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Original article

A Retrospective Study on Reproductive Outcomes After Medical And Surgical Management of Tubal Ectopic Pregnancy

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ABSTRACT

Objectives: Ectopic pregnancy (EP) is a gynecological emergency as it is one of the major causes of maternal death in the first trimester. Currently, there is a lack of sufficient data on the success and future fertility rates in EP cases. To address this gap, we conducted a retrospective study to compare the success rates and the impact on fertility and reproductive outcomes of surgical versus medical management for tubal EP. **Methods**: It was a retrospective study conducted in the Department of Obstetrics and Gynaecology of a tertiary care hospital. Medical records of patients with ectopic pregnancy within the study period who satisfied the inclusion and exclusion criteria of the study were enrolled. The records of all patients enrolled in the study were analyzed and recorded in a specially designed data collection form. **Results**: There were 90 samples during the study period based on inclusion and exclusion criteria. Twenty-eight cases were managed medically, and another sixty-two cases were managed surgically. Subsequent positive pregnancy rates were 71.4% (20/28) after medical treatment and 51.6% (32/62) after surgical Intervention. Among patients who conceived following medical management, seven patients (35%) experienced recurrent ectopic pregnancy, and one patient had a first-trimester miscarriage. For patients who were managed surgically, fifteen patients (24.19%) had repeat ectopic pregnancy. **Conclusion**: Medical management of tubal ectopic pregnancy was associated with a higher subsequent pregnancy rate compared to surgical management, although this difference was not statistically significant. However, the risk of recurrent ectopic pregnancy was higher in the medically managed group. These findings highlight the need to balance fertility preservation with the risk of recurrence when selecting the appropriate management strategy.

1. INTRODUCTION

In an ectopic pregnancy, implantation of the embryo occurs outside the uterine cavity, most probably in the fallopian tube. Ectopic implantation can also occur at other sites, such as the cervix, myometrium, uterine cornua, and abdominal cavity. Any damage to the fallopian tube can induce tubal dysfunction, which may result in retention of an oocyte or embryo. The ampullary region is the most common site for ectopic pregnancy. Also, ectopic pregnancy can develop in the infundibular and isthmic regions of the fallopian tubes. Transvaginal ultrasound imaging and serum HCG levels are used in the diagnosis of ectopic pregnancy (Dhar et al., 2011).

With the development of laparoscopic techniques, rapid and minimally invasive interventions are almost always possible, which may be radical, by the removal of the entire fallopian tube (salpingectomy), or conservative, with the only

removal of the products of gestation from the tube by salpingostomy. Non-surgical treatments for ectopic pregnancy include expectant management and methotrexate (MTX) injections, administered either intramuscularly or intravenously. MTX treatment for uncomplicated EPs has been reported to be effective, safe, and less costly compared to surgery, and it also avoids the potential complications associated with surgical procedures (Baggio et al.,2021).

In choosing the treatment modality for ectopic pregnancy (EP), multiple factors need to be considered, including the patient's medical status, the success rate, complications, side effects, and costs. Additionally, the impact on subsequent fertility is a crucial variable. Research gaps exist in understanding long-term fertility outcomes following different ectopic pregnancy management strategies. Limited data addresses predictors of treatment success for fertility preservation. To address this gap, we conducted a retrospective study to compare the success rates and the impact on fertility and reproductive outcomes of surgical versus medical management for tubal EP (Asgari et al.,2021).

2. METHODOLOGY

2.1 Study Design

It was a retrospective study with the aim of comparing the fertility and reproductive outcome after surgical and medical management for tubal ectopic pregnancy. Objectives of the study were to compare the fertility rate after medical and surgical management of ectopic pregnancy and to assess the reproductive outcomes after an ectopic pregnancy. The flowchart of the study population and follow-up is given in Figure 1.

2.2 Subject Selection

Patients were selected based on inclusion and exclusion criteria. Patients admitted during the study period with tubal ectopic pregnancy who were managed medically or surgically were included in the study, but patients with a history of infertility treatment, Patients who were managed expectantly, and patients aged> 40 at the time of diagnosis of ectopic pregnancy were excluded from the study.

2.3 Data Collection Methods

The retrospective study period was from January 2010 to January 2023. Medical records of patients with ectopic pregnancy within the study period and who satisfied the inclusion and exclusion criteria of the study were enrolled. A specially designed data collection form was prepared to record the data.

Patients were followed up to assess subsequent pregnancy outcomes through hospital medical records and by telephonic contact using details available in the medical records. Information regarding conception, pregnancy outcome, and recurrence of ectopic pregnancy was recorded. Patients were followed for a minimum period of six months to document reproductive outcomes. In patients who conceived earlier, the time to conception was recorded, which ranged from two months to six years following treatment.

2.4 Diagnostic criteria and treatment protocols

The diagnosis of tubal ectopic pregnancy was based on clinical presentation, transvaginal ultrasonography findings and serum β-hCG levels as documented in medical records. Medical management with methotrexate was administered according to institutional protocols, which included single-dose and multi-dose regimens depending on clinical parameters and the treating physician's discretion. Surgical management included laparoscopic or open procedures, with salpingectomy or salpingostomy performed based on intraoperative findings and patient stability. Follow-up methods included review of hospital medical records and telephonic contact with patients after obtaining ethical approval.

2.5 Ethical Consideration

The Institutional Ethics Committee of Lourdes Hospital, Post Graduate Institute of Medical Science and Research, Ernakulam approved the study titled "A retrospective study on reproductive outcomes after medical and surgical management of tubal ectopic pregnancy (LH/EC/2023-39, Dated 11/10/2023).

2.6 Statistical Analysis

The data collected was compiled using Microsoft Excel and presented using bar graphs to visualize the information. To perform statistical analysis, the data were imported into SPSS. Categorical variables were analysed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

3. RESULTS AND DISCUSSION

In our study period, 104 women were admitted to the hospital with a diagnosis of ectopic pregnancy. Five of 104 were excluded from the study population because patients had a history of infertility treatment. Four women had a history of tubal ectopic pregnancy

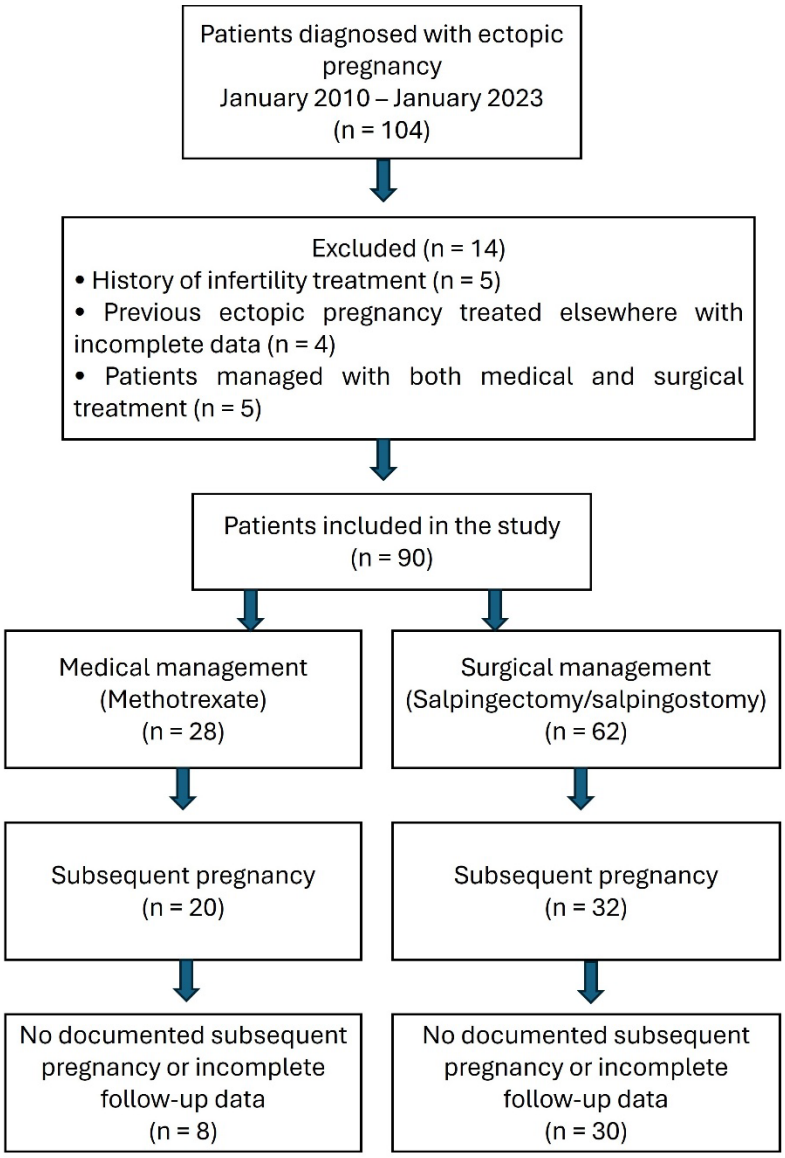

Figure 1: Flowchart of study population and follow-up

but were excluded from the study because the previous hospitalization was elsewhere, and information was not available, and five patients were excluded because they were managed both medically and surgically. Twenty-eight women were managed medically, and sixty-two other women were managed surgically. Subsequent positive pregnancy rates were 71.4% (20/28) for medical treatment and 51.6% (32/62) for surgical treatment. (Figure 2)

71.4% of the patients who received methotrexate had their next pregnancy, and only 51.6% of the patients who underwent surgical intervention for ectopic pregnancy had their next pregnancy. Since the p-value > 0.05, there was no statistically significant association between the next pregnancy and treatment mode during ectopic pregnancy. (Table 1) However, the risk of recurrent ectopic pregnancy was higher in the medically managed group.

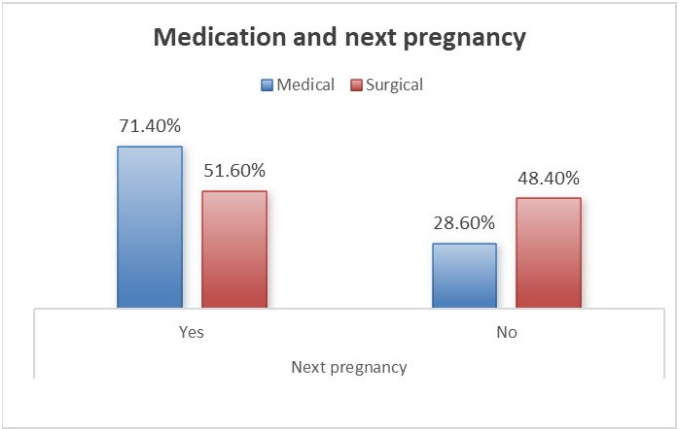

Figure 2: Subsequent pregnancy rate in surgical management vs drug management

Table 1: Association between treatment modality (medical vs surgical) and subsequent pregnancy

	Treatment				X^2	p-value
	Medical		Surgical			
Next pregnancy	**f**	**%**	**f**	**%**		
Yes	20	71.40%	32	51.60%		
No	8	28.60%	30	48.40%	3.11	0.062
Total	28	100.00%	62	100.00%		

f = frequency; % = percentage.

Statistical analysis was performed using the Chi-square test. A p-value < 0.05 was considered statistically significant.

Table 2: Duration to subsequent Pregnancy after Medical Vs Surgical Management

Duration	**Pregnancy after treatment**	
	Medical	**Surgical**
2 months	0	1
3 months	0	1
4 months	0	1
5 months	1	0
6 months	3	3
9 months	2	0
10 months	1	0
1 year	9	13
2 years	3	10
3 years	0	1
4 years	0	1
5 years	0	1
6 years	1	0
Total	20	32

About medical treatment, a single dose of MTX was enough for 18 patients, 9 patients required two doses, and one patient needed three doses. Therapy was successful for all of them, with the spontaneous improvement of symptoms. Regarding the surgical management, 57 patients underwent salpingectomy and salpingostomy was done for 5 patients.

Study subjects were followed up to know their reproductive outcomes. We assessed the interval between surgical or medical management of ectopic pregnancy and the next conception. Among the twenty-eight patients who had undergone medical treatment, twenty patients had next pregnancy. Of the 20 patients, one conceived after 5 months, three after 6 months, two after 9 months, one after 10 months, nine after 1 year, three after 2 years, and one after 6 years. Sixty-two patients were managed surgically, thirty-two patients had their next pregnancy. Among the thirty-two patients, thirteen patients conceived after one year, followed by ten patients after two years, three patients after six months, and each patient within the interval of two, three, and four months. (Table 2)

In both groups more number of patients had pregnancy within a year. Also, of the twenty patients who conceived after medical management of ectopic pregnancy, seven patients (35%) had recurrent ectopic pregnancy, and one patient had a first-trimester miscarriage. For patients who were managed surgically, fifteen patients (24.19%) had repeat ectopic pregnancy.

For a proportion of patients, information regarding subsequent pregnancy outcomes could not be obtained due to a lack of follow-up data or inability to establish contact, and these cases were classified as

having no documented subsequent pregnancy.

In the past, ectopic pregnancy was one of the main reasons for maternal morbidity and mortality in the first trimester, but nowadays, due to earlier diagnosis and timely management, there is a considerable reduction in maternal morbidity (Baggio et al.,2021). Ectopic pregnancy can be managed surgically, medically, or expectantly. Laparotomy should be preserved for patients who present with rupture and are in a state of hypovolaemic shock and compromise. If the contralateral tube is healthy, the preferred option is salpingectomy, where the entire fallopian tube, or the affected segment containing the ectopic gestation, is removed. A salpingostomy is the removal of the ectopic pregnancy by dissecting it out of the tube, leaving the fallopian tube in situ in an attempt to preserve fertility on that side. Medical treatment is useful in patients with unruptured tubal ectopic pregnancy who are haemodynamically stable and have minimal symptoms and low volume of free intraperitoneal fluid on ultrasound scan (Sivalingam et al.,2011).

The main issues facing women after ectopic pregnancy management are concerns about treatment effectiveness, future fertility, and the risk of recurrent ectopic pregnancy. Also, the available evidence about fertility outcomes after tubal ectopic pregnancy treatment was limited.

Health-related quality of life (HRQOL) was not directly assessed in the present study; previous studies have reported that systemic methotrexate therapy has a more favorable impact on HRQOL compared to surgical management, particularly laparoscopic salpingostomy. Therefore, HRQOL considerations should be taken into account when selecting an appropriate management strategy for tubal ectopic pregnancy (Nieuwkerk et al.,1998). The 2016 RCOG Green- top guideline stated "there is no difference in the rate of fertility, the risk of future tubal ectopic pregnancy or tubal patency rates between the different management methods ."A study conducted by Volkan on "fertility outcomes subsequent to treatment of tubal ectopic pregnancy in younger Turkish women" concluded that there was no difference in terms of pregnancy rates in medically and surgically managed patients (Turan V,2011).

Systemic methotrexate therapy would be preferred by most patients as part of a completely nonsurgical management strategy. Protocol suggests that surgery is the safer and preferred option, especially in cases of big EP mass with high βhCG values. In another study, a trend of higher odds for intrauterine pregnancy after salpingostomy for surgical treatment of EP as compared to salpingectomy, the risk for recurrent tubal EP is comparable for both methods. Regardless, the decision about the operating range in case of EP always depends on the actual clinical state of the patient (Kostrzewa et al.,2013). But in our study, among surgical management, most of the patients were managed with salpingectomy, which limited the study's power to show a difference.

In the present study, the rate of recurrent ectopic pregnancy was higher in patients managed medically (35%) compared to those managed surgically (24.19%). This finding may be attributed to the preservation of the affected fallopian tube following medical management, which, while beneficial for fertility preservation, may also retain underlying tubal pathology predisposing to recurrence. In contrast, surgical management, particularly salpingectomy, removes the diseased tube, thereby potentially reducing the risk of recurrent ectopic pregnancy on the affected side. Similar observations have been reported in previous studies, where conservative management strategies were associated with higher recurrence rates despite favorable overall fertility outcomes. Therefore, while medical management may offer better chances of future conception, the increased risk of recurrent ectopic pregnancy should be discussed with patients during treatment decision-making.

4. LIMITATIONS OF THE STUDY

This study is limited by its retrospective design and relatively small sample size. In addition, complete follow-up information could not be obtained for all patients due to reliance on medical records and telephonic follow-up, resulting in loss to follow-up and incomplete outcome capture. Diagnostic criteria, methotrexate dosing protocols and surgical approaches also varied over the long study period. These factors may have influenced the observed reproductive outcomes and should be considered when interpreting the results.

5. CONCLUSION

Medical management of tubal ectopic pregnancy was associated with a higher subsequent pregnancy rate compared to surgical management, although this difference was not statistically significant. However, the risk of recurrent ectopic pregnancy was higher in the medically managed group. These findings highlight the need to balance fertility preservation with the risk of recurrence when selecting the appropriate management strategy. Studies with adequate volume is required to conclude on the fertility outcome of patients who received more than one dose of

methotrexate and whether age and prior fertility affect this.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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