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# CHOICES OF OPEN VS LAPAROSCOPY APPENDECTOMY IN SECOND TO THIRD TRIMESTER PREGNANT WOMAN AND IT'S COMPLICATIONS

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## ABSTRACT

**Background:** Various causes can be claimed for abdominal pain during pregnancy. Acute appendicitis is the most common cause of abdominal pain during pregnancy. Diagnosis of acute appendicitis during pregnancy is a quite challenging due to anatomical and physiological changes that occur during pregnancy. On the period from January 2018 to January 2019 reviewed the number of pregnant patients presented to our facility by abdominal pain and diagnosed as acute appendicitis. Total number was 23 patients. 2 patients were excluded as their magnetic resonance imaging showed normal appendix and were discharged. 6 patients presented on the 1st trimester, 7 patients presented on the 2nd trimester and 8 patients on the 3rd trimester. Laparoscopic appendectomy performed in 9 patients while 12 patients had open appendectomy. The operative time on the laparoscopic group ranged from 50-80 minutes while on the open appendectomy ranged from 40-60 minutes. The length of stay after laparoscopic procedure was 1.5-3 days in comparison to 3-5 days following open appendectomy. Postoperative wound infection detected in 2 patients after open appendectomy (16%) compared with 1 patient (11%) following laparoscopic appendectomy. The postoperative pathology was classified as normal appendix, suppurated appendix, and complicated appendix. Table 2 showed the postoperative pathological examination. Preterm labor detected in one patient only had open appendectomy. Fetal outcome was evaluated by Apgar scoring together with fetal length and weight after delivery with no significant abnormality. As a Conclusions: Laparoscopic appendectomy is safe for both the mother and the fetus during pregnancy irrespective of gestational age, and the procedure is associated with a low risk of post-operative complications.

**KEYWORDS:** Appendix, Acute appendicitis, Laparoscopic, Pregnancy.

## INTRODUCTION

Abdominal pain during pregnancy can be caused by wide variety of obstetric and non-obstetric pathology that make diagnosis of acute appendicitis during pregnancy is a quite challenging problem. Limitation of CT scanning, anatomical and physiological changes during pregnancy like physiological leukocytosis that could be associated with pregnancy are also a contributing factor for difficult diagnosis.[1-3]

The most common non-obstetric cause for abdominal pain is acute appendicitis which has an incidence of 1 in 1500 pregnancy which is similar to the incidence in non-pregnant population.[4,5]

It has been reported that maternal morbidity in acute appendicitis without perforation is 17% compared with 52% with perforation while fetal mortality in non-complicated appendicitis is 7% compared with 24% in cases with complicated appendicitis.[6-8]

In general, laparoscopic appendectomy is considered nowadays as the standard technique for treating acute appendicitis but this can be stated for non-pregnant women as in pregnant women doing laparoscopic appendectomy still having debates about its safety for both fetus and mother.[9,10] Laparoscopic appendectomy during pregnancy is recommended on the first and second trimester. Regarding the third trimester no clear guidelines for performing laparoscopic appendectomy.[11]

The advantage of laparoscopic appendectomy over open appendectomy including less postoperative pain, early discharge, less risk for wound infection and giving feasibility for laparoscopic abdominal exploration.[12,13]

It has been reported that up to 23% of appendectomies performed during pregnancy show normal appendices.[14]

There is no sufficient data establishing the advantage of laparoscopic over open appendectomy in pregnant women. Old studies that comparing 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.[15,16]

## METHODS

This study is a retrospective study carried out at Alreef International Hospital, Abu Dhabi. The data of the pregnant women that were admitted with acute appendicitis with pregnancy were collected on the period from January 2018 to January 2019. The study included the patients admitted to both general surgery and obstetric departments. Total number of 23 patients was admitted with abdominal pain during pregnancy suggesting acute appendicitis. 2 patients were excluded as their magnetic resonance imaging (MRI) revealed normal appendix and were managed conservatively. 9 patients operated by laparoscopic appendectomy; 12 patients were operated by open appendectomy. Data including age of the patients, clinical picture of presentation to emergency department, age of gestation, modality used for diagnosis, operative time, postoperative discharge, and postoperative complications as well as pregnancy-related complications. Patients of each group were divided on presentation according to the gestational age into 1st, 2nd and 3rd trimesters.

The ages of our patients ranged from 21 to 36 years with a mean of 29 years. The presentation of all our patients was due to abdominal pain alone or abdominal pain with fever. Both surgical and obstetric consultations done in all patients. Both obstetric and non-obstetric ultrasound done for our patients with non-obstetric US suspected acute appendicitis in 8 patients (4 patients on the 1st trimester, 3 patients on the 2nd trimester, 1 patient on the 3rd trimester). Obstetric US performed to exclude obstetric causes of abdominal pain and to confirm gestational age.

Blood work up in emergency department (ED) revealed leukocytosis that ranged from 12,500 X 103 to 18,500 X103 cell/mm3 (Mean 15,300 X 103 cell/mm3).

### Surgical procedure

Laparoscopic and open appendectomies were performed under general anesthesia. Patients presented on the plate 2nd and on the 3rd trimester were tilted 20 to 30 degrees to the left side, an angle that was further increased after induction of anesthesia and intubation to create more space for laparoscopic approach and prevent inferior vena cava compression.

After intubation, urinary catheter was inserted under aseptic precautions to all patients. Pneumatic compression devices were applied to all patients. Different approaches to the peritoneal cavity and pneumoperitoneum were performed, on the 1st trimester and up to 16

weeks of pregnancy, both open and closed techniques were selected. From 16 weeks of pregnancy open technique was used.

Hasson's open approach was performed through supraumbilical transverse incision opening the abdominal wall layers and peritoneum. 12mm port was inserted. On the patients, after 20 weeks pregnancy, the incision was placed 3-4cm above the palpable uterine fundus.

Closed technique was performed by insertion of Veress needle through umbilicus to create pneumoperitoneum followed by insertion of 5mm optical port through supraumbilical incision to access the peritoneal cavity. Gas insufflation (CO2) was adjusted to the minimum pressure that can allow comfortable laparoscopic procedure and avoid fetal hypercarbia that is usually below 12 mmHg.

Mesoappendix was cauterized with hook and the base either ligated with 2 vicryl loops or stapled with Endo GIA 30/3.5 (COVIDIEN, Endo GIATM Universal Articulating Loading Unit) as showed in Figure 4.

For patient who was presented with complicated appendicitis culture from the abdominal fluid was taken as shown in Figure 1 and 2.

During the whole procedure, care was taken not to touch the uterus. After laparoscopic and open appendectomies, the appendix was sent for pathological examination.

Open appendectomies were performed on the traditional way using McBurney's incision that can be modified (higher incision) with advanced gestational age. No prophylactic tocolysis was applied to any of our patients.

**RESULTS**

21 patients were selected in our study out of 23 pregnant patients that were presented to our ED with abdominal pain during pregnancy with or without fever. Patients were classified according to their gestational age to 1st, 2nd, 3rd trimester. Table 1 shows the total number of patients admitted per each trimester.

**Table 1: Number of patients per trimester.**

| | Number of patients | Percentage |
|---|---|---|
| 1st trimester | 6 | 28.57% |
| 2nd trimester | 7 | 33.33% |
| 3rd trimester | 8 | 38% |

Table 2: Correlation between the number of patients on each trimester and the procedure.

| | 1st trimester | 2nd trimester | 3rd trimester | Total |
|---|---|---|---|---|
| Open appendectomy | 3 | 3 | 6 | 12 |
| Laparoscopic appendectomy | 3 | 4 | 2 | 9 |

Appendectomy as they presented at the beginning of 3rd trimester.

The total number of patients had open appendectomies were 12 patients while 9 patients had laparoscopic appendectomies.

As shown in Table 3, the operative time on the laparoscopic group ranged from 50-80 minutes while on the open appendectomy ranged from 40-60 minutes.

The length of stay after laparoscopic procedure was 1.5-3 days in comparison to 3-5 days following open appendectomy.

Postoperative wound infection detected in 2 patients after open appendectomy (16%) compared with no wound complications followed laparoscopic appendectomy.

Table 4 showing that preterm labor detected in one patient only had open appendectomy. Fetal outcome was evaluated by Apgar scoring together with fetal length and weight after delivery with no significant abnormality.

The postoperative pathology was classified as normal appendix, suppurated appendix, and complicated appendix. Table 5 showed the postoperative pathological examination and the rate of postoperative wound infection.

**Table 3: comparison between laparoscopic and open appendectomy with multiple variants.**

| | Operative time | Length of stay | Wound infection |
|---|---|---|---|
| Open appendectomy | 40-60 min. | 3-5 days | 2 |
| Laparoscopic appendectomy | 50-80 min. | 1.5-3 days | 0 |

**Table 4: Fetal outcome following laparoscopic and open appendectomy.**

| | Open appendectomy | Laparoscopic appendectomy |
|---|---|---|
| Preterm labor | 1 | 0 |
| Congenital anomalies | 0 | 0 |
| Intrauterine fetal death | 0 | 0 |

## DISCUSSION

The incidence of acute appendicitis is nearly equal in both pregnant and non-pregnant women.[17] On the other hand, acute appendicitis represent the most common cause of abdominal pain among pregnant women. 1,2 Acute appendicitis can present at any trimester but half of the cases can be seen on the 2nd trimester an observation that published by Kapan et al.[18]

In this study, we had almost the same number of patients presents along the three trimesters. Despite that, the most accurate diagnosis for acute appendicitis observed by Kazar et al and

Mazze et al was during first trimester.[18,19] In this study none of the patients presented on the 1st trimester had a normal appendix on the postoperative pathology.

Maternal and fetal outcome was reported in our study to be the same following laparoscopic or open appendectomy. Zhang et al reported the same result.[20]

The rate of negative appendectomy during pregnancy (by postoperative pathology) had been reported between 25-50% by Brown et al and Ueberrueck et al, in this study, it was reported that postoperative normal appendix was reported in 3 patients that represent 14%.[16,21]

Walsh et al reported 1% as a rate of conversion of laparoscopic to open appendectomy. In this study, none of our procedure converted from laparoscopic to open appendectomy.[15]

The risk of preterm labors for any operative interference during pregnancy reported to be 10-15% the same percentage after laparoscopic or open appendectomies an observation that was reported by Kazar et al. In this study 1 patient had preterm labor, which represent 4%.[18]

## CONCLUSION

It is safe to use do laparoscopic appendectomy during pregnancy with no or low-risk postoperative complications. It is safe with experienced surgeon to use closed technique foe pneumo-peritoneum during 1st and early on the 2nd trimester despite that open technique still the safest method. Maternal postoperative complications are equal to non-pregnant women of the same age group.

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