

Appendectomy during Pregnancy. A Comparison of Laparoscopic with Open Appendectomy in Respect of Safety and Morbidity to Mother and Fetus

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ABSTRACT

Introduction: Acute appendicitis is the most frequent non-obstetric emergency that require surgery for the period of pregnancy. The aim of the study was to assess Laparoscopic versus Open method of appendectomy in pregnant patients in respect of benefits and hazards to patients and fetus.

Study Design: Comparative Study.

Place and Duration of Study: This study was conducted at Alrass General Hospital Saudi Arabia from 1st March 2008 to 1st June 2010.

Materials and Methods: Pregnant women having acute appendicitis admitted in Alrass General Hospital Saudi Arabia and underwent open or laparoscopic appendectomy were studied.

Results: A total of 118 pregnant women were operated for acute appendicitis. 66(55.9%, n = 118) patients underwent open and 52(44.1%, n = 118) patients underwent Laparoscopic appendectomy. Mean age \pm SD (range) of patients 23.45 \pm 4.5 years (18-38) in OA (open appendectomy) group and 22.00 \pm 2.94 years (17-37) in LA (Laparoscopic appendectomy) group. Mean gestational age was 16.51 \pm 4.17 weeks (11-26) in OA and 18.28 \pm 4.61 weeks (10-27) in LA group. There were no fetal loss in any group. Pre-term delivery occurred in 6(9.1%) patients in OA and in 4(3.7%) patients of LA group.

Conclusion: In laparoscopic surgery there is no increased risk to mother and fetus as compare to open surgery.

Key Words: Appendectomy, morbidity, mother, fetus.

INTRODUCTION

The acute abdomen in the pregnant women presents a dilemma in which the surgeon must weigh the risks and benefits of potential diagnostic methods and therapy not only to the mother but also to the fetus. Acute appendicitis is the most common non-obstetric emergency that require surgery during pregnancy^{1,2}. In pregnancy diagnosis of appendicitis is difficult due to physiologic and anatomic changes occurs during pregnancy². These changes result in delayed diagnosis and increases the risk of morbidity for mother and fetus³. The diagnosis is made on the basis of history clinical examination with the help of laboratory parameters, ultrasonography and obstetric examination, despite this, the diagnosis still remain challenging. The incidence of appendicitis itself is no higher in pregnant women than in the general population.⁴ It has been known for more than century that early treatment is of decisive importance in the management of acute appendicitis⁵. In 1983 Semm was the first Surgeon who removed the appendix via Laparoscopy⁶. Laparoscopy has improved dramatically since its advent, resulting in changes to the operative management of appendicitis and symptomatic cholelithiasis. Although pregnancy was once considered an absolute contraindication to

laparoscopic surgery, such surgery now is being performed in all trimesters with increasing frequency: The optimal surgical approach for appendectomy in pregnancy, whether open or laparoscopic, remains controversial in the literature. While open appendectomy is still the standard of care in many hospitals, several authors report data supporting the laparoscopic approach as first-line therapy. However, most of these studies contained a small number of patients.^{7, 8} Use of laparoscopic appendectomy (LA) remains controversial during pregnancy because data regarding procedure safety are limited. The purpose of the study is to evaluate the outcome of Laparoscopic appendectomy in pregnant women and compared to the results of open Appendectomy.

MATERIALS AND METHODS

Pregnant women operated either Lparoscopically or open for acute appendicitis between 1st June 2005 to 10th March 2010 in Al-Rass General Hospital Qassim KSA, were included in this study. The evaluation of pregnant women (n=118) undergone appendectomies, was based on medical history, clinical findings; pathology reports ultrasonography and obstetrician opinion to confirm the diagnosis. [then intraoperative and histological findings and further course of the

pregnancy as recorded in patient file.] Pregnancy outcome information such as pre-term delivery (delivery before 37 week) birth weight, fetal losses, gestational duration, and congenital malformation were obtained from patients and patient's obstetrician. Post-operative complications such as haemorrhage wound infection, intra-abdominal abscesses, small bowel obstructions, incisional hernia were noticed.

For Laparoscopic appendicectomy open technique was used to create pneumoperitoneum & introduction of first trocar (10mm sub-umbilical). Three ports were used for Laparoscopic appendicectomy and patient was placed in supine position. The two subsequent trocar (5mm) were introduced under vision in left lower quadrant above anterior superior iliac spin and suprapubic area. Mesoappendix and appendix bas was ligated with endoloop and divided with scissor; only bipolar diathermy was used when needed. Appendix was extracted in endoscopic bag. The pneumoperitoneum pressure was kept usually between 10-12 mmHg. In open technique McBurney's or Lanz incision was used. In both group if appendix found perforated or there were abscess peritoneal lavage done using volumes of warmed saline and drains were used accordingly. Low dose heparin and antibiotic was given prophylactic ally to all patients pre-operatively.

Statistical Analysis: Data were analyzed in statistical program SPSS version 20. Categorical variables (frequencies & percentages) such as trimesters, post-operative complications were presented as n (%) and chi square test was used to compare the proportions between the groups (OA & LA). Continuous variables like age (in years), gestational age (in weeks), duration of surgery (in minutes), and hospital stay (in days) were presented as Mean ± Standard Deviation and student "t" test (2 failed) was applied to compare the means between the groups (OA & LA). All the data were calculated on 95% confidence interval P value ≤ 0.05 was considered as statistically significant level for all the comparisons.

RESULTS

A total of 118 pregnant patients who underwent surgery (laparoscopic & open) for acute appendicitis were studied. Sixty six 66(55.9%) patients underwent open appendicectomy, and in 52(44.1%) patient appendicectomy done laparoscopically. Twenty 20(16.94%) were operated in 1st trimester, 88(74.57%) during the second trimester, and 5(4.23%) during the third trimester. No any laparoscopic procedure converted to open procedure. For all patients complete follow-up up to delivery was achieved. There was no difference between groups (open & laparoscopic appendicectomy) in surgery delay after arrival at the hospital.

In our series, the mean age ± SD (range) of patients 23.45±4.5 years (18-38) in OA (open appendicectomy) group and 22.00 ± 2.94 years (17-37) in LA (Laparoscopic appendicectomy) group. Mean gestational age was 16.51±4.17 weeks (11-26) in OA and 18.28 ± 4.61 weeks (10-27) in LA group. Mean operative time was 31.89 ± 10.5 minutes (18-55) in OA and 48.01±15.9 minutes (32-85) in LA patients.

Table No.1: Frequency of post-operative complications (n = 118)

Post-operative complications	OA (n=66)	LA (n=52)	Total	P value
Haemorrhage	2(3.03%)	1(1.92%)	03(2.54%)	0.70
Wound infection	7(10.60%)	2(3.84%)	09(7.62%)	0.29
Intra-abdominal abscess	2(3.03%)	-	02(1.69%)	0.50
Small bowel obstruction	3(4.54%)	-	03(2.54%)	0.25
Incisional hernia	1(1.51%)	-	01(0.84%)	0.99
Neonatal loss	-	-	-	-
Pre-term delivery	6(9.09%)	4(3.7%)	10(8.47%)	0.89
Congenital malformation\	0	0	0	-

Table No.2: Demographic details of the patients (n = 118).

Demographic variables	OA (n=66)	LA(n=52)	Total	P value
Mean Age of patients(years)	23.45 ± 4.5(18-38)	22.00 ± 2.94(17-37)	-	0.052*
Mean Gestational age at the time Surgery (weeks)	16.51 ± 4.17(11-26)	18.28 ± 4.61 (10-27)	-	0.031*
TRIMESTER(Patients)				
First	8(12.12%)	12(23.07%)	20(16.94%)	0.52
Second	51(77.27%)	37(71.15%)	88(74.57%)	
Third	7(10.60%)	3(5.76%)	10(8.47%)	
Duration of Surgery(minutes)	31.89 ± 10.5(18-55)	48.01 ± 15.9 (32-85)	-	0.007*
Hospital stay (post-operative in days)	3.98 ± 1.5 (2-7)	2.3 ± 1.1 (1-4)	-	<0.0001**

* P value is statistically significant

** P value is statistically highly significant

Post-operative haemorrhage occurred in 2(3.03%) patients of OA and in 1(1.92%) patient of LA group and this was managed conservatively. Wound infection found in 7(10.60%) in OA and in 2(38.4%) patients of LA group there was purulent discharge from wound. In 2(3.03%) patients of OA group intra-abdominal abscess in 3(4.54%) small bowel obstruction, these complications were managed conservatively, these two complications not found in LA group, and in 1(1.51%) patient of OA group incisional hernia developed, no incision hernia found in LA group

There was no neonatal loss in any group. Pre-term delivery occur in 6(9.1%) patient in OA and in 4(3.7%) patients of LA groups. No congenital deformity detected in any neonates of both group. After surgery, mean hospital stay was 3(2-7) days in OA, and 2(1-4) days in LA group.

DISCUSSION

Pregnancy has long been considered as contra-indication for Laparoscopic surgical procedures⁽⁹⁾, because of suspicious of teratogenicity in 1st trimester and preterm delivery during second and 3rd trimester. Direct uterine trauma, decrease uterine blood flow due to the pneumoperitoneum, and toxic narcotic drugs are possible cause⁽¹⁰⁾

Nowadays Laparoscopic procedures can be safely performed⁽¹¹⁻¹³⁾. The 2nd trimester is considered the safest period to perform any surgery because the small uterus is less susceptible to traumatic injuries and have less chance to teratogenicity⁽¹⁴⁾. Hunter et al.⁽¹⁵⁾ investigated and found that CO₂ pneumoperitoneum have minimal impact on the mother and the fetus when using intraabdominal pressure of 15mmHg or less.

There are more chance that risking the enlargement of incision, from manipulation and traction to get the appendix exposed in open procedures. Manipulation to the uterus is believed to increase the risk of preterm delivery^(16, 17) ranging from 15-45 %⁽¹⁸⁻²⁰⁾.

The Laparoscopic approach offer not only a minimally invasive approach to the abdominal region, whereby the traction to the uterus can be avoided, and the incision can be tailored to the unpredictable position of the appendix, it offer an opportunity for a different diagnosis from the good visualization of other abdominal organ.

To diagnose the case of acute abdominal pain in pregnant patient and to reduce aggressive surgical approach and also to reduce fetal risk, Imaging is important tool. Sonography is often inconclusive and CT-Scan is not preferred because of radiation exposure⁽²¹⁾. MRI is safe and highly sensitive (97-100%) in patients with an inconclusive sonography⁽²²⁾, but this imaging technique has not yet been implemented, because of high cost and limited availability.

In LA wound infection rate also reduce, because the appendix is extracted within the trocar, and does not

touch the abdominal wall⁽²³⁾. Some studies shows that, the risk of intra-abdominal abscess in patients with complicated appendicitis increased after Laparoscopic appendicectomy⁽²⁴⁾. Other studies like our studies did not observe any significant increase in complication⁽²⁵⁻²⁷⁾.

In our study results of Laparoscopic appendicectomy can be compared to many series in which laparoscopic appendicectomy has special advantages for patients with complicated appendicitis⁽²⁸⁻³⁰⁾.

In addition to patient, fetal loss is one of the important consideration when selecting the surgical approach(open or Laparoscopic) in pregnant patients for acute appendicitis.

McGory et al⁽³¹⁾ reported a higher rate of fetal loss after laparoscopic versus open appendicectomy (7% vs 3%). Colin A.Walsha et al⁽³²⁾ study also shows higher rate of fetal loss in Laparoscopic appendicectomy(6%)³². Contrary to these studies our study and other studies shows low rates of fetal demise after laparoscopic appendicectomy in pregnant patients⁽³³⁻³⁹⁾. In our study there was no fetal loss either after open or laparoscopic appendicectomy. It shows that operative approach did not influence fetal loss. Our findings also supported by other studies⁽³³⁻⁴⁰⁾.

Pre-term delivery is another important consideration. In our study the preterm delivery rate was 3.7% in Laparoscopic and 9.09% in open appendicectomy, while in Eran Sadot et al⁽⁴⁰⁾ study it was 29% in laparoscopic vs 19% in open.

CONCLUSION

Laparoscopic surgery is safe as open for acute appendicitis in pregnant patients in all trimester, & surgeon is much satisfactory and confident about diagnosis, as it has therapeutic and diagnostic advantages. In Laparoscopic surgery there is no increased risk to mother and fetus as compared to open surgery.

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