

## Fertility Outcome and Recurrence of Ectopic Pregnancy in Patients with Tubal Ectopic Pregnancy underwent Laparoscopic Salpingectomy versus Laparoscopic Salpingostomy

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### Abstract

**Background:** Patients with symptomatic ectopic pregnancy are treated surgically through either salpingectomy or salpingostomy. There is evidence that laparoscopic salpingectomy may reduce fertility due to the absence of one tube and in regard to the recurrence, some investigations have showed higher recurrence of ectopic pregnancy in salpingostomy than salpingectomy but some others have reported equal recurrence in both techniques. This study compares the effects of laparoscopic salpingectomy and laparoscopic salpingostomy on fertility outcome and recurrence of ectopic pregnancy.

**Method:** This was a comparative study on a sample of pregnant women with tubal ectopic pregnancy who underwent a surgical treatment in a teaching hospital affiliated to Tehran University of Medical Sciences between 2014 and 2017. Women underwent either laparoscopic salpingectomy (group 1) or laparoscopic salpingostomy (group 2). Fertility outcome and the rate of recurrence of ectopic pregnancy were compared between the two groups.

**Results:** In whole, 390 pregnant women were treated surgically for ectopic pregnancy. Of these, 213 patients attempted to become pregnant after the surgery and were entered into the study (107 in group 1 and 106 in group 2). The frequency of intrauterine pregnancy was 55 in group 1 and 64 in group 2 while the frequency of ectopic pregnancy recurrence was 4 in group 1 and 3 in group 2 ( $P = 0.45$ ).

**Conclusion:** The findings indicated that laparoscopic salpingectomy and laparoscopic salpingostomy did not significantly differ in recurrence of ectopic pregnancy and intrauterine fertility.

### Introduction

Ectopic pregnancy (EP) is one of the most common emergencies in gynecology and its incidence is increasing worldwide (1, 2). It is believed that more than three-quarter of deaths at the first trimester of pregnancy are due to ectopic pregnancy (3). There are several risk factors for ectopic

pregnancy including pelvic adnexal surgery, history of ectopic pregnancy, tubal anatomical defects, congenital anomalies, endometriosis, tubal sterilization failure and intrauterine devices. (4, 5). Currently, different treatment procedures exist in the management of ectopic pregnancy including expectant management, medical therapy, and laparoscopic or laparotomy

surgeries (6) However, the preferred surgical method is laparoscopy that could be performed as a complete procedure with the removal of the fallopian tube (salpingectomy) or as a conservative procedure with the removal of just the trophoblast (salpingostomy).

The advantages and disadvantages of these two laparoscopic methods for ectopic pregnancy have been well documented, although controversies exist among scholars on the topic (7-11). Some investigations showed higher future fertility following salpingostomy compared with salpingectomy because of the preservation of both tubes versus one tube and consequently higher reproductive capacity (7, 8), while other investigations indicated that both modalities have similar fertility outcomes (9-11). The possible disadvantage of salpingostomy is higher rate of incomplete removal of the product of conception (persistent ectopic pregnancy) requiring additional treatment and higher risk of recurrent ectopic pregnancy in the same tube (3, 7-9, 12, 13). However, some investigations showed no significant difference between conservative surgery and total surgery in recurrent ectopic pregnancy (8, 11).

This study aimed to compare salpingectomy and salpingostomy in terms of subsequent fertility and recurrent ectopic pregnancy among women who had previously received either of these methods for ectopic pregnancy. In fact, since tubal surgery is one of the most important risk factors of ectopic pregnancy, the objective of this study was to compare two surgical procedures to find out a preferred surgical method in order to improve fertility outcomes and reduce risk of recurrent ectopic pregnancy.

## Materials and Methods

This was a retrospective study. We reviewed case records of women with tubal ectopic pregnancy attended a women's teaching hospital affiliated to Tehran University of Medical Sciences between October 2014 and December 2017.

## Data extraction

All case records were examined and a number of demographic and clinical information including age, gravity, history of abortion, ectopic pregnancy and surgery, symptoms, and type of surgery (salpingectomy or salpingostomy) were extracted. As such a list of women received salpingectomy or salpingostomy during the study period was provided. Then, we contacted all women via phone calls and after explaining the study objective and getting their agreement, interviews were conducted.

Women were asked the following questions:

- Did you attempt to conceive pregnancy after your previous surgery?
- Did you get pregnant?
- If yes, when, and whether it was normal or you experienced the same pregnancy as you did previously (ectopic pregnancy)? If the pregnancy was normal, what was the outcome of your pregnancy (abortion or live birth)?

The main investigator made all telephone calls.

## Statistical analysis

Descriptive statistics including mean, standard deviation, frequency and percentage were used to explore the data. All qualitative variables were analyzed using  $\chi^2$  test. The statistical significant level was considered as  $P < 0.05$ .

**Results**

All 390 patients who had been received laparoscopic surgery for ectopic pregnancy were approached. Of these, 177 women who did not wish to get pregnant again were excluded. The remaining 213 patients were entered and divided into the

salpingectomy (n = 107, group 1) and salpingostomy (n = 106, group 2) groups. There were no significant differences between the two groups in age, education, gravity and history of abortion and ectopic pregnancy. The characteristics of the patients are presented in Table 1.

**Table 1.** Demographic characteristics of patients

	All (n=213)	Salpingectomy (n = 107)	Salpingostomy (n = 106)	P*
<b>Age (year)</b>	No (%)	No (%)	No (%)	0.2
18-30	52 (14.4)	23 (21.5)	29 (27.4)	
30-35	83 (39)	48 (44.3)	35 (33)	
>35	78 (36.6)	36 (33.6)	42 (39.6)	
<b>Gravity</b>				0.6
0	66 (31)	34 (31.8)	32 (30.2)	
1	100 (46.9)	51 (47.7)	49 (46.2)	
2	19 (8.9)	12 (11.2)	7 (6.6)	
≥3	28 (13.2)	18 (9.3)	10 (17)	
<b>History of abortion</b>				0.29
0	166 (77.9)	88 (82.2)	78 (73.6)	
1	36 (16.9)	15 (14)	21 (19.8)	
>2	11 (5.2)	4 (3.7)	7 (6.6)	
<b>History of ectopic pregnancy</b>				0.53
No	202 (93.8)	100 (93.5)	102 (96.2)	
Yes	11 (5.2)	7 (6.5)	4 (3.7)	
<b>History of surgery</b>				0.37
None	106 (50.5)	55 (51.9)	51 (49)	
Curettage	5 (23)	1 (0.9)	4 (3.7)	
Cesarean	99 (46)	50 (46.7)	49 (46.2)	
<b>Symptom</b>				0.78
None	27 (13.2)	13 (12.9)	14 (13.5)	
Pain	54 (26.3)	29 (28.7)	25 (24)	
Vaginal bleeding	33 (16.1)	14 (13.9)	19 (18.3)	
Pain and bleeding	91 (44.4)	45 (44.6)	46 (44.2)	

\*Derived from Chi-square test.

## Outcomes

Following salpingectomy or salpingostomy, 127 pregnancy had been occurred during the two years of study. There was no significant difference in the time of pregnancy after the surgery between the two groups. However, the

maximum rate of pregnancy was in the second half of the first year. The rate of intrauterine pregnancy was 55 (93.2%) in group 1 and 63 (95.5%) in group 2 ( $P = 0.45$ ). The rate of recurrent ectopic pregnancy was 4 (6.8%) in group 1 and 2 (4.5%) in group 2. The results are shown in Table 2.

**Table 2.** Comparison of fertility outcome in women who had undergone either laparoscopic salpingectomy or salpingostomy for ectopic pregnancy

	Salpingectomy (n=107)	Salpingostomy (n=106)	P*
<b>Time of Pregnancy after the surgery</b>			0.61
no pregnancy	48 (44.9)	40 (37.7)	
up to 6 month	21 (35.5)	19 (24.0)	
from 6 up to 12 month	26 (44.0)	33 (50.0)	
after one year	12 (20.5)	14 (21.0)	
<b>Type of Pregnancy</b>			0.45
IUP	55 (93.2)	63 (95.5)	
EP	4 (6.8)	3 (4.5)	
<b>Pregnancy outcome**</b>			0.71
delivery	39 (71.0)	45 (71.5)	
abortion	16 (29.0)	18 (28.5)	

\*Derived from Chi-square test.

\*\* IUP pregnancy was considered.

## Discussion

Maternal morbidity due to ectopic pregnancy in the first trimester, including subsequent fertility is one of the most important issues for woman's health. The subsequent fertility outcome after tubal EP among different surgical methods is still controversial (11, 14-16).

In the present study, we evaluated fertility outcome and recurrent ectopic pregnancy according to positive serum beta HCG and ultrasound. We compared two laparoscopic approaches in patients with tubal ectopic pregnancy. The findings of this study indicate no significant differences between salpingectomy and salpingostomy in fertility outcome

and recurrent ectopic pregnancy. In addition, we found no significant difference in the time of pregnancy after surgery between the two groups. Similarly, some previous studies have showed no statistical difference in subsequent fertility after salpingectomy versus salpingostomy (6, 10, 15, 17, 18). However, some studies have reported lower rate of intra uterine pregnancy (IUP) in salpingectomy (8, 9, 16) and conversely, other studies have reported higher rate of IUP in salpingectomy than in salpingostomy (11, 15). In our study, IUP rate was 51.4% following salpingectomy and 60.3% following salpingostomy. In other studies, IUP rate has been 55.5% up to

67% following salpingectomy and 50.9% up to 76% following salpingostomy (8, 9, 11, 15).

The rate of recurrent EP according to the applied surgical technique is still controversial. Some studies have reported a higher risk of recurrence after laparoscopic salpingostomy versus salpingectomy (13), while other studies have showed no significant difference between the two methods (8, 11, 16, 19). In our study, EP recurrence rate following salpingectomy was 4 (3.7%) and it was 1.8% following salpingostomy. In other studies, the rate of recurrence EP has been 5% up to 18.5% following salpingectomy and 8% up to 18.5% following salpingostomy (8-11, 16, 19).

The findings of current study showed no preference for either of salpingectomy or salpingostomy. Perhaps the best way to select one of them is to decide based on the following considerations: patient's preference (7), maximizing future pregnancy, healthy contralateral tube (9), attempting to conceive naturally or with IVF and presentation of hydrosalpinx (20). A study on patients' preferences showed a strong preference towards salpingectomy (7). It has been argued that salpingostomy may increase the risk of persistent trophoblastic disease. In patients planning on IVF, salpingectomy is recommended in cases of hydrosalpinx. However, for IVF success and spontaneous pregnancy rates, salpingectomy must be considered by the indication [20].

This study had some limitations. Firstly, this was a retrospective observational study and additional randomized clinical trials are needed to confirm our findings. Secondly, the outcomes of IUP and recurrence of EP were followed up to 24 months. A longer follow-up might have different results.

Finally, it is recommended that in the future studies when extracting data from case records, investigators report data about the criteria for choosing salpingectomy or salpingostomy and about the prevalence of permanent disease in salpingostomy cases.

## Conclusion

The findings of the present study indicates that laparoscopic salpingectomy and laparoscopic salpingostomy do not differ in fertility outcome and recurrence of ectopic pregnancy.

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## Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Conflict of interest

Authors have no conflict of interest.

### Ethics approval and consent to participate

The Institutional Review Board and Ethics Committee of Tehran University of Medical Science approved the study (IR.TUMS.MEDICINE.REC.1397.538).

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### Competing interests

The authors decline any competing interests.

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