et al., intrauterine pregnancy rates were reported as 81% (84/104) in women under 36 years of age, 67% (31/46) in women aged 36-39, 50% (3/6) in women aged 40-43, and 12.5% (1/8) in women over 43 years of age [1].

Pregnancy rates in our study, with 9.5%, are far below the literature. The mean age of our patients being over 35 (36.2) and the low rate of our patients who were operated on with the desire for fertility (47.6%) can be shown among the reasons for this situation. Also, all cases were operated on by surgeons with different levels of surgical experience regarding tubal reanastomosis. This factor also might have been implicated in our low success rate.

Ectopic pregnancy rates were reported as 3.2% in a series of 202 cases [25]. Since our total pregnancy rate was quite low in this study, our ectopic pregnancy rate was calculated as zero, which is inconsistent with the literature.

It seems that the method of sterilization or the side of tubal anastomosis has no effect on the results [25,26]. All of our patients have a history of tubal ligation with the Pomeroy method. In our study, unilateral tubal reanastomosis could be performed in 14% of patients due to tubal shortness. Pregnancy was not achieved in any of our patients who underwent unilateral reanastomosis. This situation contradicts the literature.

Although the number of our cases is a limiting factor, the pregnancy results obtained in patients who underwent bilateral reanastomosis seem to be superior to those with

unilateral reanastomosis.

Another alternative for women who have lost their fertility due to tubal sterilization and who desire fertility again for various reasons is IVF treatment. According to The European IVF-monitoring program, data from 18 countries and 521 centers have been published and the pregnancy rate per cycle has been reported as 27% [27]. Better results were obtained in the USA with 36.5% [28]. These rates remain low when compared to the results of tubal reanastomosis success in the literature. Tubal reanastomosis offers the chance of spontaneous pregnancy away from the risks of IVF treatment such as ovarian hyperstimulation, multiple pregnancies, and congenital malformations [29,30].

Tubal reanastomosis is a treatment that can be successfully applied by laparotomy or laparoscopy in skilled hands and has satisfactory pregnancy results.

Compared to IVF treatment, which is expensive and includes various comorbidities, its advantages are substantial.

If there is no infertility factor in women under 35 years of age, tubal reanastomosis should be the first choice [19].

There are some limitations to our study. The main limitations are associated with its retrospective nature and low sample size. All cases were operated by surgeons with different levels of surgical experience regarding tubal reanastomosis. Poor results have been reported in reanastomosis with a tubal length less than 4 cm [31]. In this study, patients were not evaluated by hysterosalpingography regarding the tube lengths. Also, we did not evaluate the patients by hysterosalpingography concerning the tubal passage following the tubal reanastomosis surgery. We considered that these factors might have been implicated our low success rate.

Considering the cost of IVF and the socio-economic condition of our region, we think that our study will encourage our colleagues to perform such surgeries.

## Conclusion

Tubal reanastomosis can be performed by both laparoscopic and mini-laparotomy methods. We recommend performing bilateral reanastomosis if possible. We think that it would be appropriate to prioritize laparoscopic surgery because it is minimally invasive and provides high pregnancy success.

## Disclosure

Authors have no potential conflicts of interest to disclose.

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