

# Favorable Outcome For Delayed Diagnosis Of Perforated Appendix In Late Gestation

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## Abstract

A 28-year-old Emirati lady gravida 2 para 1, previous caesarean section, was admitted at her 36 weeks gestation with an acute onset of vague abdominal pain associated with nausea and vomiting of 4 days duration. Laboratory and radiological assessment were normal. Presumptive diagnosis was false labor pain or mild abruptio placenta while other possibilities were kept at the bottom of the list. Hydration and broad-spectrum antibiotics were started, The patient was kept under continuous cardiotocography (CTG) monitoring which showed pathological findings couple of hours later with maternal spike of temperature. Hence, emergency caesarean section was carried out. The abdominal cavity was explored and revealed a suspicious peritoneal fluid that necessitate exploration. A seriously inflamed appendix was found with pus oozing from its tip. Appendectomy and peritoneal lavage were done by the surgical team. Recovery was smooth and complete without complications.

## BACKGROUND

Acute abdominal pain in pregnancy is a challenging situation for the treating physician, given that the lives of the patient and the expected child are at risk. A quick and wise decision is imperative. A variety of pathologies could be responsible, whether related to pregnancy or not. Careful assessment and considering the anatomical and physiological changes associated with pregnancy certainly will avoid fetal and maternal morbidities and mortalities.

## CASE PRESENTATION

A 28-year-old Emirati lady gravida 2 para 1, previous caesarean section was admitted at her 36 weeks gestation with an acute onset of vague abdominal pain associated with nausea and vomiting of 4 days duration. Clinical examination revealed a pulse rate of 110/min, temperature was 36.8o C and blood pressure (BP) of 110/80 mm Hg. Abdominal tenderness was elicited all over with palpable uterine contractions with no scar tenderness. Vaginal examination revealed no cervical dilatation or effecement. Abdominal and pelvic ultrasonography (USG) was performed by a radiologist who reported a single live intrauterine pregnancy of 36 weeks with normal intra abdominal organs. (Figure 1).

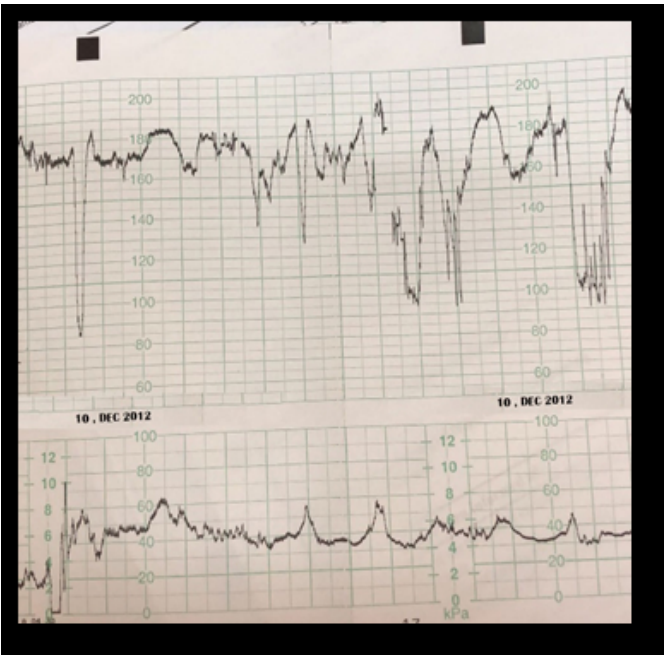
## Figure 1

Normal Renal USG



Biochemical tests revealed a hemoglobin value of 12.4 gms/dl and white blood cells of  $7.9 \times 10^9 / L$  which fall within the normal range. There was no evidence of urinary tract infection. Fetal monitoring by cardiotocography (CTG) showed pathological findings a couple of hours later (Figure 2).

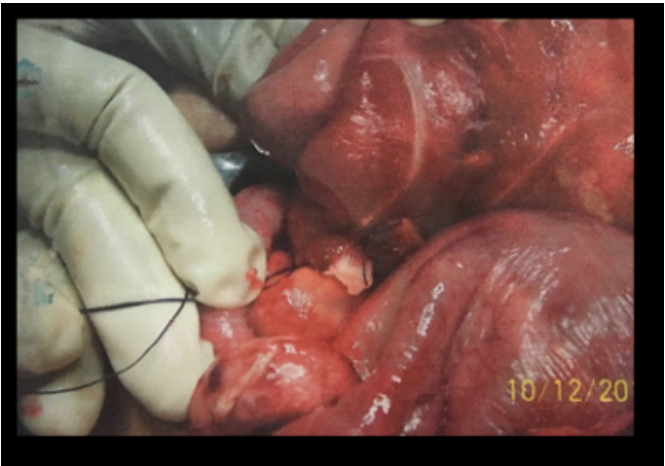
**Figure 2**  
Pathological C TG



Emergency caesarean section was carried out. A live male neonate was delivered weighing 2.160 kg with a good Apgar score of 9 and 9 at 1 and 5 minutes respectively.

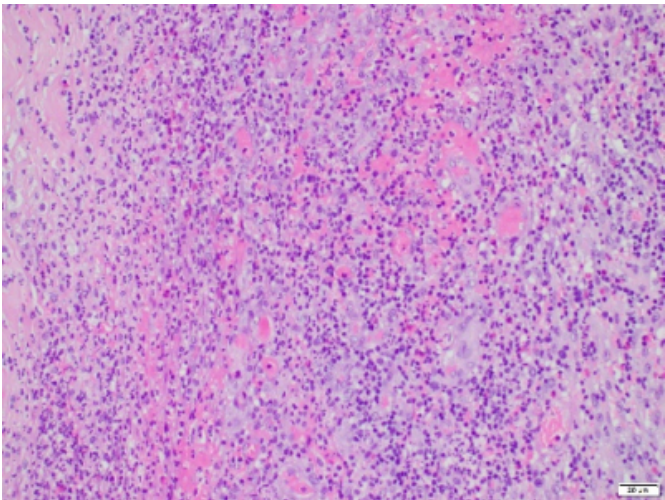
Turbid fluid was noticed upon opening the peritoneum, raising the possibility of coexistng inflammatory focus, thus pelvic and abdominal organs were explored. A seriously iflammmed appendix with pus discharging from the same place of the perforation was found with no other organ morbidities. Appendectomy and peritoneal lavage were performed by the surgical team with drain kept in situ. No other pathology found (Figure 3).

**Figure 3**  
Perforated appendix



Subsequent histopathology confirmed the intra operative findings. (Figure 4) The patient had a smooth and complete post partum course inspite of this serious intraoperative finding and discharged on the 9th post-operative day, after completing full course of broad-spectrum antibiotics.

**Figure 4**  
Histopathological examination of appendiceal specimen confirmed appendicitis.



**DISCUSSION**

Acute abdominal pain during pregnancy represents a clinical dilemma in obstetrics where diagnosis and the timely intervention may be delayed. The associated gestational anatomical and physiological changes could obscure the diagnosis. The existance of many possible causes often overlapps in their presentations (Table 1).

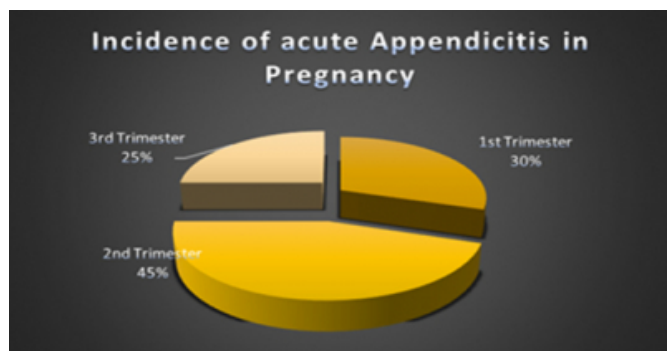
**Table 1**  
Causes of delayed diagnosis of Acute Appendicitis in Pregnancy

The difficulty	The Reason
<b>Anatomical</b>	1) Displacement of the appendix by the gravid uterus, away from Mc Burney's point. 2) Lack of peritoneal signs of inflammation , due to : a) Stretching of abdominal muscles by the enlarged uterus. b) The gravid uterus impedes the direct contact between the inflamed appendix and the paraietal peritoneum.
<b>Physiological</b>	Leukocytosis is a physiological change in pregnancy.
<b>Radiological</b>	USG : pain and abdominal rigidity, may interfere with probe compression.
<b>Increased Rate of Perforation</b>	The infection is difficult to be confined to a localized area due to uterine contractions. The omentum is unable to reach the inflamed appendix Delayed Diagnosis

Although, acute appendicitis in pregnancy is rare, it constitutes 1 out of 1500 of non-traumatic causes. (1) It can be diagnosed at any stage of gestation with approximately half of the cases diagnosed during the second trimester. (2) (Figure 5)

**Figure 5**

Incidence of Acute Appendicitis in Pregnancy

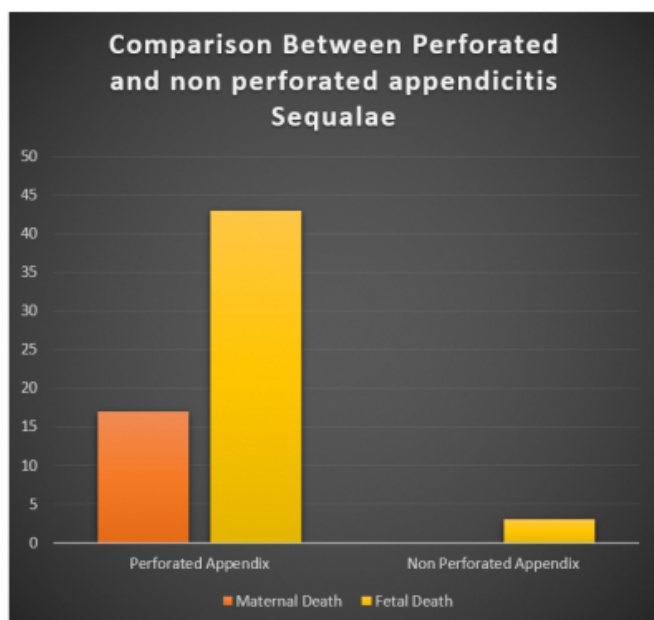


The risk of perforation in pregnancy has grave sequelae, and can unfortunately reach up to 55% compared to 4% to 19% in the general population. (3) The delay in diagnosis is the direct responsible cause of maternal death which is reported to be approximately 17%.

Furthermore, fetal loss is reported as high as 43% in perforated appendicitis, in comparison to 2% - 3% in non-perforated cases. Septicemia is the major responsible factor in addition to prematurity in some cases. (4) (Figure 6)

**Figure 6**

Comparison between Perforated and Non-Perforated appendix sequelae



Lacking the classical signs of acute appendicitis presents in the majority of cases and adds to the difficulty encountered in the diagnosis. This relates in part to the positional changes associated with advanced gestation, where the appendix is displaced by the gravid uterus, away from Mc Burney's

point. Adding to this, the absence of peritoneal signs, since the gravid uterus impedes the direct contact between the inflammation and the parietal peritoneum, make it more difficult to make the correct diagnosis.

Other difficulty found in pregnancy is that leukocytosis could be an insignificant finding, as it appears to be one of the physiological changes encountered in pregnancy. (5) Therefore, its absence shouldn't delay the surgical intervention if appendicitis is suspected clinically. Literature review revealed that in 60% of diagnosed appendicitis in pregnancy is associated with normal leukocyte levels. (6) This fact mandates the cautious interpretation of clinical and biochemical findings in pregnancy is to avoid late or misdiagnosis.

Mourad et al, conducted a retrospective study of 67 cases of appendicitis among pregnant women over 10 years and they found that neither fever nor leukocytosis was statistically significant as a helpful diagnostic marker.(7)

Another factor adding to the dilemma in diagnosing acute appendicitis in pregnancy is the existing pain and abdominal rigidity that interfere with compression. However, the role of ultrasound cannot be overlooked, as it is highly specific in diagnosing acute appendicitis and excluding other pelvic and abdominal pathologies. If ultrasonography failed to demonstrate the appendix, as in our case, magnetic resonance imaging (MRI) should be the next option due to its safety. Furthermore, the reported high negative predictive value which reaches up to 90% can lower the rate of negative laprotomies. (8)

Papa Dasari described in 2011 a 23-year-old second para who suffered from acute abdominal pain at 32 weeks of gestation, with negative radiological findings antenatally, but later on revealed free fluid in the abdominal cavity post partum, then pre operative diagnostic aspiration revealed pus. Surgical exploration diagnosed a perforated appendix with intra-abdominal pus collection and the patient had a stormy post-operative course .(9)

An incidental ruptured appendix at term diagnosed at emergency cesarean section for an abnormal fetal heart trace in a patient who reported a brief abdominal pain during the second trimester was described by Somoye and Downes. (10)

A fatal outcome for a 25-year-old pregnant lady at her 30+6 weeks gestation was described by Rakhi et al. in 2014. The patient presented with generalised abdominal pain and fever for 4 days prior to admission and based on ultrasonography

findings that suggest perforated viscus, laparotomy was carried on and intraoperative evidence of a perforated appendix with pus was found in the peritoneal cavity. The patient had stormy post-operative course and deteriorated on the second post operative day due to multiorgan failure which was complicated with cardiac arrest and intrauterine fetal death. (11)

Laparoscopic surgery is not a preferred option in the late gestation because of the blind insertion of the Verres needle or the trocar can injure the gravid uterus. In addition, the increased intra-abdominal pressure can compromise the fetal circulation. (12)

Holzer et al. reported in May 2011 a near-miss management of acute appendicitis in a 33 weeks pregnant lady who presented with worsening abdominal pain, leukocytosis, and raised C- reactive protein. They found an iatrogenic rupture of the uterine vein during laparoscopic dissection of the appendix that necessitate conversion to laparotomy and delivery (13)

Simultaneous caesarean section and appendectomy is not recommended as it may have deleterious effect on future fertility, due to endometritis and subsequent adhesion formation, unless the patient or the unborn child are in compromise. (14)

Pre-operative antibiotics should not be the sole management for acute appendicitis in pregnancy, hence appendectomy is the gold standard management. However, postoperative use is recommended.

While preoperative use of tocolytics in suspected appendicitis is risky, still it may be given post-operatively if the gestation is less than 34 weeks, in addition to preoperative antenatal corticosteroids, unless severe maternal sepsis is evident. (15) Early mobilization and thromboprophylaxis are essential.

### **CONCLUSION**

Diagnosing appendicitis in pregnancy is a difficult task that requires high suspicion and clinical skills, keeping in mind that the final diagnosis in most of the cases is retrospective. The data obtained from laboratory assessment is of limited value and should not prevent surgical intervention if required. The grave sequelae of the condition justifies a negative laparotomy, which can reach up to 35% found in pregnancy. (12)

Appendicitis should be the first diagnosis for non-traumatic abdominal pain in pregnancy. Fetal and maternal outcome are clearly linked to the severity of the existing inflammation. Risk of maternal septicemia should outweighs the risk of prematurity, thus surgery should be the only option for cure at any stage of pregnancy. Simultaneous delivery is only indicated in cases of critical fetal or maternal compromise.

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