

Magnetic Resonance Imaging as a Diagnostic Tool in Pregnancy with Appendiceal Abscess

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Abdominal pain presenting itself during pregnancy may be multifactorial, requiring immediate attention and care. In cases of intractable pain without obstetrical condition, surgical abdominal exploration is widely advised. However, we present a case where a 30-year-old, gravida 1, para 0, female complained of persistent right abdominal pain during her 25th week of pregnancy. Ultrasound revealed a right upper quadrant cystic mass and magnetic resonance imaging was arranged with compatible findings. Final impression of appendiceal abscess was determined. Broad-spectrum antibiotics were administered and the patient was discharged in stable condition after 10 days of conservative treatment. She delivered a healthy baby boy at her 40th week of gestation uneventfully. [*J Chin Med Assoc* 2007;70(8):345–347]

Key Words: acute appendicitis, appendiceal abscess, MRI, pregnancy, ultrasonography

Introduction

Acute appendicitis is the most common non-obstetric surgical condition during pregnancy, with an incidence of 0.047–0.200%.^{1–4} The distribution of appendicitis during the gestational period is as follows: first trimester, 23–29%; second trimester, 27–51%; and third trimester, 21–50%.^{1–4} Many factors, including anatomic and physiologic changes during pregnancy, nonspecific clinical symptoms and signs,⁵ as well as gestational age, make diagnosis of acute appendicitis during pregnancy difficult, and possibly result in delay of management. Although surgical intervention is indicated when acute appendicitis is highly suspected during pregnancy, medical treatment with antibiotics may sometimes achieve good results.⁶

Case Report

A 30-year-old female, gravida 1, para 0, suffered from epigastralgia 1 day before visiting the emergency unit for episodes of right flank pain with fever while she was pregnant at 25 weeks. The patient had previously been admitted to a local hospital under the impression

of acute pyelonephritis, and medical treatment had been initiated. The possibility of acute pancreatitis was considered due to a high level of serum lipase, although the level of serum amylase was within normal limits. The patient's body weight had decreased due to poor intake and appetite. Episodes of high fever up to 39.5°C off and on were noted, and right flank pain persisted although antibiotics, ampicillin 1 g q6h, had been administered.

She was then transferred to our hospital after having received the above treatment for 1 week without effect. Right flank pain, tenderness, and a fist-sized solitary mass with local heat over the right flank area were found on admission to our hospital. Blood test revealed white blood cell count of 11,400/mm³ with a shift to the left in differential counts and high C-reactive protein level of 8.3 mg/dL. Obstetric ultrasound revealed a cystic mass, 92 × 94 × 71 mm in size, over the patient's right upper abdominal cavity. The surrounding organs, including right kidney, gallbladder, liver, pancreas and right ovary, all appeared normal. The fetus *in utero* was growing well, with good activity and heart beat.

With the suspicion of acute appendicitis, surgical consultation was done, and magnetic resonance imaging

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(MRI) examination was recommended. A well-defined, fist-sized mass, located in the right flank area, lateral to the lower end of the right kidney, was found on MRI, (Figures 1 and 2). According to the symptoms and signs, combined with the findings of ultrasonography and MRI, appendiceal abscess was the only impression. Intravenous antibiotics with cefazolin 1,000 mg had been given every 6 hours since admission, although acute appendicitis was not impressed in the early stage of hospitalization. At the same time, ritodrine (2 amp in D5W 500) was given intravenously for symptoms and signs of preterm labor. The patient's general condition improved after receiving the above treatment. White blood cell count and C-reactive protein declined

to within normal ranges 1 week after admission to our hospital. Exploratory laparotomy for appendectomy was not considered due to improving conditions. Food intake was allowed after the 4th day of hospitalization without any gastrointestinal complications or discomfort.

The patient was discharged in stable condition after being hospitalized for 10 days, and 1 week of oral antibiotics was prescribed for successive treatment. Surgical intervention was advised if the symptoms and signs over the same area recurred. She attended regular follow-up at a prenatal clinic thereafter, and the cystic mass was not visible on ultrasound 1 month after discharge. The patient gave birth uneventfully to a healthy male baby weighing 3,600 g in the 40th week of gestation.



Figure 1. Axial magnetic resonance imaging shows a right, well-defined, fist-sized mass that is the appendiceal abscess (indicated by the white circle). The enlarged uterus occupies most of the abdominal cavity, with the fetus inside.



Figure 2. Coronal view of appendiceal abscess. A well-defined, fist-sized mass, located in the right flank area, lateral to the lower end of the right kidney, pointed by a black arrow and a white circle is the appendiceal abscess. The white arrow indicates the fetus in the uterus.

Discussion

There is a high incidence of obstetric complications, such as fetal wastage and preterm labor or birth, resulting from delay in diagnosis of acute appendicitis during pregnancy.^{7,8} The following are factors that contribute to delayed diagnosis. (1) The symptoms and signs of acute appendicitis, such as nausea, epigastralgia, vomiting, and constipation, are commonly seen in pregnancy, and are only found in 50% of patients.^{5,9,10} On the contrary, not all pregnant women with gastrointestinal tract symptoms or peritoneal signs have acute appendicitis.¹¹ (2) Although anorexia is considered by some investigators to be the pathognomonic symptom of appendicitis in non-pregnant patients, it cannot be used in expectant mothers for it is commonly seen during pregnancy, especially in the first trimester.^{5,12} (3) The enlarged uterus causes some degree of interference during physical examination for acute appendicitis and results in 50% of missed diagnoses.¹⁰ (4) Although fixation of the appendix due to adhesion may be seen in some patients due to inflammatory reaction, displacement of the appendix caused by the enlarged uterus makes the diagnosis more difficult.^{9,10,13} (5) Fever and leukocytosis are not clear indicators of appendicitis in pregnancy.^{2,11} Repeated samples of white blood cells with differential count is necessary in order to recognize the status of infection.

There are many organs that affect the diagnosis of acute appendicitis during pregnancy. The organ that most often leads to a missed diagnosis of appendicitis in pregnancy is the kidney. Urinary tract symptoms occur in more than 50% of patients with appendicitis during pregnancy. Consequently, such patients are often treated initially for pyelonephritis of the right kidney.^{10,12} Acute torsion of an ovarian cyst also mimics

the clinical signs of appendicitis in pregnancy, but in general, this entity has fewer intestinal symptoms and the onset is more abrupt. Consequently, in many cases, it can be traced to strenuous physical activity, such as dancing, swimming, or coitus.¹⁰ In addition, cholecystitis, acute pancreatitis,¹⁴ degenerated myoma, peritonitis, and ruptured corpus luteum are all included as possible causes of abdominal and back pain in pregnancy or the puerperium.¹² Ultrasound examination^{15,16} and MRI^{17,18} are noninvasive and powerful tools to enable differential diagnosis between appendicitis and the above probable affecting organs. Although acute appendicitis can be detected by ultrasonography, the amorphous echo produced by the surrounding intestine may interfere with interpretation. An additional MRI study can provide a more confirmatory diagnosis, especially when the complication occurs during pregnancy.

More than 70% of appendixes will perforate or rupture when operation is delayed for more than 48 hours after symptoms begin. A delay in diagnosis in pregnant patients has especially devastating effects on the outcome.^{5,10,12,19-23} Therefore, surgical intervention is indicated when acute appendicitis during pregnancy is highly suspected, no matter what findings are obtained during surgery. Preoperative broad-spectrum antibiotics are recommended before surgical treatment to reduce postoperative complications. A second or third generation cephalosporin is recommended as the first choice for treatment. As well as a combination of ampicillin, gentamycin, and clindamycin being needed for appendiceal abscess formation, a combination of metronidazole and cephalosporin has also been effective.¹⁰ Obviously, there was a delay in diagnosis in this pregnant woman with right flank pain and fever. Usually, giving ampicillin and cephalosporin is not sufficient treatment for resolution of abscess formation, but fortunately, the patient's condition improved after conservative medication. Although surgical intervention was suggested and considered, the possibility of complicating the pregnancy was discussed. After careful evaluation, it was decided that surgical intervention would only be an option if conservative medical treatment proved to be ineffective and symptoms and signs developed.^{9,23,24}

In conclusion, delayed diagnosis of acute appendicitis during pregnancy is quite common. Although medical treatment can achieve good results in some cases, surgical treatment is still indicated for acute appendicitis and/or abscess formation during pregnancy. Conservative treatment can be considered in selected cases where, after the use of broad-spectrum antibiotics, symptoms and signs diminish. Nevertheless, if pain persists, surgical intervention cannot be avoided.

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