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Original Research Article

Evaluation of safety and efficacy of laparoscopic appendectomy during pregnancy

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ABSTRACT

Background: Optimal surgical approach for appendectomy during pregnancy remains controversial. The objective of this study is to evaluate (LA) during pregnancy as regard safety and outcome compared with open appendectomy (OA).
Methods: Patients with acute appendicitis during pregnancy who were admitted to Sohag University Hospital from August 2014 to April 2018 were randomized to 2 groups: Group A (OA, 22 patients) and group B (LA, 20 patients). The primary end point was incidence of fetal loss. Secondary endpoints comprised preterm delivery, operative time, length of hospital stay, conversion rate and surgical complications.
Results: Forty-two patients were enrolled after exclusion of three cases due to severe cardiac disease. Fourteen patients (33.3%) presented during first trimester 7 patients per group, 19 (45.2%) during second trimester 10 in group A (23.8%) and 9 in group B (21.4%) and 9 (21.4%) during third trimester 5 in group A (11.9%) and 4 in group B (9.5%). Mean maternal age was 22.3±4.2 (range, 18-38) years in group A and 21.3±3.6 (range, 17-35) years in group B. Fetal loss occurred in one patient in group A (4.5%) and in 2 patients in group B (10%). No pre-term delivery occurred in either group. Operative time was slightly longer in group A (mean op. time was 42±12 min vs. 40±11min) than in Group B. No intra operative complications occurred in either group. Hospital stay was significantly shorter in group A (1.2±1.8 days) while it was (3.6±1.1days) in group B. Wound infection occurred in two patients (10%) in group B while no post-operative complications occurred in group A.
Conclusions: Laparoscopic appendectomy was is safe with no increase in fetal loss or pre-term delivery. It has the advantage of fewer post-operative wound complications, less pain and less hospital stay.

Keywords: Appendicitis, Appendectomy, Laparoscopy, Pregnancy

INTRODUCTION

Acute appendicitis when occurs during pregnancy is the most common non-obstetric cause requiring urgent surgical intervention.[1] Diagnosis of acute appendicitis during pregnancy is much more difficult than in non-pregnant due to anatomical and physiological factors in addition to limitation of radiological study.[2-3] The incidence of acute appendicitis in non-pregnant is the same as pregnant women.[4-5]

Open surgical procedure was the standard until recently and laparoscopic appendectomy (LA) has struggled to prove its superiority over the open technique, in contrast to laparoscopic cholecystectomy, which has become the gold standard for gallstone disease. Several prospective randomized studies, Meta analyses and systematic critical reviews that have been published on the topic of LA, have not allowed drawing definitive conclusions and generalizations.[6-9] There is no sufficient data establishing the advantage of laparoscopic over open appendectomy in pregnant women. Old studies that compared the two

procedures came out that laparoscopic procedure does not endanger pregnancy as open one. All the studies that were made on this topic are making the decision about what is the optimal surgical approach for acute appendicitis in pregnant women conflicting.[10]

METHODS

A total of 45 pregnant women with suspected acute appendicitis from August 2014 to April 2018, were admitted at Sohag University Hospital, surgery department. All patients were subjected to complete evaluation through detailed history, complete physical examination, laboratory investigations (CBC, LFTs, urea and creatinine), abdominal ultrasonography and ECO cardiograph for patients with cardiac disease. Three of 45 patients were excluded from the study due to severe cardiac disease with ejection fraction <35% while the other 42 patients were enrolled in the study. Ethical committee approval and written consent were taken before conducting the study. The patients were classified randomly into two groups: Group A (Odd numbers): 22 cases underwent LA and Group B (Even numbers): 20 cases underwent OA. Antibiotic prophylaxis was given at time of induction of general anesthesia. Laparoscopic and open appendectomies were performed under general anesthesia. A urinary catheter and Pneumatic compression devices were applied to all patients. Hasson's open approach was performed for pnaemoperitonium through supraumbilical transverse incision (in early pregnancy) and 3-4 cm above the palpable uterine fundus in late pregnancy, opening the abdominal wall layers and peritoneum and 10 mm port was inserted. Tilting of the patient 20 to 30 degrees to the left side was done to create more space for laparoscopic approach and prevent inferior vena cava compression. Carbon dioxide gas was adjusted to be below 12 mmHg to avoid fetal hypercapnia. LA was done by the same surgical team using 3 ports, with 30^0 telescope positioned at the umbilicus. Two 10-mm ports were inserted in the left and right lower quadrants. Exploration of abdominal cavity to locate the appendix and rule out other possible causes was done. The mesoappendix was cauterized with harmonic scalple and the base ligated with 2 vicryl loops. The appendix was removed in a laparoscopic bag. A drain was left in situ in cases of complicated appendicitis. Open appendectomies were performed through a McBurney's incision that was modified (higher incision) with advanced gestational age. Prophylactic tocolysis was not given to any of our patients. The appendix was sent for histopathological examination. Both groups were compared as regard fetal loss, preterm delivery, and operative time, length of hospital stay, conversion rate and surgical complications.

Gathered data were processed using SPSS version 15 (SPSS Inc., Chicago, IL, USA). Quantitative data were expressed as mean±SD while qualitative data were expressed as numbers and percentages (%). Student t test was used to test significance of difference for quantitative variables while Chi square was used to test significance of difference for qualitative variables. A probability values (p-value) ≤0.05 was considered statistically significant.

RESULTS

This study included 42 patients out of 45 pregnant women presented to general Surgery department or referred to it from obstetrics and gynecology department because of suspected acute appendicitis. Three patients were excluded from the study due to severe cardiac disease with ejection fraction <35% while the other 42 patients were enrolled in the study.

The patients were classified randomly into two groups: Group A (odd numbers): 22 cases underwent LA and Group B (even numbers): 20 cases underwent OA. From the 42 patients 14 patients (33.3%) were in the first trimester, 7 patients (16.6%) in both groups and 19 (45.2%) patients were in the second trimester 10 in group A (23.8%) and 9 in group B (21.4%) while 9 (21.4%) patients were in the third trimester 5 in group A (11.9%)and 4 in group B (9.5%).The mean maternal age was 22.3±4.2 year (range, 18-38) in group A and 21.3±3.6 (range, 17-35) in group B (Table1).

Table 1: Patients characteristics in both groups.

		Group A (22 Pts.)	Group B (20 Pts.)	P-Value
Age (yrs)	Mean	22.3±4.2	21.4±3.6	0.1
	Range	18-36	17-35	
Trimester	1st	7	7	
	2nd	10	9	
	3rd	5	4	
ASA	1	6	3	0.01
	11	13	17	0.08
	111	1	2	0.09

P- Value: ≤0.05 = Significant

Operative time was slightly longer in group A (mean op. time was 42±12 min vs. 40±11min) than in Group B. No intra operative complications occurred in both groups. Wound infection occurred in one patient (5%) in group B while no post-operative complications occurred in group A. Fetal loss occurred in one patient in group A (4.5%) and in 2 patients in group B (10%), while no pre-term delivery occurred in both groups. Hospital stay was significantly shorter in group A (1.2±1.8 days) while it was (3.6±1.1days) in group B (Table 2).

Negative appendicitis was found in 2 cases in both groups.one case was in 1st trimester and the other in 3rd trimester in group A while they were in 3rd trimester in group B (Table 3).

Table 2: Outcome in both groups.

	Group A	Group B	P-value
Operative time±SD	42±11 min	40±12 min	0.2
Hospital stay (days)±SD	1.2±1.8 days	3.6±1.1 days	0.06
Conversion rate	0	-	
Intra operative complications	0	O	0.00
Fetal loss	1	2	0.09
Pre- term delivery	0	0	0.0
Wound sepsis	0	2	0.08

P-value: ≤0.05= Significant.

Table 3: Postoperative pathology.

Pathological finding	Group A (22)	Group B (20)
Normal appendix	2	2
Inflamed appendix	20	18

DISCUSSION

Acute appendicitis is the most common cause of abdominal pain during pregnancy, but its diagnosis is more difficult than in non-pregnant due to anatomical and physiological changes that occur during pregnancy. A recent case control study suggested a lower incidence of acute appendicitis during pregnancy with the second trimester being particularly the most common.[11] In this study most cases were in second trimester (45.2%). Laparoscopic approach is most often recommended during the first two trimesters, as alternative diagnoses can be evaluated in case of normal appendix during the third trimester, guidelines are less clear.[12-14] Many speak for the open approach, but an increasing number of publications now report series of successful laparoscopic appendectomies during the third trimester.[12-15] In present study, maternal and fetal outcome was reported to be the same following laparoscopic or open appendectomy this came in accordance to the results reported by Alkatary et al and Pederson et al .[16-17] The reported incidence of per term delivery following any operative interference is 10-15% and it is the same for open and laparoscopic procedures in this study no preterm labor occurred. Eom et al and Walsh et al reported 1% as a rate of conversion of laparoscopic to open appendectomy.[18,10] In this study, none of our cases converted from laparoscopic to open appendectomy. Postoperative histological examination of the removed appendices reported 4 cases of normal appendix 2 in each group with no significant difference between both groups, however the reported results of negative appendix during pregnancy in literatures range between 20-45%.[19,20]

The most accurate diagnosis for acute appendicitis was during first trimester, this was stated by Thomson et al, and Cheng et al.[21,22] In this study none of the patients presented on the 1st trimester had a normal appendix on the postoperative pathology. Corneille et al, Zhang et al and Norman et al stated that laparoscopic appendectomy during pregnancy is technically feasible in all trimesters and is associated with the same benefits of laparoscopic surgery in non-pregnant patients, provided the specific recommendations for these types of patients are strictly followed and our results in this work came to agree with this opinion.[23-25]

Implementation

In our department and for long time we are treating all patients with acute appendicitis during pregnancy through open approach, but these trends have changed after we found that no risk to do laparoscopic appendectomy during all the three trimesters of pregnancy neither on the mother nor in the fetus.

CONCLUSION

Laparoscopic appendectomy is safe during the three trimesters of pregnancy without increased risk neither on the mother nor on the fetus.

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