

Prospective Comparative Assessment Between Laparotomy and Laparoscopy for the Management of Ruptured Ectopic Pregnancy

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Abstract

Aim: The aim of this study to compare between laparotomy and laparoscopy for the management of ruptured ectopic pregnancy.

Material and methods: This prospective comparative study was carried out in the Department of Obstetrics and Gynecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India. Total sampling methods, there are 50 samples. Data analysis for this study uses Statistical Product and Service Solutions (SPSS). Univariate analysis is done for the prevalence of every variable. Multivariate analysis is done to determine the statistical correlation between maternal age, parity, pregnancy weeks, hemoglobin level, transfusion and postoperative hospital stay with the type of surgery.

Results: Every sample underwent surgery, where 25 (50%) samples undergo laparotomy. The most common clinical signs and symptoms is abdominal pain which is 38 (76%) samples and 25 of them underwent laparotomy. Almost every sample, which is 45(90%) samples are not in shock. 20 of them underwent laparotomy. The most common site of ectopic pregnancy located in tubal; where 25 of them underwent laparotomy. The most common type of surgery is a salpingectomy laparotomy with a total of 13 samples. In this study, there is a statistical correlation between transfusion and methods of surgery with a p-value of 0.008. Meanwhile, there is no statistical correlation between maternal age, parity, pregnancy weeks, hemoglobin level and duration of postoperative hospital stay with methods of surgery.

Conclusion: we conclude that laparotomy is still the preferred method of surgery for managing ruptured ectopic pregnancy in Indonesia. This might be caused by a lack of equipment or operator skills in managing ruptured ectopic pregnancy with laparoscopy. Laparoscopy has a smaller incision, therefore minimal bleeding and transfusion are needed compared to laparotomy. Patients undergoing laparoscopy are hemodynamically stable, so transfusion can be minimized

Keywords: Surgery, Laparotomy, Laparoscopy, Ruptured Ectopic Pregnancy

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Introduction

Implantation of the fertilized egg anywhere other than the uterine cavity is

known as ectopic pregnancy (EP), including cervix, cornual region of the uterus, abdominal cavity and the most

common site fallopian tubes which account for 97.7% of EP. [1] Among the tubal pregnancies, different sites of the tubes are involved including interstitial (2-3%), cornua (2%), fimbria (5%), isthmus (12%) and commonest part of the tube involved is ampulla (80%). [2] Ectopic pregnancies have increased over the course of last thirty years, from 0.5% to 1-2%. [3] Multiple factors are responsible for increased incidence including age, smoking, tubal inflammation, carrying sterilization devices and tubal surgeries and applying ARTs. [4] EP is most common cause of maternal mortality related to early pregnancy and it is increasing in incidence all over the world. Common symptoms associated with EP are abdominal pain and vaginal bleeding along with other less specific symptoms of normal pregnancy such as breast tenderness, nausea and vomiting. Hemoperitoneum and dilated tube, causing peritoneal irritation are the reasons for abdominal pain. Ectopic pregnancy is diagnosed on the basis of clinical presentation, physical examination, ultrasound, and beta-hCG levels in serum.

Early and accurate diagnosis of EP is possible nowadays. This is because of the fortunate advent of beta-hCG tests and transvaginal ultrasonography.[5] In developing countries like ours, high fatality rates are due to the late diagnosis of EP as late diagnosis in almost all cases results in severe complications and emergency surgery. Surgery is treatment of choice for EP. Different surgical procedures are in practice, salpingectomy or salpingostomy, which are performed by

either laparotomy or laparoscopy.[6] Ectopic pregnancy which has not ruptured is treated by linear salpingostomy which involves removal of conception products along antimesenteric border in ampullary portion of the fallopian tube, while ruptured EP is best treated with salpingectomy. When deciding between laparoscopy and laparotomy, following parameters must be considered; past surgical history, patient's hemodynamic status and experience of the physician conducting the procedure. Therapeutic and diagnostic use of laparoscopy has been documented for years now.[7] Laparoscopy has multiple advantages over laparotomy including lesser blood transfusion, lower cost, lesser need for analgesia, shorter duration of the procedure and lesser duration of postoperative hospital stay. [8]

Material and methods

This descriptive observational with a cross-sectional study was carried out in the Department of Obstetrics and Gynecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India for 10 months.

Methodology

Total sampling methods, there are 50 samples. Data analysis for this study uses Statistical Product and Service Solutions (SPSS). Univariate analysis is done for the prevalence of every variable. Multivariate analysis is done to determine the statistical correlation between maternal age, parity, pregnancy weeks, hemoglobin level, transfusion and postoperative hospital stay with the type of surgery.

Table 1: Data of Demographics and Obstetrics of Woman with Ruptured Ectopic Pregnancy

Variable	Proportion (%) N=50	
Maternal Age		
20 – 30 years old	40	80
30 - 40 years old	8	16

>40 years old	2	4
Parity		
Primipara	10	20
Multipara	40	80
Pregnancy Weeks		
<8 weeks	35	70
>8 weeks	15	30

Table 2: Data of Administration and Surgery of Woman with Ruptured Ectopic Pregnancy

Variable	Proportion (%) N=28	
Referral		
Yes	10	20
No	40	80
Route of Hospital Admittance		
Emergency Room	39	78
Obstetrics & Gynecology Clinic	11	22
Surgery		
Laparotomy	25	50
Laparoscopy	25	50

Table 3: Data of Clinical Signs & Symptoms in Laparotomy and Laparoscopy of Women with Ruptured Ectopic Pregnancy

Variable	Laparotomy	Laparoscopy	Proportion (%)
Clinical Signs & Symptoms			
Vaginal Bleeding	20	15	70
Abdominal Pain	24	14	76
Vomiting	6	4	20
Asymptomatic	3	0	6
Slinger Pain	6	2	16
Shock			
Yes	5	0	10
No	20	25	90

Table 4: Data of Perioperative Findings in Laparotomy and Laparoscopy of Women with Ruptured Ectopic Pregnancy

Variable	Laparotomy	Laparoscopy	Proportion (%)
Site of Ectopic Pregnancy			
Tubal	25	10	70
Ovarian	0	10	20

Cornual	0	5	10
Type of Surgery			
Salpingectomy	13	13	52
Salpingectomy	4	2	12
Salpingo-oophorectomy	8	0	16
Partial Oophorectomy	0	10	20

Table 5: Multivariate Analysis of Correlation between Maternal Age, Parity, Pregnancy Weeks, Hemoglobin Levels & Post-operative Hospital Stay with Laparotomy and Laparoscopy

Variable	Laparotomy (%)	Laparoscopy (%)	P-Value
Maternal Age			
20-30 years old	17	23	0.733
30-40 years old	6	2	
40 years old	2	0 (0)	
Parity			
Primipara	8	2	0.172
Multipara	17	23	
Pregnancy Weeks			
<8 weeks	15	20	0.703
≥8 weeks	10	5	
Hemoglobins Level			
<8	10	0 (0)	0.062
≥8	15	25	
Transfusion			
0	7	20	0.008
1	6	0	
2	10	0	
3	1	5	
4	1	0	
Post-operative Hospital Stay			
2	2	2	0.690
3	10	6	
4	8	4	
5	6	2	

6	1	0	
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Every sample underwent surgery, where 25 (50%) samples undergo laparotomy. The most common clinical signs and symptoms is abdominal pain which is 38 (76%) samples and 25 of them underwent laparotomy. Almost every sample, which is 45(90%) samples are not in shock. 20 of them underwent laparotomy. The most common site of ectopic pregnancy located in tubal; where 25 of them underwent laparotomy. The most common type of surgery is a salpingectomy laparotomy with a total of 13 samples. In this study, there is a statistical correlation between transfusion and methods of surgery with a p-value of 0.008. Meanwhile, there is no statistical correlation between maternal age, parity, pregnancy weeks, hemoglobin level and duration of postoperative hospital stay with methods of surgery.

Discussion

In this study, there are 25 (50%) samples that underwent laparotomy and 25 (50%) samples underwent laparoscopy. This result is correlated with the study conducted by Kumar *et al.*[9] where laparotomy surgery is the preferred method of management of ectopic pregnancy, from a total of 63 patients, 37 (58.7%) patients underwent laparotomy while 26 (41.3%) patient underwent laparoscopy. In another study reviewed by Kumar *et al.*[9] the surgery is mostly laparotomy, from a total of 101 patients, 76 (75.3%) patients underwent laparotomy. The result is not compatible with the study conducted by M. Nabil *et al.*, where management of ectopic pregnancy through laparoscopic surgery offers more benefits than laparotomy, as it is the gold standard for direct visualization of ectopic gestation. The benefits are lesser blood loss, less need for blood transfusion, less need for postoperative analgesia and shorter duration of hospital stay.[10] However, not all are suitable for

laparoscopy; this includes the contraindication of laparoscopy, the surgeon's laparoscopy's skill, and experience, or severe pelvic adhesion.

In this study, 5 (10%) samples are in shock and both underwent laparotomy. In a study by Shrestha *et al.*[11] 12 (60%) patients are in shock and all underwent laparotomy surgery. The study follows the idea of the previous study conducted by Payal *et al.*[12] where patients with thermodynamically unstable are the key to converting treatment with laparoscopy to laparotomy.

In this study, the most common clinical signs & symptoms are abdominal pain which is found in 38 (76%) samples, followed by vaginal bleeding which is 35 (70%) samples and slinger pain which is found in 8 (16%) sample. From these clinical signs & symptoms, abdominal pain is the most common sign of a patient who underwent laparotomy while vaginal bleeding is the most common complaint of patients who underwent laparoscopy. This result is conformable with Shresta *et al.*[11] the most common clinical signs & symptoms are abdominal pain which is found in all 32 patients, followed by amenorrhea which is 21 patients and vaginal bleeding which is found in 20 patients. In that study, patients who underwent laparotomy or laparoscopy mostly complained of abdominal pain. As we know, symptoms of ectopic pregnancy are classified into acute, such as short-duration amenorrhea, spotting, abdominal and shoulder-tip pain; and chronic, such as amenorrhea, dull aching lower abdominal pain, vaginal bleeding, dysuria, urine retention, and rectal tenesmus.[13] We should consider another diagnosis as presentations often mimics other gynecological disorders and gastrointestinal or urinary tract disease, including appendicitis, salpingitis,

ruptured corpus luteum or follicular cysts, threatened or inevitable spontaneous abortion, ovarian torsion, and urinary tract infection.[14]

The most common site of ectopic pregnancy is tubal with 35 (70%) samples, followed by ovarian with 10(20%) samples. Laparotomy was done on 25 samples with tubal pregnancy, while the rest underwent laparoscopy. In ovarian and cornual ectopic pregnancy, the method of surgery is laparoscopy even though the number is few. In a study by Bahat *et al.* [14], the most common site of ectopic pregnancy is tubal which is 191 (94.5%) from a total of 202 patients, followed by cornual which is 7 (0.03%) and ovarian which is 4 (0.02%) patients. The study also reports that laparotomy is still the preferred method of ectopic pregnancy in any site. It is the same with the study conducted by Go Udigwe *et al.*¹⁶ where the ectopic pregnancy mostly happened in the ampulla of the fallopian tube; this inhibits the function of the fallopian tube thus inhibits normal implantation of a fertilized ovum within the uterine cavity.¹² For the type of surgery, salpingectomy is the surgery most commonly performed, with 26(52%) samples and 13 among them is done by laparotomy, while the rest underwent laparoscopy. In laparotomy, the dominant type of surgery is a salpingectomy, meanwhile, in laparoscopy the most common type of surgery is partial-oophorectomy. In this study, all reported salpingo-oophorectomy is done by laparotomy, meanwhile all partial-oophorectomy is done by laparoscopy. In the study by Bahat *et al.*[15] salpingectomy is still dominant, either through laparotomy or laparoscopy, with a total of 174 (86.1%) out of 202 patients. The result is also similar to the study conducted by M Nabil *et al.*, where linear salpingostomy was the main procedure performed in both laparoscopy and laparotomy.[10]

Based on the study, Pre-operative hemoglobin level is classified into 2 categories, <8 g/dL and ≥ 8 g/dL. 40 samples have a pre-operative hemoglobin level of ≥ 8 g/dL, meanwhile, 10 samples have a pre-operative hemoglobin level of <8 g/dL, where all underwent laparotomy. The mean pre-operative hemoglobin level in this study is 10.09 g/dL. In other studies, preoperative hemoglobin level is rarely included for analysis. In the study by Bahat *et al.*[15], one of the variables for analysis is hemoglobin level, with a mean of 11.09 g/dL for laparoscopy and 10.98 g/dL for laparotomy.

In this study, there is no statistical correlation between maternal age and methods of surgery by laparotomy or laparoscopy. This result is conformable with the study by Shrestha *et al.*[11], where there is no statistical correlation between maternal age and methods of surgery. This result might be caused by the difference of mean maternal age, in this study, the mean maternal age is 28.39 years old, meanwhile based on the study by Jacob *et al.*[17], the maternal age between 36-45 years old has a higher risk for ectopic pregnancy.

In this study, there is no statistical correlation between parity and methods of surgery. This result is conformable with the study by Bahat *et al.*[15] which found no correlation between parity and methods of surgery. This might be caused by parity which is not a risk factor for ectopic pregnancy. Jacob *et al.*[17] state that a history of prior ectopic pregnancy is the main risk factor for recurrence of ectopic pregnancy, meanwhile in this study, all sample has no history of ectopic pregnancy.

In this study, there is no statistical correlation between pregnancy weeks and methods of surgery, which conforms to the study by Bahat *et al.*[15] Pregnancy weeks couldn't affect the clinical condition and method of surgery.

In this study there is no statistical correlation between preoperative hemoglobin level and methods of surgery, this conforms to a study by Jahan *et al.*[18] This might be caused by the majority of samples which have a stable hemoglobin level, which means the patients can undergo surgery either by laparotomy or laparoscopy.[19] There is a statistical correlation between transfusion and methods of surgery, which conforms to a study by Jahan *et al.*¹⁸ and Synman L *et al.*[20] , where it states that laparoscopy causes fewer bleeding, transfusion, postoperative analgesia, short duration of hospital stay and time returning to daily activity compared to laparotomy. In this study, there is no correlation between the duration of postoperative hospital stay and methods of surgery. This differs from the study by Jahan *et al.*[18] which states there is a statistical correlation, where patients who underwent laparoscopy have a shorter duration of postoperative hospital stays compared to laparotomy.

Conclusion

We conclude that laparotomy is still the preferred method of surgery for managing ruptured ectopic pregnancy in Indonesia. This might be caused by a lack of equipment or operator skills in managing ruptured ectopic pregnancy with laparoscopy. Laparoscopy has a smaller incision, therefore minimal bleeding and transfusion are needed compared to laparotomy. Patients undergoing laparoscopy are hemodynamically stable, so transfusion can be minimized.

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