



LAPAROSCOPY VERSUS LAPAROTOMY IN THE MANAGEMENT OF ECTOPIC PREGNANCY: A COMPARATIVE STUDY

Obstetrics & Gynaecology

Dr Rashmi A. G	Professor, Department of Obstetrics and Gynaecology, Rajarajeswari Medical College and Hospital, Bangalore.
Dr. Riya Kumar*	Junior Resident, Department of Obstetrics and Gynaecology, Rajarajeswari Medical College and Hospital, Bangalore. *Corresponding Author
Dr. Shreya M. S	Associate Professor, Department of Obstetrics and Gynaecology, Rajarajeswari Medical College and Hospital, Bangalore.

ABSTRACT

Background: Ectopic pregnancies are the most common life threatening emergencies in early pregnancy, accounting for 0.5 to 1.5% of all pregnancies worldwide and 3.5-7.1% maternal deaths in India. Surgical management remains the mainstay of treatment in most cases through either laparotomy or laparoscopy. The presence and amount of hemoperitoneum and the patient's hemodynamic status are two of the most important factors in deciding which kind of operation to perform. The present study was designed to assess the surgical treatment and outcomes of laparoscopy versus laparotomy in the management of ectopic pregnancies. **Methods:** The study was conducted on 60 patients who presented to the emergency department or outpatient department at Rajarajeswari Medical College and Hospital, Bangalore, Karnataka, with a diagnosis of ectopic pregnancy confirmed by USG. Patients were divided into two groups based on the decision to operate by either laparoscopy or laparotomy. A comparative analysis was made between the two study groups with respect to operative time, intra-operative blood loss, haemodynamic stability, complications and outcomes. **Results:** Laparoscopic surgery had a better overall outcome. Unilateral salpingectomy was the main procedure performed in both groups. Estimated blood loss was significantly lower in the laparoscopy group ($P < 0.00001$). The duration of operation in laparoscopy group was 55.54 ± 24.46 minutes and 66.37 ± 18.51 minutes in the laparotomy group. The duration of hospitalization was significantly shorter in the laparoscopy group ($P < 0.0001$). Only 14 (45.16%) patients in the laparoscopy group required blood transfusion, whereas 26 (89.65%) patients in the laparotomy group needed transfusion ($P < 0.00001$). There were more peri-operative complications and ICU admissions in the laparotomy group ($p < 0.05$). **Conclusion:** Laparoscopic management of ectopic pregnancies offers several benefits and is superior to laparotomy in terms of lesser operative blood loss, lesser need for blood transfusions, lesser peri-operative complications and ICU admissions, shorter duration of hospital stay and lesser costs.

KEYWORDS

laparoscopy, laparotomy, ectopic pregnancy

INTRODUCTION

Ectopic pregnancy, originates from the Greek word, 'Ektopos', meaning out of place.¹ In an ectopic pregnancy, the fertilized ovum implants outside the endometrial cavity of the uterus.

It is defined as any extra or intra-uterine gestation in which the fertilized ovum implants at an aberrant site, which is inconducive to growth and development.²

The incidence of ectopic pregnancy varies between different countries and also between regions in the same country. Worldwide, ectopic gestations complicate 0.5-1.5% of all pregnancies.³

In a study by Rashmi Gaddagi et al, the incidence was 1:399 pregnancies in India.⁴

In the present century, developed countries are facing an almost four fold to fivefold increase in the incidence of ectopic pregnancies.⁵ This increase in the ratio of extra-uterine to intra-uterine pregnancies is related to the rising incidence of sexually transmitted diseases, PID, better modalities for diagnosing ectopic pregnancies and the increasing use of IVF and ARTs.⁶

The management of ectopic pregnancies has been revolutionized in the last decade, especially in developed countries, due to the increasing availability of laparoscopic equipment, medical therapy, uterine artery ligation and embolization techniques as well as more advanced diagnostic modalities which help in early diagnosis, better conservation of future fertility⁷, shorter hospital stay and reduced surgical morbidity.

Surgical management remains the mainstay of treatment in most cases through either laparotomy or laparoscopy. The presence and amount of hemoperitoneum and the patient's hemodynamic status are two of the most important factors in deciding which kind of operation to perform. The present study was designed to assess the surgical treatment and outcomes of laparoscopy versus laparotomy in the management of ectopic pregnancies.

MATERIALS AND METHODS

Source Of Data:

Study Subjects: All patients with a diagnosis of ectopic pregnancy

who were treated surgically in the Department of OBG, Rajarajeswari Medical College and Hospital, were included in the study.

Methods of collection of data

Inclusion Criteria

1. All patients with a diagnosis of ectopic pregnancy confirmed by USG (including ruptured ectopic)
2. Ectopic pregnancy cases managed surgically
3. Patients who give consent for the study

Exclusion Criteria

1. Medically managed cases of ectopic pregnancy
2. Patients who do not give consent for the study

Study Period: November 2019 to June 2021

Study Design: Comparative cross-sectional study

Sample Size: 60

Sampling Technique: Purposive sampling (non-probability sampling)

Methodology:

All patients who presented to the emergency department or outpatient department, with a diagnosis of ectopic pregnancy confirmed by USG (including ruptured ectopic) were considered for the study. Patients eligible for medical management were excluded.

After taking informed consent, the following data was collected from study patients:

1. A detailed history was taken, which included history of amenorrhoea, abdominal pain, tenderness and vaginal bleed. Relevant clinical examination was done to confirm diagnosis. Vital signs were checked to assess haemodynamic stability.
2. Decision to manage by either laparoscopy or laparotomy was taken based on haemodynamic stability of the patient, surgeon's skill and preference, anaesthetic assessment and availability of laparoscopic operation theatre at the desired time.
3. Pre-operative investigations include: Complete hemogram, Blood

grouping & Rh typing, Urine Routine, Random Blood Sugar (RBS), Renal Function Test (RFT) & Serum Electrolytes, Liver Function Tests (LFT), HIV, HBsAg, VDRL and COVID-19 testing.

4. Intra-operatively the following data was collected in both study groups: Operative time, intra-operative blood loss, haemodynamic stability and intra-operative complications if any

5. Post-operative complications were categorized as per Clavien Dindo Classification

Minor complications – Grade I & II

Major complications – Grade III, IV & V

Grade	Clinical Description
Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
Grade III	Requiring surgical, endoscopic or radiological intervention
- IIIa	Intervention not under general anaesthesia
- IIIb	Intervention under general anaesthesia
Grade IV	Life-threatening complication (including CNS complications)* requiring IC/ICU-management
- IVa	single organ dysfunction (including dialysis)
- IVb	Multi organ dysfunction
Grade V	Deaths of a patient

Figure1: Clavien-Dindo Classification Of Post-Operative Complications

6. Need for analgesia was analyzed by:

-5 point pain scale (Wong Baker faces pain rating scale)

-Number of days of analgesia requirement

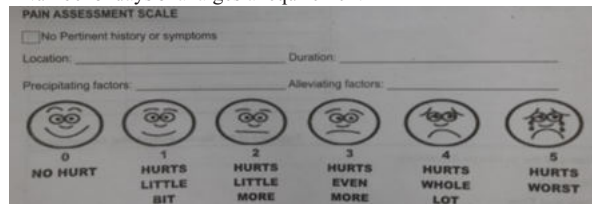


Figure 2: Pain Assessment Scale

7. A comparative analysis of the above parameters was made between the two study groups

Statistical Analysis: Data was analysed using descriptive statistics.

The clinical and surgical data were recorded in an investigative report form. These data were transferred to IBM-card, using IBM-PC with statistical program SPSS to obtain

1. Descriptive Statistics: A-Mean, B-Standard deviation ($\pm$ S.D), C-Range (minimum-maximum), D-Number and percentages

2. Analysis Statistics: Student's t test, Chi square test and Z test.

P-value of less than 0.05 was considered significant

RESULTS

A total of 60 subjects were included in the final analysis.

Decision to manage by either laparoscopy or laparotomy was taken based on haemodynamic stability of the patient, surgeon's skill and preference, anaesthetic assessment and availability of laparoscopic operation theatre at the desired time.

Based on the above, 31 patients underwent surgery by laparoscopy, while 29 patients underwent laparotomy.

Age distribution: In the present study, the mean age of presentation was 26.38 ± 4.77 years in the laparoscopy group and 25.1 ± 3.86 years in the laparotomy group.

The youngest age at presentation overall was 19 years and the oldest age at presentation was 39 years.

Parity Distribution:

When review of previous reproductive performance was studied, it was found that the maximum incidence of ectopic gestation (38.3%) occurred among the second gravida. In 14 out of 60 patients, ectopic pregnancy occurred in the first conception.

Majority of the cases (43.33%) presented at a period of gestation between 6 weeks and 8 weeks.

The earliest gestational age at diagnosis from last menstrual period was 5 weeks and the most advanced gestational age at diagnosis was at 10¹¹ weeks.

Haemodynamic Stability:

Out of 60 patients attending the emergency department, 53 (88.33%) were haemodynamically stable at admission and 7 patients (11.66%) were haemodynamically unstable.

Among these, the laparoscopy group had 96.77% patients who were haemodynamically stable and 3.22% patients who were unstable.

In the laparotomy group, 79.31% were haemodynamically stable and 20.6% were haemodynamically unstable.

Table 1: Pre-operative Hemoglobin

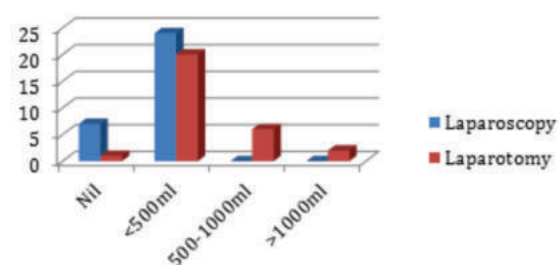
	Laparoscopy (n=31) Mean $\pm$ SD	Laparotomy (n=29) Mean $\pm$ SD
Hemoglobin (g%)	9.8 $\pm$ 1.01	8.7 $\pm$ 1.4

Pre-operative haemoglobin levels were slightly lower in the laparotomy group (8.7 ± 1.4 g/dL) as compared to the laparoscopy group (9.8 ± 1.01)

Presence Of Haemoperitoneum:

96.55% patients in the laparotomy group had haemoperitoneum out of which majority (66.96%) was below 500ml. 2 patients (6.8%) had massive haemoperitoneum of more than 1000ml.

77.41% patients in the laparoscopy group had haemoperitoneum out of which all (77.41%) were below 500ml. 7 patients (22.58%) had no haemoperitoneum



Graph 1: Haemoperitoneum In The Two Groups

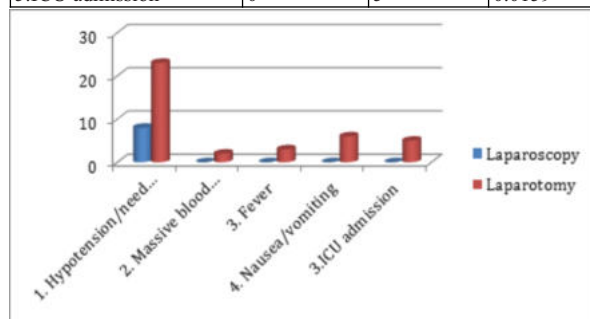
Table 2: Operative Outcome In Laparoscopy And Laparotomy Groups

	Laparoscopy (n=31)	Laparotomy (n=29)	p value
(A) Location of ectopic			N.S
Tubal ectopic			
1. Ampullary	19 (61.2%)	24 (82.7%)	
2. Isthmic	7 (22.5%)	5 (17.2%)	
3. Fimbrial	4 (12.9%)	0	
Ovarian ectopic	1 (3.22%)	0	
(B) Side of ectopic			N.S
1. Right	18 (58.06%)	15 (51.72%)	
2. Left	13 (41.9%)	14 (48.27%)	
(C) Presentation of ectopic			N.S
1. Unruptured tubal pregnancy	7 (22.58%)	1 (3.44%)	
2. Ruptured tubal pregnancy	12 (38.7%)	19 (65.51%)	
3. Tubal abortion	12 (38.7%)	9 (31.03%)	
(D) Procedure performed			N.S
1. Salpingectomy	30	29	
2. Salpingostomy	0	0	

3. Resection of ovarian pregnancy	1	0	
Total blood loss (mean $\pm$ SD)	317.74 $\pm$ 206.37ml	679.31 $\pm$ 374.52ml	0.00001
Duration of surgery (mean $\pm$ SD)	55.54 $\pm$ 24.46 mins	66.37 $\pm$ 18.51 mins	0.029
Number of patients requiring blood transfusion	14 (45.16%)	26 (89.65%)	
Number of units transfused	Mean 0.45 Max 1	Mean 1.8 Max 6	<0.00001

Table 3: Peri-operative Complications

	Laparoscopy	Laparotomy	P value
1. Hypotension/need for inotropes	8	23	<0.00001
2. Massive blood transfusion	0	2	N.S
3. Fever	0	3	0.065 (N.S)
4. Nausea/vomiting	0	6	0.0058
5. ICU admission	0	5	0.0159

**Graph 2: Peri-operative Complications In The Two Groups****Table 4: Post-operative Need For Analgesia**

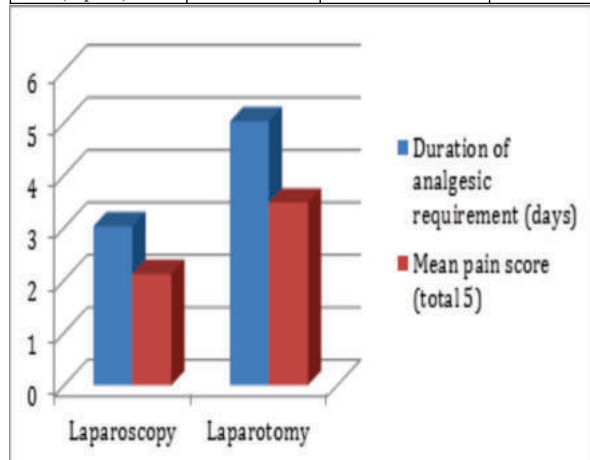
	Laparoscopy (n=31)	Laparotomy (n=29)	P value
Duration of analgesic requirement (days)	3.03 $\pm$ 0.54	5.03 $\pm$ 0.77	<0.00001
Mean pain score (total 5)	2.12	3.48	0.020

Table 5: Post-operative Grading Of Complications (Clavien-Dindo Classification)

Grading	Laparoscopy(n=31)	Laparotomy(n=29)
Grade 1	17 (54.8%)	3 (10.3%)
Grade 2	14 (45.16%)	21 (72.41%)
Grade 3	-	-
Grade 4	-	5 (17.2%)
Grade 5	-	-

Table 6: Total Hospital Stay And Cost

	Laparoscopy (n=31)	Laparotomy (n=29)	P value
Hospital stay (days)	4.54 $\pm$ 0.92	6.06 $\pm$ 1.83	0.000065
Cost (rupees)	9074 $\pm$ 1502	9131.03 $\pm$ 2092.86	0.020

**Graph 3: Post-operative Analgesic Requirement****DISCUSSION**

The advancements in the area of minimal access surgery have greatly improved the capability of obstetricians in both the diagnosis and treatment of ectopic pregnancies. Since the first excision of a tubal ectopic through a laparoscope by Shapiro & Adler,⁸ laparoscopy has gradually begun to replace laparotomy in the management of ectopic pregnancies.⁹

A similar study was done by Yuen¹⁰ on 105 patients in Hong Kong. The laparoscopy group had a lower occurrence of hemoperitoneum (45.9% vs. 75%). Yuen inferred that laparoscopy has the advantage of combining both diagnostic and therapeutic procedures in a single setting and hence, is a better approach than laparotomy for the management of ectopic pregnancy.

Another prospective study was conducted by Murphy et al¹¹ at the San Diego School of Medicine, wherein they compared laparoscopy and laparotomy in the management of hemodynamically stable patients.

Table 7: Results Of Murphy Study

	Laparoscopy (n=26)	Laparotomy (n=37)
Operative time	Comparable	Comparable
Blood loss	Significantly less	Significantly more
Hospital stay	Shorter duration	Longer duration
Need for analgesia	Less	More
Cost	Less	More

CONCLUSION

Laparoscopic management of ectopic pregnancies offers several benefits and is superior to laparotomy in terms of lesser operative blood loss, lesser need for blood transfusions, lesser peri-operative complications and ICU admissions, shorter duration of hospital stay and lesser costs.

In our study, laparoscopic surgery had a better overall outcome. Unilateral salpingectomy was the main procedure performed in both groups.

Estimated blood loss was significantly lower in the laparoscopy group ($P < 0.00001$).

The duration of operation in laparoscopy group was 55.54 $\pm$ 24.46 minutes and 66.37 $\pm$ 18.51 minutes in the laparotomy group.

The duration of hospitalization was significantly shorter in the laparoscopy group ($P < 0.0001$).

Only 14 (45.16%) patients in the laparoscopy group required blood transfusion, whereas 26 (89.65%) patients in the laparotomy group needed transfusion ($P < 0.00001$).

There were more peri-operative complications and ICU admissions in the laparotomy group ($p < 0.05$).

REFERENCES:

- Walker JJ. Ectopic pregnancy. Clin Obstet Gynecol. 2007; 50: 89–99.
- Kirk E, Bottomley C, Bourne T (2014). "Diagnosing ectopic pregnancy and current concepts in the management of pregnancy of unknown location". Human Reproduction Update. 20 (2): 250–61. doi:10.1093/humupd/dmt047. PMID 24101604.
- Geoffrey C. Ectopic Pregnancy. In: Obstetrics by Ten Teachers. Chamberlain G (ed), 16th edition. Churchill Livingstone Pub. London, 1997: 162–165.
- Rashmi A Gaddagi, AP Chandrashekar. A Clinical Study of Ectopic Pregnancy. JCDR 2012; 6: 867–869.
- Goldner TE, Lawson HW, Xia Z, et al. Surveillance for ectopic pregnancy - United States, 1970–1989. MMWR CDC Surveill Summ 1993; 42: 73–4.
- Brunham RC, Pelling R, Maclean I, Kosseim ML, Paraskevas M. Chlamydia Trachomatis - associated Ectopic Pregnancy : Serologic and histologic correlates. J Infect Dis 1992; 165: 1076.
- Murray, H., Diagnosis and treatment of ectopic pregnancy. CMAJ, 2005. 173(8): p. 905–12.
- Bruhat MA, Manhes H, Mage G, Pouly JL. Treatment of ectopic pregnancy by means of laparoscopy. Fertility and Sterility. 1980 Apr 1; 33(4): 411–4.
- Duggal BS, Tarneja P, Sharma RK, Rath SK, Wadhwa RD. Laparoscopic management of ectopic pregnancies. Medical Journal Armed Forces India. 2004 Jul 1; 60(3): 220–3.
- Yuen PM, Rogers MS, Chang A. A review of laparoscopy and laparotomy in the management of tubal pregnancy.
- Murphy AA, Nager CW, Wujek JJ, Kettel LM, Torp VA, Chin HG. Operative laparoscopy versus laparotomy for the management of ectopic pregnancy: a prospective trial. Fertility and sterility. 1992 Jun 1; 57(6): 1180–5.