

Pregnancy Outcome of Laparoscopic Tubal Reversal: A Retrospective Study

Laparoskopik Tubal Re-Anastomoz Yapılan Hastaların Gebelik Sonuçlarının Retrospektif Analizi

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ABSTRACT

Objective: Tubal sterilization is one of the most common contraceptive methods but in a small group of women, post-sterilization regret occurs. This study aimed to evaluate the reproductive outcome after laparoscopic tubal reanastomosis for sterilization regret. **Materials and Methods:** We retrospectively evaluated with ethical approval 32 patients' file with bilateral tubal ligation who were referred for laparoscopic tubal reanastomosis from september 2016 to may 2018 in Health Sciences University Gazi Yasargil Research and Training Hospital. End to end tubal anastomosis was performed by single-layer and using 4-stitch closure technique. The primary outcome was overall pregnancy, others were intrauterine pregnancy, ongoing pregnancy, ectopic pregnancy and interval from surgery to pregnancy. **Results:** A new spouse (9.4%), loss of a child (15.6%), desire of another child (71.9%), child with different sex (31.3%) and post-tubal ligation syndrome (12.5%) were the reasons for tubal reversal. The mean age of the patients was 35.6±4.7 years (range 24-46). Age was significant between pregnant (33.1±4.4) and non-pregnant (36.6±4.5) patients (p=0.06). The mean interval between sterilization and reversal was 5.4±2.3 years (range 1-10 years). The mean duration of operation was 112.1±34.9 minutes. In results of reanastomosis; 13(40.625%) patients unilateral, 19(59.375%) patients bilateral reversal procedure were performed. After reanastomosis, overall pregnancy frequency 9(28.1%) was given. In calculation of overall pregnancy; intrauterine 8(25%), ectopic 1(3.1%) and ongoing 1(3.1%) values take into account. The mean interval from surgery to pregnancy was 14.6 months (range, 3-24 months). **Conclusion:** Laparoscopic tubal reversal is an important alternative to IVF and has the advantages of fewer complications, less postoperative discomfort, a smaller incisional scar, a shorter recovery time, and earlier resumption of normal activities compared with laparotomy. In our study, the rate of all pregnancies was 28.1% and the mean age of the pregnant group was 33.1 while the mean age was 36.6 in the non-pregnant group. In sterilized women who suffer regret, laparoscopic tubal reanastomosis is an effective treatment, especially in younger women.

Key Words: Laparoscopy; tubal reanastomosis; refertilization

ÖZET

Amaç: Tubal sterilizasyon en sık kullanılan kontraseptif yöntemlerden biridir, ancak küçük bir grup kadında, sterilizasyon sonrası pişmanlık oluşur. Bu çalışmada, sterilizasyon pişmanlığı duyan kadınlarda laparoskopik tubal re-anastomoz sonrası üreme sonuçlarını değerlendirmeyi amaçladık. **Gereç ve Yöntemler:** Sağlık Bilimleri Üniversitesi Gazi Yaşargil Eğitim ve Araştırma Hastanesi'nde Eylül 2016'dan Mayıs 2018'e kadar laparoskopik tubal re-anastomoz için başvuran bilateral tubal ligasyonu olan 32 hastanın dosyası, etik onay alınarak retrospektif olarak değerlendirildi. Tubal re-anastomoz, uç uca tek tabaka ve 4-dikiş kapatma tekniği kullanılarak gerçekleştirildi. Birincil sonuç gebeliklerin hepsi, diğer sonuçlar intrauterin gebelik, devam eden gebelik, ektopik gebelik ve ameliyattan hamileliğe kadar geçen süredir. **Bulgular:** Yeni bir eş (%9,4), çocuk kaybı (%15,6), başka bir çocuk isteği (%71,9), farklı cinsiyette çocuk istemi (%31,3) ve post-tubal ligasyon sendromu (%12,5), tubal re-anastomoz nedenleridir. Hastaların yaş ortalaması 35,6±4,7 yıldır (24-46 yaş). Hamileler (33,1±4,4) ve gebe olmayan (36,6±4,5) hastalar arasında yaş farkı anlamlı bulunmuştur (p=0,06). Sterilizasyon ve re-anastomoz arasındaki ortalama süre 5,4±2,3 yıldır (1-10 yıl). Operasyon süresi ortalama 112,1±34,9 dakikadır. Re-anastomoz sonuçları; 13(40,625%) hastaya tek taraflı, 19(59,375%) hastaya bilateral re-anastomoz işlem uygulandı. Re-anastomoz sonrası tüm gebeliklerin sayısı 9 (%28,1) olarak verildi. Bu gebelikler; intrauterin 8 (%25), ektopik 1 (%3,1) ve devam eden gebelik 1 (%3,1) şeklindedir. Ameliyattan gebeliğe kadar geçen ortalama süre 14,6 aydır (3-24 ay). **Sonuç:** Laparoskopik tubal re-anastomoz, IVF için önemli bir alternatiftir ve laparotomi ile karşılaştırıldığında daha az komplikasyon, daha az postoperatif rahatsızlık, daha küçük bir insizyonel skar, daha kısa iyileşme süresi ve normal aktivitelerin daha erken başlaması gibi avantajlara sahiptir. Çalışmamızda tüm gebeliklerin oranı %28,1 olup gebe kalan grubun yaş ortalaması 33,1'e karşılık gebe kalmayan grubun yaş ortalaması 36,6 olarak bulduk. Pişmanlığa uğramış bu hastalarda laparoskopik tubal re-anastomoz, özellikle genç kadınlarda etkili bir tedavidir.

Anahtar Kelimeler: Laparoskopi; tubal re-anastomoz; refertilizasyon

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Female sterilization is a widely used contraceptive method. The incidence of poststerilization regret has been reported to be 3-8%, despite careful consideration prior to this procedure.¹ The most important reason for people to choose this method is because it is permanent. Several characteristics of patients have been determined to be predictors of regret. One of the major risk factors for subsequent regret of sterilization is a young maternal age at the time of sterilization. Other potential factors are death of a child, a change in marital status, and desire to have another child because of improvement of the socioeconomic condition of the family.²

The procedures for reversal of sterilization were developed during the last few decades, with the first procedure performed in the early 1970s by laparotomy.³ With this surgical approach, a midline abdominal incision is made, through which the fallopian tubes can be accessed. Next, the occluded ends of the tubes are excised and methylene blue is instilled to test the degree of patency. An anastomosis is then made with sutures and in most cases, supplemented by the use of a splint.⁴ During the same period of time, the laparoscopic approach was implemented.⁵ Similar to laparotomic microsurgical procedures, the two-layer technique was often employed. Other techniques include single-layer, 1-stitch, 2-stitch, 3-stitch, 4-quadrant sutures or sero-muscular fixation with microstaplers and biological glue.⁶ In most laparoscopic procedures, a supplementary splint is used as well.

Conventionally, the gold standard for recanalization has been microsurgical tubal recanalization through the laparotomy route. Recent improvements in laparoscopic microsurgical instruments have allowed tubal reanastomosis to be performed by laparoscopy. Excellent results have been reported after laparoscopic tubal reanastomosis. Reports on the pregnancy rate after laparoscopic tubal reversal have demonstrated as favourable results as those with microsurgical reversal.⁷ Minimally invasive laparoscopic microsurgery has introduced a

new dimension for tubal reconstruction as the magnification obtained is similar to that obtained with an operating microscope. The major advantage is short postoperative stay duration with minimal tissue handling, less postoperative adhesions. The laparoscopic procedure for reversal of tubal sterilization is equally effective as the laparotomic approach.⁸

Tubal reversal can be done by either laparotomy or laparoscopy. So far, various different techniques have been described with both methods. Therefore, this study aimed to present the results of reproductive outcome of 32 patients who underwent laparoscopic tubal reanastomosis.

MATERIALS AND METHODS

We retrospectively evaluated with ethical approval 32 patients with bilateral tubal ligation who were referred for laparoscopic tubal reanastomosis from september 2016 to may 2018 in Health Sciences University Gazi Yasargil Research and Training Hospital. Tubal sterilization was performed by Pomeroy's technique during caesarean section in all of the patients. If the total length of the tuba was greater than 4cm and there was no adhesions, surgery was performed. Therefore, some patients were bilateral, some patients were unilateral reversal procedure were performed. All the patients were operated by B. and were telephoned and asked whether they were pregnant or not, after tubal reversal. The primary outcome was overall pregnancy. Other outcomes were intrauterine pregnancy, ongoing pregnancy, ectopic pregnancy and interval from surgery to pregnancy month. We studied clinical characteristics, including age, gravida, parity, abortus, type of anastomosis, operation time, ligation interval. We evaluated the reason for tubal reanastomosis such as a new spouse, loss of a child, desire of another child, child with different sex and post-tubal ligation syndrome.

The tubal sterilization reversal procedures were performed by laparoscopy under general anesthesia. First the status of the tubes was evalu-

ated and the suitability of the tubes for recanalization was decided. Depending on the suitability of the tubes for recanalization, the laparoscopic tubal reanastomosis was performed either unilaterally, bilaterally, or not performed at all. End to end tubal anastomosis was performed by single-layer and 4-stitch closure using with 4-0 polyglactin 910 (Vicryl; Ethicon). First suture at 6 o'clock was taken and then respectively 9 and 12 o'clock were taken in the muscularis layer. The last suture at 3 o'clock was taken in the muscularis layer. The patency was assured intraoperatively by methylene blue injection. The patients were discharged on the second day of surgery.

STATISTICAL METHOD

All statistical analyses were performed using SPSS for Windows version 17.0 (SPSS Inc., Chicago, IL, USA). Data were expressed as means, medians, standard deviations, and percentages. We used Student's t test to compare group means and Fisher exact test to compare proportions. A P value of <0.05 was considered significant.

RESULTS

A total of 32 patients with bilateral tubal ligation who underwent laparoscopic unilateral or bilateral tubal reversal were evaluated retrospectively. A new spouse (9.4%), loss of a child (15.6%), desire of another child (71.9%), child with different sex (31.3%) and post-tubal ligation syndrome (12.5%) were the reasons for tubal reversal procedure. The mean age of the patients was 35.6±4.7 years (range 24-46). Age was marginally significant between pregnant (33.1±4.4) and non-pregnant (36.6±4.5) patients (p=0.06). The mean interval between sterilization and reversal was 5.4±2.3 years (range 1-10 years). The operation time ranged from 45 to 210 minutes with a mean time of 112.1±34.9 minutes. In addition, results of gravida (4.84±1.5), parity (3.97±1.2) and abortus 19(59.4%) are given in (Table 1).

In results of reanastomosis; 13(40.625%) patients unilateral, 19(59.375%) patients bilateral reversal procedure were performed. After reanastomosis, overall pregnancy frequency 9(28.1%) was

TABLE 1: Characteristics of the patients.

	n (%)
<i>Reason of tubal reversal</i>	
1) New spouse	3 (9.4)
2) Loss of a child	5 (15.6)
3) Desire of another child	23 (71.9)
4) Different sex	10 (31.3)
5) Post-tubal lig symptom	4 (12.5)
Abortus	19 (59.4)
<i>Mean±SD (Min-Max)</i>	
Ligation interval, years	5.4±2.3 (1-10)
Operation time, min	112.1±34.9 (45-210)
Gravida	4.84±1.5 (2-8)
Parity	3.97±1.2 (2-7)
Age, years	35.6±4.7 (24-46)*
<i>Pregnant</i>	33.1±4.4 (24-38)
<i>Non-pregnant</i>	36.6±4.5 (31-46)

*Age difference between pregnant and non-pregnant woman is marginally significant 0.05<p<0.10.

TABLE 2: Results of the reversal procedure.

	n (%)
Reanastomosis	
1) Unilateral	13 (40.6)
<i>Pregnant</i>	1 (7.7)
<i>Non-pregnant</i>	12 (92.3)
2) Bilateral	19 (59.4)
<i>Pregnant</i>	8 (42.1)
<i>Non-pregnant</i>	11 (57.9)
Overall pregnancy	9 (28.1)
Intrauterine pregnancy	8 (25.0)
Ectopic pregnancy	1 (3.1)
Ongoing pregnancy	1 (3.1)
<i>Mean±SD (Min-Max)</i>	
Interval from surgery to pregnancy month	14.6±6.3 (3-24)

given in (Table 2). In calculation of overall pregnancy; intrauterine 8(25%), ectopic 1(3.1%) and ongoing 1(3.1%) values take into account. The mean interval from surgery to pregnancy was 14.6 months (range, 3-24 months).

DISCUSSION

Although tubal sterilization is done as a permanent contraception method, few unfortunate women

may seek reversal later. In the current study, the most common reason for seeking reversal was death or disability of child (72%) followed by second marriage (28%).⁹ The most common reason for seeking reversal in our work was desire of another child (71.9%) and within the second frequency was child with different sex (31.3). On the contrary, the most common reason for regretting sterilization in the developed countries was the desire to have children from a new husband.

In the last 3 decades, microsurgical tubal reanastomosis has been offered to patients with tubal ligation who desired pregnancy.¹⁰ Using microsurgical techniques, reported pregnancy rates vary between 57% and 84% with a risk for ectopic pregnancy of 2% to 7%.¹⁰ Age at the time of tubal reversal is the most important factor in the outcome of tubal reanastomosis (especially younger than 35 years of age). The average age of the patients who were pregnant in our study was 33.1±4.4 and the average age of those who were not pregnant was 36.6±4.5. This result supports the literature. The remaining total tubal length appears to be one of the prognostic factors of tubal reanastomosis. Poor results have been reported when the total tubal length was shorter than 4cm.¹¹ In our study, if the total length of the tuba of the patients was over 4cm and there is no adhesion, surgery was performed. Therefore, some patients were bilateral, some patients were unilateral reversal procedure were performed. The literature also supports the same, and a previous study reported 100% pregnancy rate with >4 cm and 0% with <3 cm of the tubal length after tubal reversal by microsurgical technique.¹²

A laparoscopic approach of this procedure was introduced by Sedbon et al. in 1989 using biological glue and an intraluminal guidewire.¹³ Since then, several techniques have been reported with different pregnancy rates (PRs). In 1993, Reich et al. reported a series of 22 laparoscopic tubal anastomoses with the two-suture technique. The PR was 35% in their study.¹⁴ Yoon et al. reported 54 cases of laparoscopic microsurgical reanastomosis. The overall PR was

77.5% and there was one case of ectopic pregnancy.¹⁵ Dubuisson's research group reported their experience with single-suture laparoscopic tubal reanastomosis in 1998. The overall intrauterine PR was 53.1%. The operative time was reduced to an average of 72 minutes.¹⁶ Bissonnette et al. reported an intrauterine PR of 65.3% in 102 patients using the one-suture technique.¹⁷ Yoon et al. performed anastomosis of the tube in two layers, with four sutures in each layer. They reported an intrauterine PR of 82.8% in 202 patients.¹⁸ However, Ribeiro et al. reported a PR of 56.5% in 2003.¹⁹ They used conventional 5mm laparoscopic instruments and a one chip camera, and performed the anastomoses in a single plane, including the muscularis and serosa in one layer. Karayalcin R. et al. reported overall pregnancy, intrauterine pregnancy, and ectopic pregnancy rates were 55.5% (15/27), 51.8% (14/27), and 3.7% (1/27), respectively.²⁰ K Jayakrishnan et al. reported overall pregnancy rate was 58.8%.²¹ Çetin C, et al. reported clinical pregnancy rates were higher in the tubal reversal group 55.2%.²² Jacoba A.H. van Seeters et al. reported pregnancy rate after sterilization reversal was 42-69%, with heterogeneity seen from the different methods utilized and ectopic pregnancy rate was 4-8%.²³ In our study we found the following results in: overall pregnancy, intrauterine pregnancy, and ectopic pregnancy rates were 9(28.1%), 8(25%) and 1(3.1%) respectively. Our pregnancy outcomes are slightly lower than the literature. The laparoscopic approach potentially involves less manipulation of intraperitoneal organs and causes less bleeding.²⁴ These advantages may result in fewer adhesions further enhancing the pregnancy rate and is a preferred technique in many centers.

The other treatment option for women who wish to become pregnant after having had tubal sterilization is IVF. The European IVF-monitoring program showed a pregnancy rate per IVF cycle of nearly 27% in patients who were submitted to IVF in 521 Human Reproduction Centres in 18 countries in Europe.²⁵ The advantage of IVF is that success or failure is recognized during

the same treatment cycle. IVF allows cryopreservation of good-quality embryos, which permits another replacement cycle. This is an important aspect for women in advanced reproductive age. However, after surgery, time is required to achieve pregnancy, leading to some anxiety for couples. Therefore, treatment should be individualized based on findings resulting from investigation of couples, their wishes, and the costs involved.

The limitations of the study are its retrospective nature, small group to arrive at a statistically significant result, and a relatively short follow-up period.

In conclusion, laparoscopic tubal reversal should be considered as a first-line treatment option for young women without other infertility factors. Because laparoscopic tubal reanastomosis has the advantages of fewer complications, less postoperative discomfort, a smaller incisional scar, a

shorter recovery time, and earlier resumption of normal activities compared with classic microsurgery. Our study showed that the overall pregnancy rate was 28.1% and the mean age of the pregnant group was 33.1 while the mean age was 36.6 in the non-pregnant group. We consider that this technique is an alternative to classic microsurgery in patients who desire reversal of tubal sterilization.

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Ethics

The study was approved by the Ethics Committee of University of Health Sciences Diyarbakır Gazi Yaşargil Education and Research Hospital in Turkey (approval number: 2018-95).

Conflict of Interest

No conflict of interest was declared by the authors.

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