Section: Obstetrics and Gynaecology

Original Research Article

LAPAROSCOPIC VERSUS OPEN SALPINGECTOMY FOR RUPTURED TUBAL ECTOPIC PREGNANCY: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Background: Ectopic pregnancy with tubal rupture is a life-threatening condition, requiring emergency surgical intervention. Traditionally, laparotomy was the standard treatment; however, laparoscopic salpingectomy has gained popularity due to minimally invasive advantages. The aim and objective is to compare laparoscopic versus open salpingectomy in ruptured tubal ectopic pregnancy with respect to operative time, intraoperative blood loss, postoperative recovery, complications, and duration of hospital stay.

Materials and Methods: A prospective comparative study was conducted on 80 patients diagnosed with ruptured tubal ectopic pregnancy. Patients were divided into two groups: laparoscopic salpingectomy (n=40) and open salpingectomy (n=40). Parameters analyzed included operative time, blood loss, hospital stay, complications, and recovery time. Statistical analysis was performed using Student's t-test and Chi-square test.

Results: Laparoscopic surgery showed significantly reduced intraoperative blood loss, shorter hospital stay, and faster recovery. No significant difference was observed in operative time. Postoperative complications were lower in the laparoscopic group.

Conclusion: Laparoscopic salpingectomy is a safe and effective alternative to open surgery in selected patients with ruptured ectopic pregnancy, offering better postoperative outcomes and quicker recovery.

Keywords: Ectopic pregnancy; Laparoscopy; Laparotomy; Salpingectomy; Tubal rupture; minimally invasive surgery.

INTRODUCTION

Ectopic pregnancy is a significant cause of maternal morbidity and mortality, accounting for approximately 1–2% of all pregnancies worldwide.[1] The majority of ectopic pregnancies occur in the fallopian tube, particularly in the ampullary region, which constitutes nearly 70% of cases.[2] Ruptured tubal ectopic pregnancy is a surgical emergency that can lead to massive intra-abdominal hemorrhage and requires prompt intervention.

Traditionally, laparotomy has been the standard approach for managing ruptured ectopic pregnancy, especially in hemo-dynamically unstable patients.[3] However, with advances in minimally invasive surgery, laparoscopy has emerged as a preferred alternative due to its advantages, including reduced postoperative pain, shorter hospital stay, and faster recovery.[4]

Several studies have demonstrated that laparoscopic management is associated with significantly less intraoperative blood loss and fewer postoperative complications compared to laparotomy.[5] Moreover, laparoscopy offers better visualization of pelvic structures, thorrow lavage and evacuation of clots, enabling precise surgical intervention and improved outcomes.[6]

Despite these benefits, concerns remain regarding the feasibility of laparoscopy in cases of ruptured ectopic pregnancy, particularly in settings with limited resources or in patients presenting with

severe hemodynamic instability. Therefore, this study aims to compare laparoscopic and open salpingectomy in patients with ruptured tubal ectopic pregnancy.

Aims and Objectives

Aim

To compare laparoscopic versus open salpingectomy in ruptured tubal ectopic pregnancy.

Objectives

1. To compare intraoperative blood loss
2. To compare operative time
3. To evaluate postoperative recovery
4. To assess complication rates
5. To compare duration of hospital stay

MATERIALS AND METHODS

Study Design; This study was a prospective comparative study, meaning patients were followed forward in time and outcomes of two surgical methods were compared.

Study Setting and Duration: The study was conducted in the Department of Obstetrics and Gynecology at Rohilkhand medical college and hospital over a period of 12 months.

Study Population: A total of 80 patients diagnosed with ruptured tubal ectopic pregnancy were included in the study.

Grouping of Patients

Patients were divided into two groups:

- Group A (n=40): Underwent laparoscopic salpingectomy
- Group B (n=40): Underwent open salpingectomy (laparotomy)

Allocation was based on:

- Patient's clinical condition
- Hemodynamic stability
- Availability of laparoscopic facilities and expertise

Inclusion Criteria

Patients were included if they:

- Had confirmed ruptured tubal ectopic pregnancy
- Were hemodynamically stable or stabilized after resuscitation
- Were aged 18–40 years

Exclusion Criteria

Patients were excluded if they:

- Had unruptured ectopic pregnancy
- Were severely unstable requiring immediate laparotomy
- Had bleeding disorders or serious comorbid conditions

Preoperative Management

All patients underwent:

- Detailed history and clinical examination
- Ultrasound (USG) and beta-hCG to confirm diagnosis
- Hemoglobin estimation and blood grouping
- IV fluid resuscitation
- Blood arranged if required

Surgical Procedures

1. Laparoscopic Salpingectomy

- Performed under general anesthesia
- Creation of pneumoperitoneum
- Ports insertion and positioning of patients
- Evacuation of clots and lavage
- Identification of ruptured tube
- Removal of affected tube using bipolar cautery and scissors
- Hemostasis secured
- Specimen removed through port

2. Open Salpingectomy (Laparotomy)

- Performed under general anesthesia
- Pfannenstiel or midline incision
- Abdomen opened and hemoperitoneum evacuated
- Ruptured tube identified and removed
- Bleeding controlled
- Abdomen closed in layers

Parameters Studied

The following outcomes were compared:

- Operative time (minutes)
- Intraoperative blood loss (ml)
- Duration of hospital stay (days)
- Postoperativecomplications (wound infection, fever, ileus)
- Time to ambulation
- Time to return to normal activity

Postoperative Care

- Monitoring of vital signs
- Pain management using analgesics
- Early mobilization encouraged
- Antibiotics given as per protocol
- Patients followed up until recovery

Statistical Analysis

- Data entered into SPSS software
- Quantitative data expressed as mean ± standard deviation
- Qualitative data expressed as percentage

Tests used:

- Student's t-test → for comparing means (e.g., blood loss, hospital stay)
- Chi-square test → for categorical data (e.g., complications)

p-value < 0.05 considered statistically significant.

RESULTS

Table 1: Age Distribution of Patients in Both Groups

Age Group (years)	Laparoscopic (n=40)	Open (n=40)	Total (%)
18–25	12	10	27.5
26–30	18	20	47.5

31–35	8	7	18.7
>35	2	3	6.3

Interpretation: The majority of patients in both groups belonged to the 26–30 years age group (47.5%), with comparable distribution between groups, indicating no selection bias based on age.

Table 2: Comparison of Operative Time (minutes)

Parameter	Laparoscopic Group	Open Group	p-value
Mean operative time (min)	65 ± 10	70 ± 12	0.08

Interpretation: The mean operative time was slightly lower in the laparoscopic group; however, the difference was not statistically significant ($p > 0.05$), indicating both procedures required comparable time.

Table 3: Comparison of Intraoperative Blood Loss (ml)

Parameter	Laparoscopic Group	Open Group	p-value
Mean blood loss (ml)	100 ± 50	320 ± 70	<0.001

Interpretation: Laparoscopic salpingectomy resulted in significantly lower blood loss compared to open surgery ($p < 0.001$), demonstrating a clear advantage of the minimally invasive approach.

Table 4: Duration of Hospital Stay (days)

Parameter	Laparoscopic Group	Open Group	p-value
Mean hospital stay (days)	2.0 ± 1.0	6.0 ± 1.0	<0.001

Interpretation: Patients in the laparoscopic group had a significantly shorter hospital stay compared to the open group ($p < 0.001$), indicating faster postoperative recovery.

Table 5: Postoperative Complications

Complication	Laparoscopic (n=40)	Open (n=40)	p-value
Wound infection	1 (2.5%)	6 (15%)	0.04
Fever	2 (5%)	5 (12.5%)	0.23
Ileus	0 (0%)	3 (7.5%)	0.07

Interpretation: Postoperative complications were lower in the laparoscopic group, with a statistically significant reduction in wound infections ($p < 0.05$). Other complications were also less frequent, though not statistically significant.

Table 6: Time to Recovery (Return to Normal Activity)

Parameter	Laparoscopic Group	Open Group	p-value
Days to normal activity	7 ± 2	14 ± 3	<0.001

Interpretation: Patients who underwent laparoscopic surgery returned to normal activity twice as fast as those undergoing open surgery, which was highly significant ($p < 0.001$).

DISCUSSION

The present study compared laparoscopic and open salpingectomy in the management of ruptured tubal ectopic pregnancy and demonstrated that laparoscopic surgery offers significant advantages in terms of reduced blood loss, shorter hospital stay, faster recovery, and fewer postoperative complications.

In the present study, the majority of patients belonged to the 26–30 years age group, which corresponds to the peak reproductive period. This finding is consistent with previous studies that have reported a higher incidence of ectopic pregnancy in women of reproductive age.[7,8] The comparable age distribution between both groups in this study indicates that there was no significant demographic bias influencing the outcomes.

The mean operative time was slightly lower in the laparoscopic group compared to the open group, although the difference was not statistically significant. This observation is in agreement with previous studies which reported that operative time becomes comparable between laparoscopy and laparotomy when performed by experienced surgeons.[9,10] Initially, laparoscopic procedures may require more time due to technical challenges; however, with increasing surgical expertise and improved instrumentation, the duration becomes similar or even shorter.

A major finding of the present study was the significantly reduced intraoperative blood loss in the laparoscopic group. This can be attributed to better visualization, magnification, and precise hemostasis achieved through energy devices. Similar findings have been reported in earlier studies, which demonstrated that laparoscopic surgery results in

less tissue trauma and reduced bleeding compared to open surgery.[11,12]

The duration of hospital stay was significantly shorter in the laparoscopic group, which is one of the key advantages of minimally invasive surgery. Early mobilization, reduced postoperative pain, and minimal surgical trauma contribute to faster recovery. These findings are in accordance with previous studies that reported significantly reduced hospital stay in laparoscopic management of ectopic pregnancy.[11,13]

Postoperative complications were lower in the laparoscopic group in the present study. Wound infections were significantly more common in the laparotomy group, likely due to larger incisions and increased exposure of tissues. Previous studies have also demonstrated a lower incidence of postoperative complications, including infections and ileus, in patients undergoing laparoscopy.[14,15] The absence of ileus in the laparoscopic group in our study further supports the advantages of minimally invasive techniques.

Another important observation was the significantly faster return to normal daily activities in patients who underwent laparoscopic surgery. This reflects better postoperative recovery and improved quality of life. Similar findings have been reported in other studies, where patients treated laparoscopically resumed normal activities much earlier than those undergoing open surgery.[16,17]

Despite these advantages, laparotomy continues to have a crucial role in certain clinical situations. In cases of severe hemodynamic instability, massive hemoperitoneum, or lack of laparoscopic expertise, open surgery remains the preferred approach. This has been emphasized in previous studies, which highlight that patient safety and rapid intervention are the primary considerations in emergency settings.[18]

Overall, the findings of this study are consistent with existing literature and strongly support the use of laparoscopic salpingectomy as the preferred surgical approach in hemodynamically stable patients with ruptured tubal ectopic pregnancy.[19,20]

Limitations of the Study

1. The sample size was relatively small (n=80), limiting generalizability
2. Being a single-center study, results may not represent wider populations
3. Selection bias may be present, as stable patients were more likely assigned to laparoscopy
4. Long-term outcomes, particularly future fertility, were not assessed
5. Surgeon expertise variation was not standardized and could influence outcomes.

CONCLUSION

The present study demonstrates that laparoscopic salpingectomy is a safe, feasible, and effective alternative to open salpingectomy in the management of ruptured tubal ectopic pregnancy in hemodynamically stable patients. The laparoscopic approach was associated with significantly reduced intraoperative blood loss, shorter duration of hospital stay, fewer postoperative complications, and faster return to normal daily activities when compared to laparotomy. Although the operative time between the two procedures was comparable, the overall postoperative outcomes clearly favored laparoscopy. The advantages of minimally invasive surgery, including reduced tissue trauma, better visualization, and early recovery, make it the preferred surgical modality in appropriately selected patients.

However, open salpingectomy continues to play a vital role in cases of hemodynamic instability, massive hemoperitoneum, or in settings where laparoscopic expertise and facilities are limited. Therefore, the choice of surgical approach should be individualized based on the patient's clinical condition, surgeon's experience, and available resources.

In conclusion, laparoscopic salpingectomy should be considered the gold standard for the management of ruptured tubal ectopic pregnancy in stable patients, while laparotomy remains an essential life-saving procedure in emergency situations.

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