

Laparoscopy versus laparotomy management of tubal pregnancy

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ABSTRACT

Objectives: To compare laparoscopy versus laparotomy management of tubal pregnancy and the reproductive outcome.

Methods: A retrospective chart review of 81 patients admitted for management of tubal pregnancy was carried out at Riyadh Armed Forces Hospital from January 1998 until January 2000. The patients were divided according to surgical procedure performed into: Group I (33 patients) laparoscopy and group II (48 patients) laparotomy. We evaluated pre and postoperative serum β -human chorionic gonadotrophin levels, total operating time, total blood loss or blood transfusion or both, duration of hospital stay, recurrence rates of ectopic pregnancy and future fertility outcome for all patients.

Results: No differences were found between both groups in patient age, parity, size of adnexal mass, condition at the time of presentation, site of tubal pregnancy, previous history of ectopic, pre and postoperative serum β -human chorionic gonadotrophin and the total operating time. There were significant reductions of total blood loss, number of blood transfusion

units, and duration of hospital stay, in the laparoscopic group compared to the laparotomy group. A total of 54 patients desired pregnancy, 23 patients in the laparoscopy and 31 patients in the laparotomy group. No significant differences were found in the fertility outcome between both groups. The rates of subsequent intrauterine pregnancy were 74% (17/23) in the laparoscopy group and 61%, (19/31) in the laparotomy group and the rates of subsequent ectopic pregnancy were 4% (1/23) in the laparoscopy group and 10% (3/31) in the laparotomy group.

Conclusion: Laparoscopic treatment of ectopic pregnancy in hemodynamically stable patients offers major economic benefits superior to laparotomy in terms of less need for blood transfusion, shorter duration of hospital stay and convalescence.

Keywords: Ectopic pregnancy, laparoscopy, salpingostomy, salpingectomy, fertility outcome.

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Ectopic pregnancy (EP) is an abnormal extrauterine pregnancy, affecting approximately 1% to 2% of all pregnancies.¹ However, it remains the most common cause of death in the first trimester and accounts for approximately 9% of pregnancy-related deaths overall.¹ Increased sensitivity of serum β -human chorionic gonadotrophin (hCG) immunoassay and improved quality of transvaginal ultrasound allow early detection and conservative management of ectopic pregnancy. The sites of

ectopic implantation can be divided into tubal and extratubal. Tubal pregnancy accounts for more than 95% of all ectopic pregnancies. The traditional treatment of tubal pregnancy is salpingectomy by laparotomy. However, in the early 70s, the trend changed from radical approach to nonsurgical or conservative surgical approach to unruptured EP, by expectant, methotrexate, linear salpingostomy, segmental resection or fimbrial expression. In the past several years, the laparoscopic approach for

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management of EP has replaced laparotomy.^{2,3} In the surgical management of EP, gynecologists must consider the patient's condition, status of affected and contralateral tube and the desire for further childbearing. Several investigators reported that treatment of EP by laparoscopy yields pregnancy rates comparable to those reported by laparotomy.^{4,7} Furthermore, laparoscopic treatment demonstrated lower cost, shorter hospital stay, less operative time, less blood loss, less analgesia required, shorter convalescence and was associated with a significant reduction in the extent of both de novo adhesion formation and reformation that may result in improved fertility rates.² The purpose of this retrospective study was to compare our experience of laparoscopy versus laparotomy management of tubal pregnancy, and whether our results are comparable to published data.

Methods. From January 1998 to January 2000, we conducted a retrospective chart review of all patients who were admitted to Riyadh Armed Forces Hospital, Riyadh, Kingdom of Saudi Arabia for management of EP. One hundred women, aged 18 to 43 years, were included with EP that was managed by surgical approach. Of a total of 100 patients, 19 patients were excluded, this was due to loss to follow-up (n = 11), laparoscopic injection of methotrexate (n = 2), tubal abortion (n = 4), and fimbrial expression (n = 2). Eighty-one patients were followed up for a minimum of 12 months after the procedures. The patients were divided initially into 2 main groups. Group I: laparoscopic treated patients (n = 33), and group II: laparotomy treated patients (n = 48), the characteristics of both groups are shown in Table 1. For subgroup analysis, the 2 groups of patients were stratified into 4 different subgroups, according to surgical procedure performed. Group 1: laparoscopic salpingostomy (n = 24), group 2: laparoscopic salpingectomy (n = 9), group 3: laparotomy salpingostomy (n = 3) and group 4: laparotomy salpingectomy (n = 45) as shown in Table 2. All women were diagnosed to have EP based on the history of amenorrhea of more than 5 weeks, symptoms and signs, positive pregnancy test and ultrasound findings of empty uterus with or without adnexal mass, confirmed at laparoscopy or laparotomy. All hemodynamically stable patients (n = 63) had diagnostic laparoscopy as the primary procedure to confirm the diagnosis and to evaluate the contralateral tube before deciding which surgical approach would be performed (Table 1). Meanwhile, hemodynamically unstable patients (n = 18) had exploratory laparotomy as the primary procedure. We evaluated pre and postoperative serum β -hCG levels, total operating time, total blood loss or blood transfusion or both, duration of hospital stay, recurrence rates of EP and future fertility outcome for

Table 1 - Characteristics of patients treated by laparoscopy (group I) and by laparotomy (group II).

Variable	Group I (patients treated by laparoscopy) N = 33	Group II (patients treated by laparotomy) N = 48
Age (years)	27.7 +/- 6.0	30.1 +/- 5.3
Parity	2.3 +/- 1.9	3.0 +/- 2.7
Ectopic size (cm)	2.6 +/- 1.1	3.2 +/- 1.7
Condition		
Stable	33	30
Unstable	0	18
Site of ectopic		
Right	20	27
Left	14	20
History of previous ectopic	3	5
Preoperative β -hCG	2533 +/- 444	4988 +/- 106
Postoperative β -hCG	872 +/- 194	402 +/- 100
Total operating time (min)	93.1 +/- 37.3	84.3 +/- 40.6
Total blood loss (ml)	218 +/- 190	592 +/- 614*
No. of patients requiring blood transfusion	2	9*
Total hospital stay (days)	3.3 +/- 2.2	5.2 +/- 1.1*
Fertility outcome		
No. desiring conception	23	31
No. of infertility	5 (22%)	9 (29%)
No. of IUPs	17 (74%)	19 (61%)
No. of recurrent EPs	1 (4%)	3 (10%)
hCG - human chorionic gonadotrophin; No. - number IUP - intrauterine pregnancy; EP - Ectopic pregnancy values are means +/- standard deviation; *P < 0.5		

all patients. All operations were performed under general anesthesia, with endotracheal intubation. For laparoscopic surgery, the 3-puncture technique was utilized; a 10 mm laparoscope introduced through the umbilicus and 2 additional 5 mm trocars were inserted into the lower right and left sides of the abdomen. For unruptured tubal pregnancies, a linear salpingostomy was performed. The involved tube is identified and, if necessary, freed from surrounding structures, and a diluted solution of vasopressin 5 IU in 20 ml of physiological saline was injected using a 22-gauge needle through a 5 mm port into the wall of the tube at the area of maximal distension. This allowed surgery with minimal bleeding. The tube was then opened with a fine diathermy knife over the implantation site at the antimesenteric surface with a longitudinal incision (10-15 mm). The product of conception was flushed out of the tube with a high pressure of irrigation solution. Then, after gentle blunt dissection with suction irrigation, the entire product of conception was removed with a 5 mm an

Table 2 - Characteristics of patients treated by laparoscopy (salpingostomy: group I and salpingectomy: group 2) and by laparotomy (salpingostomy: group 3 and salpingectomy: group 4).

Variable	Group 1 (laparoscopy salpingostomy) N=24	Group 2 (laparoscopy salpingectomy) N=9	Group 3 (laparotomy salpingostomy) N=3	Group 4 (laparotomy salpingectomy) N=45
Age (years)	26.5 +/- 5.1	30.9 +/- 7.3	30.3 +/- 5.0	30.1 +/- 5.3
Parity	1.9 +/- 1.7	3.2 +/- 2.3	2.0 +/- 1.7	3.0 +/- 2.7
Ectopic size (cm)	2.5 +/- 1.1	2.8 +/- 1.2	1.8 +/- 0.2	3.3 +/- 1.8
Condition				
Stable	24	9	2	28
Unstable	0	0	1	17
Site of ectopic				
Right	20 (83%)	5 (56%)	2 (67%)	30 (67%)
Left	4 (17%)	4 (44%)	1 (33%)	15 (33%)
History of previous ectopic	2	2	1	3
Preoperative β -hCG	1620 +/- 214	4767 +/- 736	2233 +/- 196	5200 +/- 110
Postoperative β -hCG	616 +/- 163	1417 +/- 253	3641 +/- 99	4073 +/- 107
Total operating time (min)	96.7 +/- 41	83.8 +/- 25	70 +/- 17.3	85.3 +/- 42
Total blood loss (ml)	239 +/- 203	164 +/- 151	283 +/- 202	614 +/- 629*
Total hospital stay (day)	3.3 +/- 2.5	3.1 +/- 1.6	4.0 +/- 1.7	5.3 +/- 1.0*
Fertility outcome				
No. desiring conception	17	6	2	29
No. of infertility	4 (24%)	1 (17%)	1 (50%)	7 (24%)
No. of IUPs	12 (71%)	5 (83%)	1 (50%)	19 (66%)
No. recurrent EPs	1 (5%)	0	0	3 (10%)
hCG - human chorionic gonadotrophin; No. - number; Values are means +/- standard deviation; IUP - intrauterine pregnancy; EP - Ectopic pregnancy; *P<0.05				

atraumatic forceps from the abdominal cavity. The tube was irrigated carefully and inspected for bleeding. Bleeding points were coagulated with light application of bipolar coagulation. The incision tube was left open to heal by secondary intention. Salpingectomy was performed mostly in cases of ruptured ectopic or if hemostasis was difficult to obtain. Total salpingectomy was performed by progressive coagulation and cutting of the mesosalpinx, starting with the fimbriated end and progressing to the proximal isthmic portion of the tube. There, it was separated from the uterus after bipolar coagulation or loop-type ligation and cutting with scissors. For laparotomy treated patients by salpingostomy or salpingectomy the same technique was applied through a Pfannenstiel incision. However, in 4 cases treated by laparotomy, the tube was closed with fine 6:0 sutures. After surgery, all patients were followed up by serial serum β -hCG levels on day 4 and day 7 and then weekly until non-pregnant levels (< 5 IU/l) were reached, with weekly clinical examination and transvaginal ultrasound scans if needed. For patients who planned subsequent pregnancy, 3 months of contraception was required

before this was attempted. Hysterosalpingogram (HSG) was performed if no pregnancy occurred 6 months after surgery. Transvaginal ultrasound scan was performed if positive β -hCG was reported, to confirm the presence of intrauterine pregnancy. The data was analyzed using Student's t-test. Comparisons between groups were performed by Fisher's exact and chi-square tests. Two-tailed tests were used and a P value of < 0.05 was considered statistical significant.

Results. A total of 81 patients were available for analysis that met the inclusion criteria. In the first group analysis, group I (n = 33), consisted of patients treated by laparoscopy (salpingostomy or salpingectomy), and group II (n = 48), consisted of patients treated by laparotomy (salpingostomy or salpingectomy). No differences were found between both groups in patient age, parity, size of adnexal mass, condition at the time of presentation, site of tubal ectopic, previous history of ectopic, pre and postoperative serum β -hCG and the total operating time (Table 1). There was significant reduction of total blood loss (P<0.01), number of blood

transfusion units ($P < 0.05$), and duration of hospital stay ($P < 0.01$), in the laparoscopic group compared to the laparotomy group, as shown in Table 1. A total of 54 patients desired pregnancy from both groups, 23 patients in the laparoscopy group and 31 patients in the laparotomy group. No significant differences were found in the fertility outcome between both groups (Table 1). The rates of subsequent intrauterine pregnancy (IUP) were (17/23) 74% in the laparoscopy group and (19/31) 61% in the laparotomy group, and the rates of subsequent EP were (1/23) 4% in the laparoscopy group and (3/31) 10% in the laparotomy group. In subgroup analysis, the 4 groups were analyzed as shown in Table 2. When we compared group one versus group 3 (laparoscopic salpingostomy versus laparotomy salpingostomy), similarly no differences were found between both groups in patient age, parity, size of adnexal mass, condition at the time of presentation, site of tubal ectopic, previous history of ectopic, pre and postoperative serum β -hCG, total operating time, total blood loss, duration of hospital stay and the fertility outcome (Table 2). When we compared group 2 versus group 4 (laparoscopy salpingectomy versus laparotomy salpingectomy), there was significant reduction in total blood loss ($P < 0.04$), and duration of hospital stay ($P < 0.03$) (Table 2). No significant differences were found in the fertility outcome between both groups (Table 2).

Discussion. In this retrospective study, we compared laparoscopic (salpingostomy and salpingectomy) treated patients with tubal pregnancy versus laparotomy treated patients (salpingostomy and salpingectomy). As expected, we found significant reduction of total blood loss, number of patients who needed blood transfusion and total days needed for hospital admission in the laparoscopic group versus laparotomy group. These findings were in agreement with previous prospective studies.⁸⁻¹⁰ We were unable to show a significant reduction in the total operating time in the laparoscopic group as other investigators found^{5,11} as operative laparoscopy was recently adopted in our department and the surgeon had relatively little experience. Furthermore, 15 different gynecologists were included in this review from which only 5 gynecologists can perform operative laparoscopy. However, in the laparoscopy group a shorter duration of hospital stay and convalescence were comparable with other reports.⁵ It has been speculated that laparoscopic surgery implies an increased risk of complication in terms of reoperation. The relaparotomy rate ranged between 2.5 to 7%.^{4,11-13} In our study, we had no case of secondary intervention in the laparoscopy group. These findings may be due to the small number of patients treated by salpingotomy ($n = 24$) and to the preoperative levels of serum β -hCG < 3000 IU/l. In our study the hCG elimination was similar in both

laparoscopy (5 +/- 2.4 days) and laparotomy (4.5 +/- 3.2 days), whether treated by conservative salpingostomy or radical salpingectomy (P not significant), implying that the radicality in removing the trophoblastic tissue is as efficient by laparoscopy as by laparotomy. Fertility outcome was assessed for the 2 main groups (laparoscopy versus laparotomy), 23 patients desiring pregnancy in laparoscopy and 31 patients in laparotomy. Our study showed no significant differences between the 2 groups for infertility 22% and 29%, IUPs 74% and 61%, and number of recurrent EPs 4% and 10%. Further analysis for subgroups (salpingostomy and salpingectomy by laparoscopy versus laparotomy) comparing conservative versus radical surgery had also shown no differences in the fertility outcome (Table 1, 2). These results demonstrate that for patients who desire pregnancy with normal contralateral tube, it is advisable to perform salpingostomy rather than salpingectomy. While salpingectomy can be preserved for a damaged or bleeding tube, this is in agreement with previous prospective and retrospective studies.¹⁴⁻¹⁶ Another interesting finding in our study was that the most common age group with EP was 28 years.

We concluded that laparoscopic treatment (salpingostomy or salpingectomy) of EP in hemodynamically stable patients offers major economic benefits superior to laparotomy in terms of less need for blood transfusion, shorter duration of hospital stay and convalescence. This result is confirmed by the fact that the postoperative elimination of hCG was similar in both the laparoscopy and laparotomy-treated patients. This data allows a better estimation of the fertility outcome and appropriate counseling of patients.

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