

# Laparoscopic tubal reanastomosis: 10-year pregnancy results of a single tertiary center

<sup>1</sup>Eralp BULUTLAR

<sup>2</sup>Gizem Berfin ULUUTKU BULUTLAR

<sup>1</sup>Resul KARAKUŞ

<sup>1</sup>Sultan Seren KARAKUŞ

<sup>1</sup>Gizem BOZ İZCEYHAN

<sup>1</sup>Department of Obstetrics and Gynecology, University of Health Sciences, Turkey. Istanbul Zeynep Kamil Maternity and Children's Diseases Health Training and Research Center, Istanbul, Turkey

<sup>2</sup>Department of Obstetrics and Gynecology, Haydarpaşa Numune Training and Research Hospital, Istanbul, Turkey

## ORCID ID

**EB** : 0000-0002-2246-4899

**GBUB** : 0000-0001-6979-0854

**RK** : 0000-0001-7386-3833

**SSK** : 0000-0003-4032-9604

**GBI** : 0000-0002-3358-6250



## ABSTRACT

**Objective:** This study aims to investigate whether tubal reanastomosis can be considered a superior or alternative method to *in vitro* fertilization (IVF) for women who have previously undergone tubal ligation but wish to conceive again. The focus is on assessing tubal reanastomosis as an option for patients seeking natural conception after changing their minds for various personal reasons. The study specifically evaluates this method in relation to IVF, particularly in cases where factors such as age, ovarian reserve, and partner spermogram values are considered.

**Material and Methods:** This clinical trial and case series study screened women who had previously undergone tubal ligation and later applied to the Gynecology and Obstetrics Service at Zeynep Kamil Hospital between 2012 and 2022. From this group, 86 women were deemed suitable for surgery and underwent tubal reanastomosis. Postoperative pregnancy rates and outcomes, including abortion, ectopic pregnancy, and term delivery rates, were analyzed to assess the effectiveness of tubal reanastomosis.

**Results:** The pregnancy rate following tubal reanastomosis was 33% within the studied group. Among these pregnancies, 8% ended in abortion, 3% resulted in ectopic pregnancies, and 89% reached full term. Tubal reanastomosis was shown to be a cost-effective method compared to IVF, avoiding complications associated with IVF, such as multiple pregnancies and ovarian hyperstimulation syndrome (OHSS). The method also demonstrated high patient compliance and success rates. Additionally, it allowed for simultaneous surgical intervention for co-existing conditions, such as endometrial polyps, ovarian cysts, fibroids, and adhesions.

**Conclusion:** Tubal reanastomosis presents as an effective alternative treatment option to IVF for select patient groups, with favorable pregnancy rates and fewer associated complications. It is particularly suited for patients who are younger, have adequate tube length after ligation, a favorable hormone profile, and a supportive partner spermogram. This method is less costly, has fewer risks, and offers a viable path to conception for those seeking natural pregnancy after tubal ligation.

**Keywords:** *In vitro* fertilization, pregnancy, spontaneous, tubal ligation, tubal reanastomosis.

**Cite this article as:** Bulutlar E, Uluutku Bulutlar GB, Karakuş R, Karakuş SS, Boz İzceyhan G. Laparoscopic tubal reanastomosis: 10-year pregnancy results of a single tertiary center. Zeynep Kamil Med J 2024;55(4):192–195.

**Received:** September 02, 2023 **Revised:** April 23, 2024 **Accepted:** July 29, 2024 **Online:** November 28, 2024

**Correspondence:** Eralp BULUTLAR, MD. Sağlık Bilimleri Üniversitesi, İstanbul Zeynep Kamil Kadın ve Çocuk Hastalıkları Sağlık Uygulama ve Araştırma Merkezi, Kadın Hastalıkları ve Doğum Kliniği, İstanbul, Türkiye.

**Tel:** +90 505 912 67 32 **e-mail:** eralpbulutlar@hotmail.com

Zeynep Kamil Medical Journal published by Kare Publishing. Zeynep Kamil Tıp Dergisi, Kare Yayıncılık tarafından basılmıştır.

**OPEN ACCESS** This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



## INTRODUCTION

Tubal ligation is a contraceptive method widely used all over the world. One in four women in America opts for contraception. Among all methods, the most preferred method between the ages of 35–45 is female sterilization.<sup>[1,2]</sup> In 10,863 women who underwent tubal sterilization, the five-year failure rate of the procedure is 5 out of 1,000, the twelve-year failure rate is 7 out of 1,000, making it a very effective method.<sup>[2]</sup> However, a small group of patients regrets tubal ligation for various reasons. Even though these patient groups are determined to plan the operation with careful examination, 3–8% of women feel remorse after tubal ligation.<sup>[3]</sup> This regret may be due to child death, remarriage, changes in the financial and social status of the family, etc.

However, only 1–3% of this patient population applies to the hospital to have a child again.<sup>[4]</sup> IVF and tubal reanastomosis options are available for these patients. The advantage of tubal reanastomosis over IVF is that it is cost-effective, does not result in multiple pregnancies, and provides natural pregnancy. The disadvantage is that the period of conception can be long. For this reason, it is not a suitable option for those who want to get pregnant at an advanced age.

The chance of pregnancy in women who underwent reanastomosis after sterilization is approximately 25–83.3%.<sup>[5]</sup> The variability in success rates is due to the fact that reanastomosis is not suitable for every woman. Therefore, it is a more appropriate option to refer women who are not suitable candidates for reanastomosis to IVF.

The aim of our study is to investigate whether the tubal recanalization method is an alternative to IVF for patients who underwent tubal sterilization and then wished to have children again.

## MATERIAL AND METHODS

Our study was conducted in accordance with the Declaration of Helsinki. Approval was obtained from the Clinical Research Ethics Committee of Hospital on December 7, 2022, with decision number 142, prior to initiating the study.

In our study, women who wanted to get pregnant again after tubal ligation and underwent tubal recanalization between January 2012 and January 2022 at Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital's Gynecology and Obstetrics Department were retrospectively screened. For the research, an application was made to the Ethics Committee of Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital, and ethics committee approval was obtained. Antimüllerian Hormone (AMH), transvaginal ultrasound, and spouse's spermogram were examined before the operation for all patients who wanted reanastomosis in our clinic. While those with problems resulting from AMH and spermogram tests were referred to IVF, tubal reanastomosis was preferred in the presence of accompanying problems (ovarian cyst, uterine myoma, endometrial polyp, etc.). We retrospectively screened 98 women who were found suitable for tubal reanastomosis and were operated on. Consent was obtained from all women participating in the study with an "informed voluntary consent form." Of these patients, 16 women had tubal reanastomosis because their children had died, 30 women had remarried, and 52 women had changed their minds. After the operation, 12 out of 98 patients could not be reached for the postop-

**Table 1: Clinical and demographic characteristics of the patients**

Age	35.75 (21–48)
Gravida	2.92±1.23 (1–7)
Parity	1.79±0.74 (0–3)
Living children	1.72±0.71 (0–3)
Interval from sterilization to anastomosis (month)	42.2 month (6–132)

erative pregnancy result, so no information could be obtained from them. Therefore, 86 patients were included in the study.

Laparoscopic tubal reanastomosis was performed in 82 women, and tubal reanastomosis was performed in 4 of them due to a history of surgical intervention for recurrent abdominal issues. In the tubal reanastomosis procedure at our clinic, after the connected ends of the tubes are freed, the free ends of the tubes are brought together from 4 quadrants using 4–0 or 5–0 absorbable microsutures, ensuring passage in the proximal region with saline introduced into the cavity. After reanastomosis, methylene blue is administered intraoperatively to confirm that there is no leakage and that methylene blue passes through the tubes. Tubal passage was observed with hysterosalpingography 2 months postoperatively. The information of these women was obtained from the archive. Later, these women were called for follow-up, and those who could not attend were contacted by phone to determine whether they became pregnant after the operation and, if so, how the pregnancy ended.

All statistical data were obtained using SPSS-21. The Student t-test and Chi-square test were used for statistical analysis. Descriptive values are expressed as Mean±Standard Deviation.

## RESULTS

In the patients included in the study, the mean age at tuboplasty was 35.75±6 years, with a minimum age of 21 and a maximum age of 48 years. The mean time from tubal ligation to reanastomosis was 42.2 months. The shortest repentance period was 6 months, while the longest was 132 months. The mean number of deliveries for the patients before reanastomosis was 1.79 (0.74) (Table 1).

The pregnancy rate reaching term in patients who underwent tubal reanastomosis was 29.4%. While the term pregnancy rate was 58.8% in patients under the age of 40, this rate was 19.7% for those over the age of 40 (Table 1).

A total of 85% of tubal reanastomoses were performed laparoscopically, and 15% by minilaparotomy. The pregnancy outcomes between the laparoscopy and minilaparotomy groups were similar (33% vs. 33%)<sup>[6,7]</sup> (Table 2).

## DISCUSSION

There are two options for women who wish to get pregnant again after tubal sterilization: *In vitro* fertilization (IVF) and Tubal Reanastomosis. In a study by Gomel et al.,<sup>[6]</sup> the pregnancy rate for IVF was 28%, while the pregnancy rate after tubal reanastomosis was found to be 55%.<sup>[6]</sup> In the study by Yavuz et al.,<sup>[9]</sup> it was observed that pregnancy rates after tubal reanastomosis reached 60%.

**Table 2: Pregnancy outcomes of tubal reanastomosis**

	%
Pregnancy rate after reanastomosis	33
Live birth rate after reanastomosis	29.4
Live birth rate after reanastomosis in patient under 40 years of age	58.8
Live birth rate after reanastomosis in patients over 40 years old	19.7
Ectopic pregnancy	3
Abortion rate in women who achieved pregnancy	8

When the live birth rates after tubal reanastomosis in our hospital were examined, it was observed that the live birth rate was 29.4% regardless of age, while the live birth rate was 58.8% when narrowed to patient groups under 40 years of age. This result aligns with the literature, which indicates a significant decrease in live birth rates above 40 years of age. The most important unchangeable criterion affecting the success of tubal reanastomosis is maternal age.<sup>[10,11]</sup> In all reanastomosis patients treated in our clinic, the hormone profile was checked; specifically, patients with Anti-Müllerian Hormone (AMH) levels below 1 and those whose spouses had oligospermia or azoospermia in spermogram tests were referred directly to the assisted reproductive center. Although advanced age is seen in the literature to reduce success rates, patients who requested reanastomosis were not excluded from the study and were included in tubal reanastomosis. In these patient groups, pregnancy outcomes were almost similar to *in vitro* fertilization (IVF).<sup>[5,10,12]</sup>

The ectopic pregnancy rate after tubal reanastomosis is reported to be 4–7%.<sup>[5,8]</sup> In our study, the ectopic pregnancy rate was found to be 3.0%, which is lower than the literature.

All of the tubal reanastomoses we performed involved cases of tubal ligation previously performed with the Pomeroy method.

In the study conducted by An Boeckxstaens et al.<sup>[13]</sup> (2007) with 79 women, the live birth rate after tubal ligation was reported as 52%, with a miscarriage rate of 6.3%. Conversely, in the study by Tan and Loh,<sup>[14]</sup> (2010) which focused on women under 40 years old undergoing IVF after tubal ligation for the purpose of conceiving, the pregnancy rate was 46.8%, with a live birth rate of 34.6% and a miscarriage rate of 9.7%. Furthermore, the ectopic pregnancy rate was 1.8%, the rate of multiple pregnancies was 12.8%, and ovarian hyperstimulation syndrome developed in 4.8% of women.

## CONCLUSION

How to counsel and guide patients who wish to become pregnant after tubal ligation is very important. First, it is essential to conduct a thorough gynecological examination and ultrasonography, along with taking a detailed anamnesis from these patients. Additionally, it is crucial to assess the ovarian reserve of the patients and to perform a spermogram analysis of the spouse. Based on these results, if it is predicted that the patient will not be able to conceive spontaneously,

they should be referred to the assisted reproductive techniques center rather than pursuing tubal reanastomosis. However, tubal reanastomosis is a reasonable option for patients with normal test results who also desire reanastomosis. Tubal reanastomosis is significantly more economical compared to the financial burden of *in vitro* fertilization in our country. Pregnancy rates are not lower than those achieved with IVF, either in our cases or in studies in the literature. On the contrary, in most studies, they are higher. Therefore, tubal reanastomosis is a very reasonable option for young patients (especially those under the age of 40), for patient groups with normal AMH levels and spermograms, and for those who wish to conceive naturally.

## Statement

**Ethics Committee Approval:** The Istanbul Zeynep Kamil Maternity and Children's Diseases Health Training and Research Center Clinical Research Ethics Committee granted approval for this study (date: 07.12.2022, number: 142).

**Author Contributions:** Concept – EB, GBUB, RK, SSK, GBİ; Design – EB, GBUB, RK; Supervision – EB, SSK, GBİ; Resource – EB, RK, GBUB; Materials – EB, GBUB; Data Collection and/or Processing – EB, GBİ; Analysis and/or Interpretation – EB, GBİ; Literature Search – EB, SSK, RK; Writing – EB, RK; Critical Reviews – EB, GBUB.

**Conflict of Interest:** The authors have no conflict of interest to declare.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Use of AI for Writing Assistance:** Not declared.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Peer-review:** Externally peer-reviewed.

## REFERENCES

- Mosher WD, Jones J. Use of contraception in the United States: 1982–2008. *Vital Health Stat* 23 2010;1–44.
- Peterson HB, Xia Z, Hughes JM, Wilcox LS, Tylor LR, Trussell J. The risk of ectopic pregnancy after tubal sterilization. U.S. collaborative review of sterilization working group. *N Engl J Med* 1997;336:762–7.
- Gordts S, Campo R, Puttemans P, Gordts S. Clinical factors determining pregnancy outcome after microsurgical tubal reanastomosis. *Fertil Steril* 2009;92:1198–202.
- Liskin L, Rinehart W, Blackburn R, Rutledge AH. Minilaparotomy and laparoscopy: Safe, effective, and widely used. *Popul Rep C Female Steriliz* 1985;C125–67.
- Yoon TK, Sung HR, Kang HG, Cha SH, Lee CN, Cha KY. Laparoscopic tubal anastomosis: Fertility outcome in 202 cases. *Fertil Steril* 1999;72:1121–6.
- Gomel V. Reversal of tubal sterilization versus IVF in the era of assisted reproductive technology: A clinical dilemma. *Reprod Biomed Online* 2007;15:403–7.
- Sastre J, Mínguez JÁ, Alcázar JL, Chiva L. Microsurgical anastomosis of the fallopian tubes after tubal ligation: A systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol* 2023;291:168–77.
- Dubuisson JB, Chapron C. Single suture laparoscopic tubal re-anastomosis. *Curr Opin Obstet Gynecol* 1998;10:307–13.
- Yavuz A, Akkurt MÖ, Yalçın Y, Tatar B, Karakoç G. The reproductive results after reversal of tubal sterilization. *Türkiye Klinikleri J Gynecol Obst* 2015;25:227–30.

10. Chambers GM, Ho MT, Sullivan EA. Assisted reproductive technology treatment costs of a live birth: An age-stratified cost-outcome study of treatment in Australia. *Med J Aust* 2006;184:155–8.
11. Cohen MA, Chang PL, Uhler M, Legro R, Sauer MV, Lindheim SR. Reproductive outcome after sterilization reversal in women of advanced reproductive age. *J Assist Reprod Genet* 1999;16:402–4.
12. Kim JD, Kim KS, Doo JK, Rhyeu CH. A report on 387 cases of microsurgical tubal reversals. *Fertil Steril* 1997;68:875–80.
13. Boeckxstaens A, Devroey P, Collins J, Tournaye H. Getting pregnant after tubal sterilization: Surgical reversal or IVF? *Hum Reprod* 2007;22:2660–4.
14. Tan HH, Loh SF. Microsurgical reversal of sterilisation - is this still clinically relevant today? *Ann Acad Med Singap* 2010;39:22–6.