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# Acute Abdomen in Pregnancy

JMAJ 44(11): 496–500, 2001

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**Abstract:** The diagnosis and important aspects in treating acute abdomen tend to be delayed due to the peculiar physiological features of pregnancy and the restrictions imposed on image diagnostic techniques such as x-ray and CT. Physicians should pay attention in this regard as any delay may seriously deteriorate the condition of both mother and fetus. Detailed questioning of the patient and abdominal findings, especially information obtained by palpation, are considered essential in making a diagnosis and determining proper treatment. Ultrasonography is non-invasive to both the mother and fetus and is useful for diagnosing illness during pregnancy, including acute abdomen, acute appendicitis, and ileus. In treating the pregnant patient, high priority should be placed on improving the patient's condition and determining the necessity of surgery. Rather than postpone the decision to opt for surgery, the physician in charge is advised to seek additional professional opinions and enlist the support of other surgeons in order to arrive at earlier diagnosis and treatment.

**Key words:** Acute abdomen; Pregnancy

## Introduction

Acute abdomen is a general term for “acute abdominal diseases accompanied primarily by sudden abdominal pain for which a decision to perform emergency surgery must be made in a very short time”.<sup>1)</sup> Causes of acute abdomen in pregnancy include ectopic pregnancy, peduncular torsion of an ovarian cyst, ovarian bleeding, and pelvic inflammation.<sup>2)</sup> However, it may also be caused by such illnesses as acute appendicitis, ileus, and cholecystitis.<sup>3)</sup> The specific physiological features of the mother and pos-

sible influences on the fetus have to be taken into consideration in the treatment of acute abdomen in pregnancy. Because of the pregnancy, restrictions are imposed on image diagnostic techniques such as x-ray and CT. Due to these considerations and restrictions, delay in diagnosis and treatment could lead to a serious condition in both the mother and fetus. Thus, prompt and appropriate decision-making and subsequent treatment are needed.

This paper addresses approaches to accurate diagnosis and the important aspects in the treatment of acute abdomen in the field of surgery.

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This article is a revised English version of a paper originally published in the Journal of the Japan Medical Association (Vol. 124, No. 7, 2000, pages 993–996).

Table 1 Acute Abdomen Complications in Pregnancy in the Past 19 Years (1973.1~1991.12)

Disease/Case	Number of cases (%)	Age (mean age)
Acute appendicitis	40 (70.1)	20~35 years old (25.2)
Ileus [hernia impaction]	12 (21.0) [ 8 (14.0)]	21~40 years old (29.4) [22~39 years old (29.4)]
Peduncular torsion of ovarian cyst	3 (5.3)	22~34 years old (28.5)
Acute cholecystitis, cholangitis	2 (3.6)	38, 39 years old (38.5)
Total	57 (100.0)	20~40 years old (26.7)

(Inoue, M. *et al.*, "Acute abdomen during pregnancy." Progress of abdominal emergency treatment, 1992; 12: 900)

## Acute Abdomen in Pregnancy

Acute abdomen in pregnancy may be caused by various illnesses not related to pregnancy. According to Inoue *et al.*, appendicitis accounts for 70.1% (including 10% complicated with perforating peritonitis) of the diseases that cause acute abdomen, followed by ileus (21.0%), peduncular torsion of ovarian cyst (5.3%), and acute cholecystitis and cholangitis (3.6%) (Table 1).<sup>3)</sup> Acute pancreatitis<sup>4)</sup> and ureterolith,<sup>5)</sup> which also cause acute abdomen, are conservative treatment cases.

## Approaches to Diagnosis

### 1. Auscultation

The symptoms observed in acute abdomen are often similar to digestive symptoms associated with pregnancy. In this regard, detailed questioning of the patient is necessary. The major symptom of acute abdomen is abdominal pain. As a first step, the causative disease should be determined on the basis of the site and characteristics of the abdominal pain as well as what the patient has eaten. Sudden, violent pain is characteristic of such occurrences as digestive tract perforation, mesenteric artery embolism, and ureterolith. Acute appendicitis starts with the pain and discomfort in the upper abdomen, which localizes in the lower right

abdomen (the site later moves upward, corresponding to the gestational cycle). Acute cholecystitis and acute pancreatitis frequently occur after eating rich food. Information on associated symptoms, and descriptions of stools, as well as the patient's medical history are also helpful for diagnosis. If there is a post-surgical history and severe vomiting, ileus can be suspected. Tarry stools suggest the perforation of a duodenal ulcer. Bloody stools may indicate ischemic colitis or mesenteric artery embolism. Similar symptoms may have occurred several times in the past, in the case of acute cholecystitis, due to gallstones.

### 2. Physical findings

Abdominal findings, particularly those obtained by palpation, are indispensable for both diagnosis of the causative disease and determining proper treatment. Decisions to conduct emergency surgery or opt for conservative treatment, by placing the patient under observation, should be made on the basis of symptoms such as peritoneal irritation. Even if the laboratory test findings indicate no abnormalities, celiotomy should often be conducted when the peritoneal symptoms are severe. The Blumberg sign and muscular defense are important findings based on which the causative disease, the severity and the extent (localized or diffuse) of peri-

tonitis can be determined with reference to the site of most severe pain.

Diagnosis is often made more difficult during pregnancy due to the deviation of organs caused by an enlarged uterus and relaxation of the abdominal wall. It is a well-known fact that the position of the appendix shifts upward and to the right with the progress of gestation.<sup>6)</sup> This makes it difficult to differentiate appendicitis from acute cholecystitis and duodenal ulcer perforation. In addition to acute abdominal pain, the absence of bowel sounds during auscultation is an important finding indicating peritonitis. Spread of inflammation into the pelvis can be suspected if rectal probing causes tenderness at the Douglas pouch.

### 3. Laboratory findings

#### (1) Blood test

An increase in the leukocyte count is to be expected in the case of acute abdomen associated with infection. However, the leukocyte count often exceeds 10,000/mm<sup>3</sup> during pregnancy.<sup>7)</sup> Accordingly, increases in the neutrophil count and CRP also have to be taken into consideration. The leukocyte count increases along with the deterioration of the condition, further decreasing the count rather than increasing it so that it is not advisable to judge the degree of inflammation based on leukocyte count alone. In addition, deterioration in pathology may lead to sepsis and the complication of disseminated intravascular coagulation (DIC). Because of this, it is necessary to check the platelet count and the coagulation system. Biochemical tests are conducted to check for the presence of any hepatic, cholangial and pancreatic diseases and to check renal function.

#### (2) Abdominal ultrasonography

Ultrasonography is the first choice in making a diagnosis of acute abdomen in pregnancy because it is non-invasive to both the mother and fetus and because a large amount of information can be obtained by this simple procedure.

Appendicitis: Acute appendicitis is suspected if a swollen appendix (short axis diameter of



Fig. 1 Ultrasonography of acute appendicitis  
Swollen appendix (↑) and abscess (⇐) in the periphery

6 mm) is imaged at the point that corresponds with the tenderness. In this case, the inflammation is considered to have reached or exceeded the phlegmonosa. When the layer structure becomes obscure, gangrenous appendicitis is suspected. Imaging of stool stones is also helpful in the diagnosis. In the case of catarrhal appendicitis, however, the appendix is not detected and the finding is difficult to obtain. A low echo site in the periphery indicates the presence of abscess, and the findings including the retention of ascites, thickening of the peripheral intestinal wall, and the intestinal tract dilated by palsy of peristalsis indicate the spread of inflammation into the periphery (Fig. 1).<sup>8)</sup>

Ileus: Characteristic ultrasonography findings of simple ileus include dilated intestinal tract and full intestinal image as well as intestinal folds (the keyboard sign) (Fig. 2-a).<sup>8)</sup> Ultrasonography is useful for the diagnosis of ileus in which the x-ray detects scarcely any gas. When ileus is clinically suspected, ultrasonography should definitely be conducted. By check-

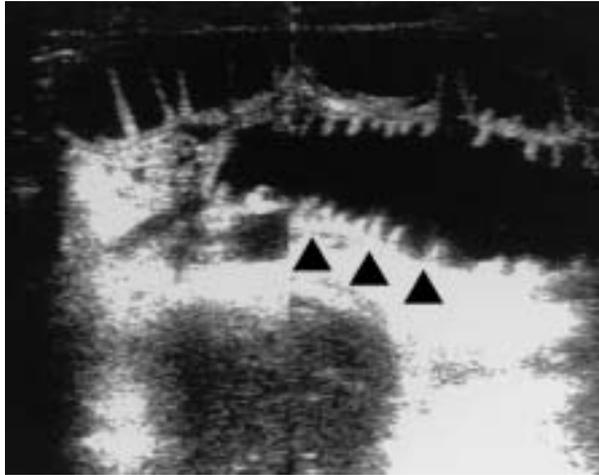


Fig. 2-a Ultrasonography of simple ileus  
Dilated intestinal tract and intestinal folds (keyboard sign, ▲) are observed.

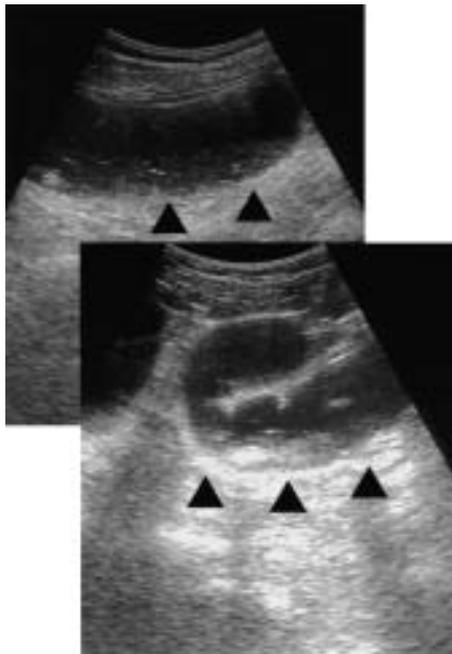


Fig. 2-b Ultrasonography of strangulated ileus  
Intestinal folds (keyboard sign) become obscure (▲).

ing the to-and-fro movement of the intestinal contents, it is possible to detect the presence or absence of intestinal peristalsis. If peristalsis is present, it is mechanical ileus. If it is absent, it is paralytic ileus.

If the above symptoms are accompanied by an obscure keyboard sign, disappearance of to-and-fro movement and ascites retention, strangulated ileus is conceivable (Fig. 2-b).

Other cases: In the case of ureterolith, dilated renal pelvis and urinary tract are imaged. It is also useful in the differential diagnosis of acute cholecystitis as well as hepatic, cholangial and pancreatic diseases.

### (3) Abdominal x-ray

To avoid any influence on the fetus, x-rays of the abdomen are taken only when necessary. However, if the condition of the mother and fetus requires emergency treatment or surgery, x-rays should be taken regardless of the pregnancy. If abdominal free air and niveau are revealed, the physician may diagnose the patient as having a digestive tract perforation or ileus. However, attention should be paid to cases of serious strangulated ileus showing less intestinal gas.

### (4) Abdominal centesis

A description of ascites (bloody or purulent) is helpful to make a diagnosis and evaluation of severity. A safe site for centesis is sought by ultrasonography and the ascites are collected by centesis from the patient under local anesthesia. The scope of applications for ultrasonography is extensive.

## Important Points in the Treatment

### 1. Improvement of the systemic condition

First, the systemic condition of the patient is investigated based on vital signs such as circulatory pattern, respiratory condition, and presence of fever, then measures are taken to facilitate improvement in the systemic condition. It should be remembered that prolonged hypotension, hypoxemia, and acidosis may result in the death of the fetus.

### 2. Cooperation with other departments

As pregnancy is a special condition, acute abdomen requires accurate diagnosis as well as prompt and appropriate treatment. In severe

cases, where the patient has gone into shock or the case is complicated with peritonitis, delay in treatment may result in a poor prognosis for the mother and fetus. Physicians are advised to place high priority on improving the patient's condition and determining the necessity of surgery. When diagnosis is difficult, it is best to enlist the cooperation of other surgeons to facilitate early diagnosis and treatment.

### Conclusion

This paper has described the approaches to diagnosis and the most important points in the treatment of acute abdomen in pregnancy. The specific physiological features of pregnancy and any influence on the fetus have to be taken into consideration in the treatment of acute abdomen in pregnant patients. Furthermore, restrictions are imposed on making diagnoses. Due to these considerations and restrictions, delay in diagnosis and treatment could lead to a serious condition in both mother and fetus. Thus, it is necessary to be in close contact with a surgeon for multidisciplinary diagnoses and treatment.

### REFERENCES

- 1) Ogata, T.: *Standard Textbook of Surgery (4th edition)*. Igaku Shoin, Tokyo, 1987, p.641. (in Japanese)
- 2) Asahina, T. and Terao, T.: "Field of Gynecology". *The Japanese Journal of Acute Medicine* 1998; 22: 733–737. (in Japanese)
- 3) Inoue, M., Onda, M., Moriyama, Y. *et al.*: "Acute celiopathy during pregnancy. *Progress in Abdominal Emergency Treatment*" 1992; 12: 899–901. (in Japanese)
- 4) Katayama, H., Tanimoto, H., Hisazumi, I. *et al.*: "Two pregnancy cases complicated with pancreatitis". *Perinatal Medicine* 1997; 29: 887–891. (in Japanese)
- 5) Noguchi, T., Kurishita, M., Shimoyama, T. *et al.*: "Two urinary tract calculus cases that demonstrated acute celiopathy in the middle stage of gestation". *Tokyo Journal of Obstetrics & Gynecology* 1998; 47: 285–287. (in Japanese)
- 6) Baer, J.L., Reis, R.A. and Arens, R.: Appendicitis in pregnancy with changes in position and axis of the normal appendix in pregnancy. *JAMA* 1932; 98: 1359.
- 7) Tanaka, K., Kasai, S., Maeda, Y. *et al.*: "Two pregnancy cases complicated with acute celiopathy". *The Tokai Journal of Obstetrics & Gynecology* 1998; 35: 175–162. (in Japanese)
- 8) Kameoka, S. and Akimoto, S.: "Ultrasonography of digestive tract and others", edited by Takehara, Y., Akimoto, S. and Kimura, K. *CME Series 13: Guide to Abdominal Echography*. Japan Medical Association, Tokyo, 1991, pp.351–362. (in Japanese)