

Acute Appendicitis In Pregnancy: The Presentation And The Outcome

Inaam Faisal Mohammed¹, Bashar Akram AlBayati²

1Assistant Professor in Obstetrics and Gynecology - College of Medicine - University of Diyala - Diyala - Iraq.

2General surgeon - Baquba Teaching Hospital - Diyala - Iraq.

Abstract: Background: *Acute Appendicitis is the most common non obstetric surgical emergency during pregnancy that can occur throughout pregnancy but difficulty in diagnosis and delayed treatment can be associated with adverse maternal and pregnancy outcome.*

Patients and Method: *A prospective, observational study conducted in the Department of General Surgery at Baquba Teaching Hospital – Diyala – Iraq, from April 2016 to April 2020. Seventeen pregnant women, with acute appendicitis, were included. The patients' age ranged from 19 - 39 years with a mean age of 25 years. The patients' history, operative findings, postoperative outcome and histopathology results were recorded and analyzed.*

Result: *Four patients were in the first trimester, 8 patients were in the second trimester while 5 patients were in the third trimester. Abdominal pain was the main symptoms in all patients followed by poor appetite and nausea, while the main physical signs were tenderness and rebound tenderness in right lower quadrant of the abdomen. The appendix was grossly inflamed in 16 patients and was normal in one patient as proved by histopathology. During the follow up period, 3 patients had surgical site infection (SSI) and treated conservatively, 2 patients had preterm contractions and treated by tocolytic drugs, while fetal loss occurred in one patient.*

Conclusion: *Acute appendicitis is a common surgical emergency during pregnancy but high degree of suspicion and skills are required for early diagnosis with subsequent proper management to avoid possible complications both to the fetus and the mother*

Keywords: *acute appendicitis, presentation in pregnancy, postappendectomy outcome.*

1. INTRODUCTION

Acute Appendicitis is the most common non obstetric surgical emergency during pregnancy, accounting for two-thirds of all gastrointestinal conditions requiring laparotomy. ⁽¹⁻⁹⁾

The incidence of acute appendicitis is 1/800 to 1/1500 pregnancies ^(4, 8-11) and is similar to that for non-pregnant women of reproductive age. ^(1, 12, 13). Appendicitis can occur throughout pregnancy, though it is seen more often during the second trimester. ^(4, 8, 9, 11)

The etiology and pathogenesis of acute appendicitis in pregnant woman, as in the general population, is not well known although, mechanical obstruction of appendiceal lumen or break down of mucosal barrier by direct invasion by pathogens or by an inflammatory response that has been triggered by an infectious agent or some other stimulus, are proposed to be possible causes. ^(14, 15)

The clinical presentation and outcome of presumed acute appendicitis are similar in pregnant and nonpregnant women of reproductive age ^(10, 13, 16) but typical clinical picture is present in only 50% - 60% of cases ^(12, 17) as history and physical examination are less reliable and the laboratory and ultrasonographic evaluation are less accurate in pregnant individuals ^(5, 9)

because of the relatively high prevalence of abdominal discomfort and gastrointestinal complaints, as well as anatomical changes related to the increase in uterine size and the physiological leukocytosis that occurs during this period. ^(1, 3, 5, 8) with the lack of specificity of preoperative evaluation, the pathologic diagnosis of appendicitis is confirmed in only 30% to 50% of cases. ^(18, 19)

Difficulty in diagnosis and delayed treatment can be associated with adverse maternal and pregnancy outcome including fetal loss and preterm labour in addition to the classical complications of acute appendicitis ^(3,8) and the condition worsens when rupture appendix and peritonitis occurs. ^(5, 7, 11, 12, 14, 18, 20)

While surgical management is standard of care for acute appendicitis in pregnant patients ^(21, 22); conservative management is not recommended to avoid peritonitis and subsequent complications. ^(5, 10) Management should be prompt and undertaken by a multidisciplinary team approach. ⁽²²⁾

2. PATIENTS AND METHOD

A prospective, observational study conducted in the Department of General Surgery at Baquba Teaching Hospital – Diyala – Iraq, from April 2016 to April 2020. After proper history and physical examination aided by the laboratory investigations and ultrasonographic evaluation, 17 pregnant women, with acute appendicitis, were included. The patients' age ranged from 19 - 39 years with a mean age of 25 years. Informed consents were obtained from the patients regarding the need for operation (appendicectomy) and possible postoperative complications. The follow up period extended to one month after operation or to delivery. A standardized data collection form including demographic data, obstetric, medical and surgical history, operative findings, postoperative outcome and histopathology results, was completed for each patient.

3. RESULTS

Seventeen pregnant females with diagnosis of acute appendicitis were operated in our hospital. The patients' age ranged from 19-39 years with mean age of 25 years. Four patients were in the first trimester, 8 patients were in the second trimester while 5 patients in the third trimester. As shown in fig. 1

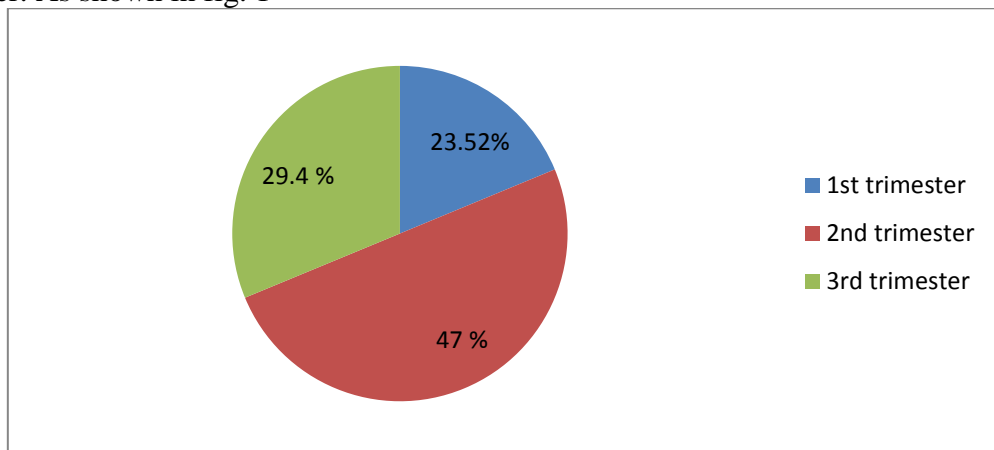


Fig. 1: The distribution of the patients according to the gestational age.

Abdominal pain was the main symptoms in all patients irrespective of the gestational age, 14 patients with periumbilical pain then shifted to right lower quadrant of the abdomen while in 3 patients had poorly localized lower abdomen pain. poor appetite was the complain in 14 patients, nausea was a symptom in 13 patients and 6 patients had repeated vomiting. Table 1 shows the main symptoms in our patients.

Table 1: patients' symptoms in our patients

<i>Symptoms</i>	<i>No. of patients (%)</i>
Abdominal pain	17 (100%)
Right lower quadrant	14 (82.35 %)
Poorly localized	3 (17.65 %)
Poor appetite	14 (82.35 %)
Nausea	13 (76.47 %)
Vomiting	6 (35.3 %)

The main physical sign was tenderness in right lower quadrant of the abdomen in all the patients while rebound tenderness was noted in 14 patients, 12 patients had fever and Roving's sign was present in 10 patients. Table 2 shows the main physical signs.

Table 2: The main physical sign in our patients

<i>Physical signs</i>	<i>No. of patients (%)</i>
Tenderness	17 (100 %)
Rebound tenderness	14 (82.35%)
Fever	12 (70.58 %)
Roving's sign	10 (58.8 %)

The appendix was grossly inflamed in 16 patients and in 2 patients it was perforated. While one patient had normal appendix as proved by histopathology. Table 3 shows the pathological findings.

Table 3: pathological findings

<i>Findings</i>	<i>No. of patients (%)</i>
Grossly inflamed	16 (94.1 %)
Perforated	2 (11.76 %)
Normal	1 (5.88 %)

During the follow up period, 3 patients had surgical site infection (SSI) and treated conservatively, 2 patients had preterm contractions and treated by tocolytic drugs, while fetal loss occurred in one patient (who had perforated appendicitis and purulent peritonitis) as shown in table 4.

Table 4: postoperative complications in our patients

<i>Complication</i>	<i>No. of patients (%)</i>
Surgical site infection	3 (17.65%)
Preterm contractions	2 (11.76 %)
Fetal loss	1 (5.88 %)

4. DISCUSSION

Two percent of pregnant women in the world undergo surgical procedures unrelated to pregnancy^(23, 24). The most frequent nonobstetric surgical emergency in pregnant women is appendicitis^(1-9, 24).

In our study the patients' age ranged from 19- 39 years with a mean of 25 years. This can be explained by the fact that acute appendicitis has a peak incidence in the second and the third decades coinciding with the child bearing years and the incidence in pregnant appears broadly the same as in nonpregnant women ^(1,12,13,19).

Acute appendicitis can occur throughout pregnancy but more commonly in the second trimester (47 % of cases in this study) and this is also found in other studies ^(3-5, 8, 9, 12, 13, 19), but Chawla et al ⁽¹¹⁾ found that 60% of cases were seen in the first trimester.

The clinical presentation of acute appendicitis in pregnant and nonpregnant women are the same ^(10,13,16) although, the diagnosis is more challenging and reported to be often inaccurate in pregnant women because of physiological changes in pregnant mimic presenting features of appendicitis ^(13,17) and thus high level of suspicion, skills and experience is required ⁽¹⁴⁾ to avoid delay in diagnosis and subsequent risk of perforation with peritonitis and eventually increase rate of complications ^(12-14, 17).

In our study abdominal pain was the most common complaint in all patients irrespective of the gestational age, followed by loss of appetite in 82.35 % of patients and nausea in 76.47 % of patients. Abdominal pain, loss of appetite and nausea were also common symptoms in the studies of Ahmet Türkan et al ⁽³⁾, Somaye Bazdar et al ⁽⁵⁾, Tika Ram Bhandari et al ⁽⁷⁾ and Antônio Henriques de Franca et al ⁽⁸⁾.

Lower abdominal tenderness and rebound tenderness were the most frequent physical finding in our study and these findings were coincidental with studies of Ahmet Türkan et al ⁽³⁾, Somaye Bazdar et al ⁽⁵⁾, Tika Ram Bhandari et al ⁽⁷⁾ and Antônio Henriques de Franca et al ⁽⁸⁾. The negative laparotomy rate was 5.88 %, although a negative laparotomy rate of 30 to 50 % is accepted by Vincent Wu et al ⁽¹⁾ and Brown JJ et al ⁽²⁵⁾, 21.4 % by Tika Ram Bhandari et al ⁽⁷⁾, 15.8 % by Abbas Aras et al ⁽¹⁷⁾. Appendicular perforation with purulent peritonitis was seen in 2 patients (11.76 %) and both patients were in the last trimester and this was explained by a delay in presentation on diagnosis, while the proportion of appendicular perforation was 16 % in the study of S.F. Kazim et al ⁽¹³⁾, 25% in Tika Ram Bhandari et al ⁽⁷⁾ and 43% in Masood A et al ⁽⁶⁾.

SSI occurred in 3 patients (17.65 %) and were treated conservatively, while SSI was reported in 10.3 % of cases by Somaye Bazdar et al ⁽⁵⁾, In 14.3 % of cases by Tika Ram Bhandari et al ⁽⁷⁾, 17.6 % of cases in Irfan Nazir Mir et al ⁽⁹⁾ and 8 % of patients in S.F. Kazim et al ⁽¹³⁾. While no SSI was observed by Ahmet Türkan et al ⁽³⁾.

Preterm contractions were reported in 2 patients (11.76%) and were treated by tocolytic agents. In the study of S.F. Kazim et al ⁽¹³⁾, 13% of patients had preterm contractions.

In this study one patient had fetal loss in the postoperative period; the patient was in the third trimester with perforated appendicitis and purulent peritonitis as patients with perforated appendicitis associated with peritonitis or abscess are prone to fetal loss ^(6, 12) and significant postoperative morbidity ⁽⁷⁾. Irfan Nazir Mir et al ⁽⁹⁾ reported abortion rate of 37.5 % in the first trimester and premature delivery of 14 % in the third trimester; S.F. Kazim et al ⁽¹³⁾ reported 8% rate of preterm delivery and 2.7 % fetal loss while no maternal or fetal mortality was seen in the studies of Tika Ram Bhandari et al ⁽⁷⁾ and Selin Kapan et al ⁽¹⁹⁾ inspite of high perforation rate.

5. CONCLUSIONS

Acute appendicitis is a common surgical emergency during pregnancy but high degree of suspicion and skills are required for early diagnosis with subsequent proper management to avoid possible complications both to the fetus and the mother.

6. REFERENCES

- [1] Vincent Wu, B. Anthony Armson. Appendicitis in pregnancy: Clinical presentation and perinatal outcome. *J SOC OBSTET GYNAECOL CAN* 1999; 21(14):1328-33.
- [2] Arkeliana Tase, Mohamad Fathul Aizat Kamarizan, Keshav Swarnkar. Appendicitis in pregnancy: Difficulties in diagnosis and management. *Guidance for the emergency general surgeon: A systematic review. International Journal of Surgery Open* 2017; 6: 5-11.
- [3] Ahmet Türkan, Metin Yalaza, Mehmet Tolga Kafadar, Gürkan Değirmencioğlu. Acute Appendicitis in Pregnant Women: Our Clinical Experience. *Clin Invest Med* 2016; 39 (6): S159-S163.
- [4] Polly Weston, Paul Moroz. Appendicitis in pregnancy: how to manage and whether to deliver. *The Obstetrician & Gynaecologist* 2015; 17:105–110.
- [5] Somaye Bazdar, Maryam Dehghankhalili, Shekoofeh Yaghmaei, Maryam Azadegan, Amirhossein Pourdavood, Mohammad Hadi Niakan, Ali Mohammad Bananzadeh. Acute Appendicitis during Pregnancy; Results of a Cohort Study in a Single Iranian Center. *Bull Emerg Trauma* 2018; 6(2):122-127.
- [6] Masood A, Saleh S, Shaheen A, Fakhry T, Shawky M, et al. (2016) Maternal and Fetal Outcome in Pregnant Women with Acute Appendicitis: A Three Year Observational Study. *Obstet Gynecol Int J* 5(5).
- [7] Tika Ram Bhandari, Sudha Shahi, Sarita Acharya. Acute Appendicitis in Pregnancy and the Developing World. *International Scholarly Research Notices* 2017, Article ID 2636759.
- [8] Antônio Henriques de Franca Neto, Melania Maria Ramos do Amorim, Bianca Maria Souza Virgolino Nóbrega. Acute appendicitis in pregnancy: literature review. *Rev Assoc Med Bras* 2015; 61(2):170-177.
- [9] Irfan Nazir Mir, Atif Naeem Raja, Mir Mujtaba Ahmad, Raja Nadeem. Acute Appendicitis in Pregnancy, Management and Outcomes: A Hospital Based Study. *Open Access J Surg* 2017; 2(1):ID.555579.
- [10] Sanda RB, Garba SE. Acute appendicitis in pregnancy. *Arch Int Surg* 2013; 3:6-10.
- [11] S Chawla, Shakti Vardhan, S Jog. Appendicitis during pregnancy. *MJAFI* 2003; 59: 212-15.
- [12] Abdoulhossein Davoodabadi, Hassan Davoodabadi, Hossein Akbari, Monireh Janzamini. Appendicitis in Pregnancy: Presentation, Management and Complications. *Zahedan J Res Med Sci.* 2016; 18(7):e7557.
- [13] S.F. Kazim, K.M. Inam Pal. Appendicitis in pregnancy: Experience of thirty-eight patients diagnosed and managed at a tertiary care hospital in Karachi. *International Journal of Surgery* 2009; 7: 365–7.
- [14] Zainur Rashid, Suhaila SA, Azmi MN. Acute appendicitis in pregnancy: a diagnostic and management challenge. *IMJM* 2014; 13(1):77-80.
- [15] Roland EB Andersson, Mats Lambe. Incidence of appendicitis during pregnancy. *International Journal of Epidemiology* 2001; 30:1281-85.
- [16] Segev L, Segev Y, Rayman S, Nissan A, Sadot E. Acute Appendicitis during Pregnancy: Different from the Nonpregnant State? *World J Surg.* 2017; 41(1):75-81.
- [17] Abbas Aras, Erbil Karaman, Çağhan pekşen, Remzi Kızıltan, Mehmet Çetin Kotan. The diagnosis of acute appendicitis in pregnant versus non-pregnant women: A comparative study. *Rev AssocMed Bras* 2016; 62(7):622-627.
- [18] Patricia A. Pastore, Dianne M. Loomis, John Sauret. Appendicitis in Pregnancy. *J Am Board Fam Med* 2006; 19:621– 6.

- [19] Selin KAPAN, Mehmet Abdussamet BOZKURT, Ahmet Nuray TURHAN, Murat GÖNENÇ, Halil ALIŞ. Management of acute appendicitis in pregnancy. *Turkish Journal of Trauma & Emergency Surgery* 2013; 19 (1):20-24.
- [20] Michael Freeland, Erin King, Karen Safcsak, Rodney Durham. Diagnosis of appendicitis in pregnancy. *The American Journal of Surgery* 2009; 198 (6):753–8.
- [21] Blears EE, Keller DS, Ellis CN. Review of Operative vs. Non-Operative Management of Appendicitis in Pregnancy. *Surgery Curr Res* 2017; 7: 287. doi : 10.4172/2161-1076.1000287.
- [22] Miloudi N , Brahem M , Ben Abid S , Mzoughi Z , Arfa N , Tahar Khalfallah M Acute appendicitis in pregnancy: specific features of diagnosis and treatment. *Journal of Visceral Surgery* 2012; 149(4):275-9.
- [23] Adnan Budak, Abdullah Senlikci, Ramazan Guven. Can patients with appendicitis in pregnancy be operated in secondary hospital: A retrospective study? *Bitlis Eren University Journal of Science and Technology* 2018; 8 (1): 28-31.
- [24] Arer IM, Alemdaroğlu S, Yesilağac H, Yabanoğlu H. Acute appendicitis during pregnancy: case series of 20 pregnant women. *Ulus Travma Acil Cerrahi Derg* 2016; 22 (16):545-8.
- [25] Brown JJ, Wilson C, Coleman S, Joypaul BV. Appendicitis in pregnancy: an ongoing diagnostic dilemma. *Colorectal Dis* 2009; 11:116-22.