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ORIGINAL ARTICLE

Laparoscopy Versus Laparotomy in the Management of Ectopic Pregnancy

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ABSTRACT

Objective: To compare the outcome of laparoscopy with laparotomy in the management of ectopic pregnancy (EP), both ruptured and un-ruptured.

Patients and Methods: This cross-sectional study was conducted in Department of obstetrics and gynecology at multiple centers in Sahiwal, Bahawalpur and Multan, during the period from January 2015 to June 2017. Total no. of 167 patients of ectopic pregnancy were included in our study. Of these 167 patients, 32 came with ruptured ectopic pregnancy and other 135 with un-ruptured EP. Following outcome variables were collected; operative time, complications, estimated blood loss and postoperative hospital stay. Mean and standard deviation was calculated for demographic variables while frequency and percentage was calculated for outcome variables and association of these variables with groups was checked using computer software SPSS version 16. p value $\leq$ 0.05 was considered as significant.

Results: Out of total 167 patients, ruptured EP was found in 19.2% and non-ruptured in 80.8% patients. Regarding blood transfusion and need of analgesia, significant association (p=0.000) was found between laparoscopy and laparotomy. As compared to laparotomy, during laparoscopy large number of patients did not require blood transfusion ((95.3%) and analgesia (64.1%). Regarding total operating time, duration of hospital's stay and estimated blood loss, significant difference (p=0.000) was found between the two groups.

Conclusion: Postoperative outcomes suggested that laparoscopy proved to be more efficient regarding blood loss, need for blood transfusion, need for analgesia and duration of postoperative hospital stay as compared to laparotomy.

Key words: Laparoscopy, Laparotomy, Ruptured ectopic pregnancy.

Author`s Contribution
[1] Conception, synthesis, planning of research and manuscript writing Interpretation and discussion
[2] Data analysis, interpretation and manuscript writing, [3,4] Active participation in data collection.

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Article info.
Received: August 31, 2017
Accepted: December 21, 2017

Cite this article. *Murtaza M, Hameed H, Khan RM.Z, Nazar B. Laparoscopy versus Laparotomy in the Management of Ectopic Pregnancy. JIMDC.2018; 7(1):18-22*

Funding Source: *Nil*
Conflict of Interest: *Nil*

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 interstitia (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]. Indications for laparotomy are previous history of surgery leading to adhesions or infection and deteriorated hemodynamics. Frequency of postoperative adhesions is lower in laparoscopic surgery. In current study we analyzed the outcomes of laparoscopy and laparotomy in the management of ruptured and unruptured pregnancies.

Patients and Methods

This cross sectional multicenter study was conducted in Department of obstetrics and gynecology; City Hospital Multan, Fatima Medical Center Multan and Medicare Hospital Multan, from January 2015 to June 2017. Sample size was calculated through open epi web site by using 95% confidence interval and 80% power. Mean difference was noted from reference study.[14] EP was the inclusion criteria. Patients treated with methotrexate were excluded from the study. Total 167 patients were included in our study. Of these 167 patients, 32 came with complaint of ruptured EP and other 135 were with un-ruptured EP. These patients were admitted through emergency or outpatient department. Authorization for the study protocol was obtained from the Hospital Ethics Committee and informed consent was taken from the patients. Patients were divided in two groups; group 1 and group 2 depending upon the undergoing procedure, Laparoscopy and Laparatomy respectively. Total 64 patients were included in group 1 and 103 in group 2. Age, BMI, parity, beta-hCG level and gestational age of ectopic pregnancy were the patient characteristics recorded during clinical examination. As described earlier the final diagnosis was based upon clinical presentation, physical examination, transvaginal ultrasound, and beta-hCG level in serum.

Semi lithotomy position was used to perform the laparoscopic procedure. Laparatomy was performed using standard surgical protocol. All the procedures were performed by a well experienced surgeon with 5 years of experience. Pethidine 1.5 mg/kg I/M was used as analgesic and was prescribed on demand. Other analgesic used was diclofenac sodium 100mg. Analgesia was prescribed at every eight hours. Following outcome variables were collected; operative time, complications, estimated blood loss and postoperative hospital stay. SPSS 16 was used to analyze the data. Mean and standard deviation was calculated for demographic quantitative variables. Frequency and percentage was calculated for outcome categorical variables. Student t test and fisher exact tests were used to calculate significance level.

Results

Out of total 167 patients, ruptured EP was found in 19.2% and non-ruptured in 80.8% patients (Figure 1). Demographic characteristics of both groups are mentioned (Table I). Regarding blood transfusion and need of analgesia, significant association (p=0.000) was

Table 1: Demographic Characteristics of Participants in Two Groups (n=167)		
Characteristics	**Laparoscopy (n=64) Group I mean±SD**	**Laparotomy (n=103) Group II mean±SD**
Age (years)	30.29±4.89	31±3.88
Parity	2.84±0.99	1.47±1.11
beta-HCG (mIU/mL)	4683±2350.91	5387±2499.64
gestational age (months)	7.20±1.32	7.61±0.86
BMI (kg/m²)	23.62±4.38	22.53±3.43

Regarding total operating time, duration of hospital's stay and estimated blood loss, significant difference (p=0.000) was found between two groups (Table 3).

Table 3: Comparison of outcome variables between two groups (n=167)			
Outcome variables	**Laparoscopy (n=64) Group I mean ±SD**	**Laparotomy (n=103) Group II mean ±SD**	**p-value**
Estimated Blood Loss (ml)	188.50±84.18	460.77±126.79	0.000
Operative time (minutes)	53.50±19.56	84.74±30.82	0.000
Hospital Stay (days)	1.26±0.44	5.09±0.29	0.000

Discussion

Due to great procedural advancement in the field of minimally invasive surgery effective diagnosis and treatment of EP is possible today. [9] Shapiro and Adler [10] excised a tubal pregnancy through laparoscope for the first time decades ago. Since then, it has been used frequently and it replaced laparotomy as a procedure for management for EP. [11]

found between laparoscopy and laparotomy. As compared to laparotomy, during laparoscopy large number of patients do not require blood transfusion ((95.3%) and analgesia (64.1%) (Table 2). Predisposing factors like age, smoking, tubal inflammation, carrying sterilization of devices, tubal surgeries and applying ARTs which are demonstrated in this study are similar to those discussed in past studies by different authors.[12,13] In our study we used transvaginal ultrasonography and beta-hCG levels to make the diagnosis and other studies have also shown that use of these modalities has improved the diagnosis of EP.[14] Laparoscopy is considered as a method of choice for early ectopic pregnancy but it has also been proved to be effective in cases of ruptured ectopic pregnancy and hemoperitoneum, unless the patient is massively unstable hemodynamically.[15,16] In one of the many similar studies it was quite evident that laparoscopy is a better technique in terms of blood loss, need for blood transfusion, less requirement of postoperative analgesia and shorter postoperative hospital stay.[17]

Ectopic pregnancy is a life threatening disease which requires early diagnosis and prompt treatment. A study upon the comparison of laparoscopy and laparotomy was done in China which showed that even though laparoscopy is the novel approach in management of ectopic pregnancy yet it has more advantage as compared to the conventional approach. It has been widely accepted by surgeons as well as patients but the rate of use of this technique is still low in China as compared to other developed countries.[18] All this advancement and frequent use of laparoscopy has made early diagnosis greatly possible and effectively lifesaving and it has been documented in literature.[19] Another study compared the efficacy of laparoscopy and laparotomy and has shown that laparoscopy is an effective and feasible approach in the treatment of ectopic pregnancy in terms of less duration of postoperative hospital stay, early diagnosis of the disease and improved reproductive outcomes as compared to the conventional laparotomy. In spite of these advantages there are few things which are

Table 2: Association of Blood Transfusion and no need for Analgesia between Groups (n=167)					
Variable		Groups		Total	p-value
		Laparoscopy	Laparotomy		
Blood Transfusion	Y n(%)	3(4.7)	77(74.7)	80	p=0.000
	N n(%)	61 (95.3)	26 (25.24)	87	
Total		64	103	167	
No Need for Analgesia	Y n(%)	41(64.1)	0(0)	41	p=0.000
	N n(%)	23(35.9)	103(100)	126	
Total		64	103	167	

inevitable even in laparoscopic procedure like, duration of the surgery, blood loss and postoperative complications rate is similar to the laparotomy provided that surgeon is an expert in laparoscopy.[20] Similarly, in another study, the same conclusion was made describing that laparoscopic management of ectopic pregnancy is very effective, safe and economical when compared to laparotomy and thus it has benefits for the patients and surgeon as well. They suggested that laparoscopy should be considered as gold standard for the condition of ectopic pregnancy [21].

Site of the EP is important when type of procedure is decided. For instance, linear salpingostomy is best procedure to deal with an ampullary pregnancy. While laparotomy and surgical excision is best suited for cornual pregnancies. But cornual pregnancies have also been efficiently treated with laparoscopic procedure. Currently ectopic pregnancy is best treated by operative laparoscopy.[12] Its advantages are quite evident from our study and these findings are fully supported in literature. Although laparoscopy is method of choice for ectopic pregnancy treatment but if the patient presents with unstable vital signs, laparotomy should be considered.[22]

Conclusion

Even though operative outcomes were comparable in both laparotomy and laparoscopy but postoperative outcomes suggest that laparoscopy proved to be more efficient regarding blood loss, need for blood transfusion, need for analgesia and duration of postoperative hospital stay.

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