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ACUTE APPENDICITIS IN PREGNANCY;
MATERNAL AND FOETAL OUTCOME

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ABSTRACT... **Objective:** To determine the maternal and foetal outcome among the cases of acute appendicitis during pregnancy. **Design:** Prospective Study. **Setting:** Aga Khan Hospital for Women, Kutyana Memon Hospital and Hamdard University Hospital, where authors work. **Period:** From June 2004 to May 2008. **Material and Methods:** A total of 21 pregnant females who presented with right sided abdominal pain with clinical diagnosis of acute appendicitis were managed during this study period. All patients were admitted and managed by both surgeon and obstetrician. Detailed 'clinical history and physical examination was performed and all patients were investigated by complete blood picture, urine analysis and ultrasonography of abdomen and pelvis. Appendicectomy was performed through Grid Iron incision. Macroscopic appearance of appendices and other operative findings were recorded and all specimens were sent for histopathology. All the patients were followed up till the out come of pregnancy. **Results**: Twenty one patients were managed during this study period and out of these 21,13 patients were primigravida and 8 were multigravida. At presentation most of the patients were in their second trimester of pregnancy. Acute appendicitis was confirmed by histopathologically in 16 out of 17 patients with inflamed looking appendices (negative appendicectomy rate was 23.80%). Foetal loss occurred in 2 patients (9.52%) and both were in their second trimester of pregnancy. One patient gave birth to a baby who had low birth weight (4.76%) and one patient who was operated in third trimester had premature labour (4.76%) three weeks prior to expected date. Remaining 17 patients delivered at term without any consequences. Two patients developed wound infection which responded to wound care and antibiotics. **Conclusion:** Acute appendicitis is the commonest cause of acute abdomen during pregnancy. A timely decision and a professional liaison among obstetrician and surgeon are key factors for a better outcome.

Key words: Appendix, appendicitis, appendicectomy, pregnancy, acute, maternal, foetus, morbidity, mortality.

INTRODUCTION

Acute appendicitis is the most common non-obstetrical emergency in pregnancy requiring surgical intervention[1,2]. Its incidence during pregnancy is comparable with general female population but the risk of perforation increases two to three folds during pregnancy especially in late trimester presentations[3,4]. The clinical diagnosis of acute appendicitis in pregnancy is a challenge even for experienced clinicians because of the adaptations both in anatomy and physiology[2]. This diagnostic difficulty leads either to high negative appendicectomy rate[5] or increased incidence of perforation consequent upon delayed diagnosis[2,6]. Maternal and foetal morbidity and mortality increases greatly with perforated appendicitis causing peritonitis[3]. A high index of suspicion and good clinical skills are required for prompt diagnosis and to prevent the patient and foetus from the consequences of delay in diagnosis[7]. This study was designed to determine the maternal and foetal outcome among the cases of acute appendicitis during pregnancy.

MATERIAL AND METHODS

This prospective descriptive study was conducted at Aga Khan Hospital for Women, Kutyana Memon Hospital and Hamdard University Hospital, where authors work for the period of four years from June 2004 to May 2008. During this period 21 pregnant females presented with right

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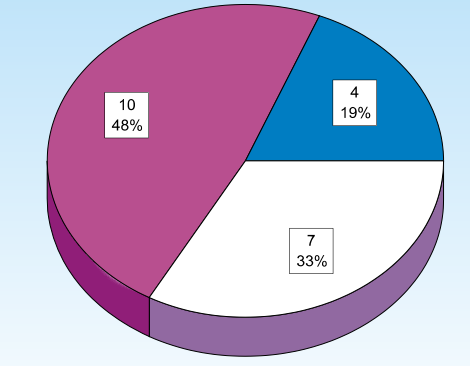
sided abdominal pain with clinical diagnosis of acute appendicitis. All patients were admitted and managed by both general surgeon and obstetrician. Detailed clinical history and physical examination was performed and all patients were investigated by complete blood picture, urine analysis and ultrasonography of abdomen and pelvis. Appendicectomy was performed through Grid Iron incision. Second generation cephalosporin or co-amoxiclav in combination with metronidazole was administered intravenously at the time of induction of general anaesthesia and postoperatively for three days. Macroscopic appearance of appendices and other operative findings were recorded and all specimens were sent for histopathology. All the patients were followed up till the out come of pregnancy.

RESULTS

Twenty one patients were treated during this study period with age range of 17 to 38 years (mean age was 24.3 years). Out of 21, 13 patients were primigravida and 8 patients were multigravida. At presentation most of the patients were in their second trimester of pregnancy. Figure I showed the distribution of patients according to the trimester of pregnancy.

Fig-I. Distribution of Patients in Different Trimesters Of Pregnancy



The duration of symptoms was from 5 hours to 72 hours (mean presentation time was 29.2 hours). The late presentation of more than 24 hours was common in late second trimester and in third trimester. Abdominal pain was the presenting complaint in all patients but the classical shifting pain in right lower quadrant was present in only 7 patients and fixed pain in right lower quadrant was present in 4 patients. After pain anorexia was the commonest symptoms. Details of symptomatology are shown in table I.

Table-I. Various presentations of acute appendicitis in pregnancy

Symptoms	No. Of Pts.	%age
Abdominal pain		
Pain in right lower quadrant	11	52.4
Pain in whole right side of abdomen	5	23.8
Pain in right upper quadrant	2	9.5
Diffuse abdominal pain	3	14.3
Vomiting	13	61.9
Nausea	15	71.4
Anorexia	18	85.7
Fever	9	42.8
Dysuria	5	23.8

On physical examination elevated temperature was present in 12 patients (57.14%). Tenderness at Mc Burney's point was present in 13 patients (61.90%). Point of maximum tenderness was right lumbar region in 3 patients (14.3%) and right hypochondrium in 2 patients (9.5%). Rest of the 3 patients (14.3%) had diffuse tenderness. Rebound tenderness was elicited in 9 patients (42.85%) only. Tenderness on rectal and vaginal examination was present in 7 patients (33.33%) only. Complete blood picture showed total leucocyte count more than 10,000 x 10^9 /L in 16(76.19%) patients, among them leucocyte count of more than 15.000 x 10^9/L was present in 7 patients (33.335). Neutrophil percentage of more than 75% found in 71.42% of patients.

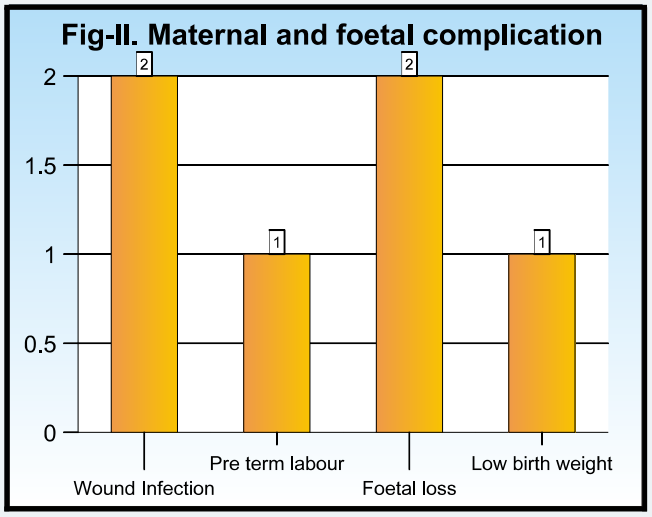
Urine analysis showed white blood cells of more than 30/HPF in 3 patients only. Ultrasonography of abdomen and pelvis showed inflamed appendix in 4 patients, inflamed appendix in combination of free fluid in right iliac fossa and/or cul-de-sac in 5 patients, only free fluid in right iliac fossa and/or cul-de-sac in 4 patients and normal scan in 8 patients. Foetal parameters were normal in all patients. Peroperatively inflamed appendices were found in 17 patients (80.95%) and two

of them were perforated with pus confined in right iliac fossa. Details of per operative findings are given in table II.

Table-II. Details of operative findings

Preoperative findings	No of Patients	%age
Acute appendicitis	7	33·33
Suppurative appendicitis	5	23·81
Gangrenous appendicitis	3	14·30
Perforated appendicitis	2	9·52
Normal appendix	4	19·04

Out of 4 patients in whom appendix was found normal, one patient had torsion of right ovarian cyst. No other cause of pain was found in remaining three patients. All specimens were sent for histopathology. Acute appendicitis was confirmed histopathologically in 16 out of 17 patients with inflamed looking appendices (negative append icectomy rate was 23.80%). Foetal loss occurred in 2 patients (9.52%) and both were in their second trimester of pregnancy. One patient gave birth to a baby who had low birth weight (4.76%) and one patient who was operated in third trimester had premature labour (4.76%) three weeks prior to expected date. Remaining 17 patients delivered at term without any consequences. Two patients developed wound infection which responded to wound care and antibiotics. Figure II shows the details of maternal and foetal complications encountered.



DISCUSSION

Acute appendicitis is the most common cause of acute abdomen during pregnancy requiring surgical intervention with an incidence of 1 in 1440 pregnancies[2,3]. Its highest incidence is seen in second trimester ranging from 27 to 60%, followed by first trimester (19 to 36%). Although incidence decreases from 15 to 33% in the third trimester but perforation is commonly seen in late trimester probably due to atypical presentation as pregnancy advances[3,8]. Our study also confirms this incidence rate, being highest in second trimester (47.61%) but the second cluster of the patients belonged to third trimester (7 patients 33.33%). The clinical diagnosis of acute appendicitis is a challenge in the presence of gravid uterus and from the middle of the second trimester appendix is displaced upward and the abdominal wall is lifted from the appendix by gravid uterus and muscular laxity occurs[9]. Sometimes the gravid uterus walls off the perforation and cause pre term labor before presenting as acute abdomen[2]. The common presenting symptoms are supposed to be right lower quadrant pain, anorexia, nausea and vomiting[10] but In second and third trimesters right upper quadrant pain or entire right sided are even more common[3,5]. In this study classical right iliac fossa pain was the presenting complaint in 52.38% of patients. The second most common site was the entire right side of abdomen and two patients presented with diffuse abdominal pain explaining the ongoing changes in the abdomen with gravid uterus. Nausea and vomiting were present in 71.42% and 61.90% of patients respectively but these features may easily be attributed to pregnancy in first trimester and can not be relied upon but their reappearance late in pregnancy should be viewed with suspicion[11].

Fever and tachycardia may not be present[3] as fever was the presenting feature in 9 patients (42.85%) only. There is not a single reliable sign or symptoms that can aid in the diagnosis of acute appendicitis in pregnancy [3,12]. In general population increased total leucocyte count is considered helpful in the diagnosis of acute appendicitis

but during pregnancy this counts can normally reach up to 16,000 x 10^9/L, so must be interpretated with caution[3,5,8]. Similar finding is present in our study that majority of the patients had TLC more than 10,000 x 10^9/L (16 patients) and out of these. 7 patients had TLC more than 15,000 x 10^9/L, but neutrophils percentage more than 75% was present in 15 patients and predominance of polymorphonuclear cells was not the feature of pregnancy and it represented the presence of infection[4].

Ultrasound is considered as an important diagnostic tool especially in pregnancy with high specificity[4,8] but it has its limitations especially in third trimester when gravid uterus hinders the visualization of appendix[2]. We performed ullrasonography in every patient and it proved helpful preoperatively either showing swollen appendices or free fluid in 13 of our patients, but it missed one patient with ovarian pathology. Recently Helical computed tomography has been tried in pregnant patients with suspected acute appendicitis but still more trials are needed for its routine use in patients with pregnancy. A delay in diagnosis results in an increased rate of mortality and morbidity in patients and foetus and strong suspicion of acute appendicitis sometimes made these imagings unnecessary as the risk of foetal death may rise up to 36% with perforation and diffuse peritonitis[3,1314]. This atypical presentation and absence of any key investigation makes the accurate diagnosis difficult in gravid abdomen resulting in many more laparotomies about 1 of 936 births[2] and high negative appendicectomy rate (up to 44%)[14]. Our negative appendicectomy rate (23.80%) is comparable with other studies as shown in table III.

The surgical intervention in gravid abdomen may result in foetal loss and this is the main reason of hesitancy to proceed with surgery[5], but early intervention is required for a good out come[15] with the realization that "mortality of acute appendicitis is the mortality of delay"[16]. With increasing use of antibiotics, tocolytic agents and improved perioperative care maternal mortality and morbidity has reduced markedly[3].

There was no maternal mortality occurred in our study although morbidity increased with preterm labour in one patient (4.76%). which is comparable with already defined risk of pre term labor of 4 to 6% after surgical intervention. The chances of foetal loss increase more with delayed diagnosis and onset of peritonitis rather then early appendicectomy[5]. Foetal mortality in our study[1] was 9.52%. Other authors described the foetal mortality in the range of 7 to 14%. M D Horowitz described in his study 6 patients who presented with peritonitis and foetal mortality in his study was 50% and maternal mortality was 16.66%[10]. Table III showed the comparison of negative appendicectomy rate, pre term labor and foetal morbidity and mortality in our study with other studies. As none of the study earlier has all parameters, therefore these are not present in each column for comparison.

Our experience showed that prompt diagnosis and timely surgical intervention is required (when acute appendicitis is suspected in pregnant female) to avoid unnecessarily high mortality and morbidity both for mother and foetus.

Table-III: Comparison of negative appendicectomy rate and maternal and foetal outcome of appendicectomy in pregnant women

Authors	Negative Appendicectomy Rate	Pre term	Low birth weight	Foetal mortality
Present study	23.80%	4.76%	4.76%	9.52%
Abbas Ghazanfar et al[5]	14%	8%	8%	14%
W W K To et al[1]	18.42%	5.26%	-	10.52%
Anderson B et al[17]	25%	7.14	-	7.14%
Mehmoodian al[7]	22.22%	-	-	-
McGory ML et al[18]	23%	11%	-	6%
Yilmaz HG et al[19]	-	-	-	8%
Cohen-Kerem R et al[20]	-	3.5%	-	2.5%
Walsh CA et al[21]	27%	-	-	6%
Al Mulhim AA[14]	44%	-	-	26%

CONCLUSION

Acute appendicitis is the commonest cause of acute abdomen during pregnancy. A timely decision and a professional liaison among obstetrician and surgeon are required for a better outcome.

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