

## Appendicitis and Pregnancy: Report of Two (2) Cases

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**Abstract:** Acute appendicitis is a common pathology with an estimated lifetime incidence of 7 % to 8 %. However, during pregnancy, its incidence is much lower, ranging from 0.05 % to 0.13 %. It is the most common non-obstetrical surgical emergency during pregnancy. It is a serious condition in pregnancy because of delay in diagnosis leading to complications with a poorer maternal and fetal prognosis.

The purpose of this study is to discuss the specific diagnostic features of acute appendicitis in pregnancy to facilitate early diagnosis and improve its management.

We report such two cases of appendicular peritonitis: first of a 28-year-old woman, diagnosed during the first trimester of pregnancy and the second of 21 years diagnosed during the caesarean section.

For pregnant women exhibiting abdominal pain in the right iliac fossa, right flank or right hypochondriac regions associated with fever and vomiting, acute appendicitis should be suspected in time to avoid complications leading to poor maternal and fetal prognosis.

**Keywords:** Appendicitis, Pregnancy, Management.

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### Introduction

Acute appendicitis is the most common non-obstetrical surgical emergency during pregnancy (Allen and Helling, 1989; Berthet-Badetti *et al.*, 1997; Nouria *et al.*, 1998). Its lifetime incidence is estimated between 7% and 8%. But during pregnancy, its incidence is low, ranging from 0.05% to 0.13% (Lebeau *et al.*, 2005; Ramanah *et al.*, 2011; Abbasi *et al.*, 2014).

Acute appendicitis in pregnancy is a serious condition that affects maternal and fetal prognosis. Its signs and symptoms are polymorphous and misleading, resulting in diagnostic error and delayed prompt management (Leroy, 1981; Touhami, 1984; Narjis *et al.*, 2011). The purpose of this study is to discuss the diagnostic features of this condition to improve its management.

## Clinical Presentation

### Case 1

A 28-year-old gravida 4, para 2, 2 live children, 1 abortion, 12 weeks of amenorrhea who had been admitted to the Obstetrics and Gynaecology Department of Ouahigouya Teaching Hospital on account of diffuse abdominal pain of a week duration associated with vomiting and fever.

On admission, the patient was fully conscious; her temperature was 39° C with a blood pressure of 110/60 mm Hg. On abdominal examination, she had a distended and generalized tenderness. Pelvic examination found a long, closed cervix centered in the middle with a globular shape uterus and whitish leucorrhea. Because of possible ectopic pregnancy or a risk of abortion, the patient was admitted for observation under treatment.

Routine laboratory tests revealed:

- A positive *immunological pregnancy test*
- A total leukocyte count of 18850 cells per ml
- A cultocentesis yielding a whitish fluid
- A fetal ultrasound revealed an intrauterine monofetal pregnancy at 12 weeks gestation.

A surgeon was consulted on the second day of admission because of persistent symptoms. Clinical diagnosis of a peritoneal syndrome was made and the abdominal ultrasound result concluded to peritonitis of appendicular origin. Intraoperative aspiration yielded 350 ml of purulent peritoneal fluid and surgical exploration revealed an appendiceal abscess. Anterograde appendectomy was performed. The patient developed a septic shock and died 4 hours postoperatively despite adequate resuscitation.

### Case 2

A 21-year-old primigravida who had been admitted to the obstetrics and gynecology department on account of diffuse abdomino-pelvic pain associated with vomiting and fever of 4 days duration. On admission, the patient was fully conscious with good general condition, temperature of 37°C, a blood pressure of 110/60 mm Hg and a pulse rate of 128 beats/minute. The fetal presentation was cephalic with fetal back on the left side. The fundal height was 35 cm and the fetal heart rate was 162 beats / minute.

Vaginal examination found 1 fingertip width dilated and effaced cervix, membranes were not felt, a fetal cephalic presentation, an accessible sacral promontory with an estimated promonto-retropubic distance of 8.5 cm. Mucous plug was seen on fingertip after palpation.

Routine laboratory tests revealed a hemoglobin level of 11g/dl, a total leukocyte count of 12000 cells per ml and a B negative blood type.

A diagnosis of the first stage of labor with cephalopelvic disproportion in a full-term pregnancy was made and caesarean section was indicated. The caesarean delivery gave birth to a male newborn with a birth weight of 3.1 kg, a head and chest circumferences of 33 cm and 34.5 cm respectively, a height of 47 cm and an Apgar score of 9, 10, and 10 at one, five and 10 minutes respectively. Intraoperative findings revealed a purulent peritonitis of appendicular origin with a necrotic appendix and a moderate purulent peritoneal fluid. A

retrograde appendectomy with peritoneal and parietal drainage was performed. Postoperative management was as follows:

- Monitoring of vitals
- Administration of 3 liters of IV fluids/day
- Medication: 2 g of ceftriaxone daily, 500 mg of Metronidazole 8 hourly, 1g of intravenous paracetamol and 1 ampule of Acupan 8 hourly, 75 mg of Diclofenac/12 hours and 10 IU of syntocinon every 8 hours.

The patient was doing well postoperatively. The drain was removed on postoperative day 3 and the patient was discharged on postoperative day 6 after wound dressing.

## Discussion

Acute appendicitis is the most common non-obstetrical surgical emergency during the pregnancy; its incidence is estimated between 0.05% and 0.13% (Lebeau *et al.*, 2005; Ramanah *et al.*, 2011; Abbasi *et al.*, 2014). In the study of Lebeau *et al.*, (2005), the incidence of acute appendicitis was 1 in 467 pregnancies (0.2%) accounting for 65.6% of non-traumatic abdominal emergencies during pregnancy. Marret *et al.*, (2000) and Chambon and Quandalle, (1986) had similar results, reporting respectively frequencies of 65.6% and 66.6%. The prevalence of acute appendicitis during pregnancy is low, ranging from 0.05% to 0.1% in the western series (Leroy, 1981; Maisonnette *et al.*, 1999). We reported a first case in her first trimester of pregnancy and a second case in her last trimester of pregnancy. Nourira *et al.*, (1998) reported that acute appendicitis occurs more often during the first two trimesters of pregnancy. However, Halverson *et al.*, (1992) in their study on 12 appendectomies found equal frequency during the second and third trimester. Gestational age does not seem to affect the occurrence of acute appendicitis.

The difficulty in the diagnosis of acute appendicitis during pregnancy depends on the gestational age (Leroy, 1981; Lemine *et al.*, 1994; Duffour *et al.*, 1996; Nourira *et al.*, 1998). During the first trimester, the presentation of appendicitis is similar to its classical presentation (Lemine *et al.*, 1994). Abdominal pain is the most consistent sign. It was found in the first case of this series. This pain may lead to the discussion of a threatened abortion, urinary tract infection or ectopic pregnancy, hence the value of obstetric ultrasound and cytological and bacteriological examination of urines (Leroy, 1981; Duffour *et al.*, 1996).

Abdominopelvic ultrasonography confirms the diagnosis when it visualizes non-compressible, aperistaltic appendix of more than 7 mm in diameter with a wall thickness of more than 3 mm and sometimes a presence of fluid in the appendicular lumen (Duffour *et al.*, 1996; Tamirel *et al.*, 2002). When performed by a trained operator, it has a sensitivity of about 100% and a specificity of 96% in the first trimester of pregnancy (Lim *et al.*, 1992). It can also reveal indirect signs such as fluid in the right iliac fossa or in the pouch of Douglas. Ultrasound has an interest of eliminating other surgical and obstetrical pathologies and to specify the gestational age and to give information on fetal vitality. In the first case of this series, the ultrasound was an excellent contribution in confirming the diagnosis of appendicitis during the 1st trimester. We therefore recommend ultrasound because of its availability, its usefulness to diagnose appendicitis during pregnancy and the absence of radiation exposure.

The coelioscopic exploration is diagnostic as it visualizes the appendix and its location (Duffour *et al.*, 1996; Batallan, 1999). It prevents the white laparotomy procedure and can be diagnostic of other causes of abdominal pain such as ectopic pregnancy (Nourira *et al.*, 1998;

Marret *et al.*, 2000). As a second line investigation, magnetic resonance imaging (MRI) is indicated in case of difficulty to make diagnosis (Ramanah *et al.*, 2011).

Complete blood count may not be helpful and reliable because of physiological alterations during pregnancy leading to hyperleucocytosis (Nouira *et al.*, 1998; Narjis *et al.*, 2011). The C reactive protein may be normal (Duffour *et al.*, 1996).

During the last two trimesters of pregnancy, the diagnosis of appendicitis becomes more challenging due to appendiceal and uterine anatomical changes. The appendix is superiorly and laterally displaced, reaching the costal margin at the 8th month of pregnancy (Marret *et al.*, 2000). The pain is localized to the right flank or hypochondrium. It can be accompanied by uterine contractions suggestive of late abortion, premature birth or labor.

In the second case of this series, the diagnosis of acute appendicitis was an intraoperative incidental finding during caesarean section. The increased uterine volume during the last two trimesters can alter ultrasound investigation (Maisonnette, 1999). The upwardly displaced appendix is less visualized by the ultrasound in the sub hepatic position than in the right iliac fossa (Berthet-Badetti, 1997). However, ultrasound can show indirect signs such as sub-diaphragmatic collection. When the condition is advanced, a peritoneal collection is found as during the first trimester. Ultrasound has also an interest in making the differential diagnosis with other causes of abdominal pain during pregnancy.

The main reasons theoretically contraindicating diagnostic laparoscopy after the first trimester of pregnancy are the risk of uterine injury and the fetal risk during creation of CO<sub>2</sub> pneumoperitoneum and increased intra-abdominal pressure leading to a decreased uteroplacental blood flow [18]. However, some authors believe that laparoscopy is possible in the 2nd trimester and even beyond through the free space between the previously identified uterine fundus and the xiphoid process (Batallan, 1999; Barnes *et al.*, 2004).

Complications of acute appendicitis during pregnancy are as in a non-pregnant woman (Adloff and Schloegel, 1989). All the various complications of acute appendicitis can be seen in the 1<sup>st</sup> trimester. The uterus is then in its pelvic location and does not displace the surrounding organs that may have adhesions with appendicular structures and isolate it from the peritoneal cavity making an appendicular plastron. Acute diffused peritonitis is a complication of acute appendicitis and was observed in the first case of this series. During the second and third trimesters, no anatomical structure prevents the spread of appendicular infection. The uterine contractions prevent the formation of adhesions that are useful to the localisation of the infection. The high level of steroids reduces the inflammatory response and the increased pelvic vascularisation facilitates spreading of the infection (Leroy, 1981; Berthet-Badetti *et al.*, 1997; Maisonnette *et al.*, 1999). These reasons explain the rapid complication to peritonitis in the 3rd trimester as seen in the second case of this series.

The maternal-fetal prognosis depends on the severity of the condition and the delay in treatment (TshibanguKangu *et al.*, 1985; Curet *et al.*, 1996; Duffour *et al.*, 1996). The fetal mortality rate is more than 35% when there is appendicular peritonitis (Duffour *et al.*, 1996; Babakania *et al.*, 1997) and ranges from 1 to 8% with uncomplicated acute appendicitis (Mahmoodian, 1992; Babakania *et al.*, 1997). In the second case of this series, a full term pregnancy with caesarean delivery gave a live male newborn. Pre-term delivery and spontaneous delivery are the main fetal risks and preterm delivery rate was 22.2% in the study of Nouira *et al.*, (1998). These risks are particularly high during the first week after

appendectomy. The maternal prognosis has been improved because of early diagnosis and management. One patient of this series died 4 hours after surgery secondary to septic shock. Some authors did not have a mortality case in their studies which may be explained by early diagnosis and management according to TshibanguKangu *et al.*, (1985). In this series, all 2 cases were diagnosed late with a subsequent delay in management. Appendicular peritonitis represents the major complication with a risk of maternal mortality and its frequency is estimated to be between 14% to 20% (TshibanguKangu *et al.*, 1985; Narjis *et al.*, 2011). In developed countries, maternal mortality is low and ranges from 0.01% to 0.4% due to early diagnosis and the quality of management (Allen and Helling, 1989; Berthet-Badetti *et al.*, 1997).

### Conclusion

Acute appendicitis during pregnancy is a rare condition with relatively challenging diagnosis. For pregnant women exhibiting abdominal pain in the right iliac fossa, right flank or right hypochondriac regions associated with fever and vomiting, acute appendicitis should be suspected in time to avoid complications leading to poor maternal and fetal prognosis. The diagnosis and management are easier during the trimester and the prognosis is generally good. In the last 2 trimesters, the diagnostic difficulties can lead to complications and aggressive surgical treatment. Pelvic ultrasound should be systematic in case of abdominal pain in pregnant women. Surgical exploration is indicated when there is a doubt about the diagnosis.

### Contribution of the authors

All authors contributed to the writing of this manuscript.

### Declaration of interest

The authors don't report any conflict of interest.

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