

Research Letter

Mesentery band-like adhesion which caused entrapment of duodenum at 32 gestational weeks

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A wide variety of diseases, including disorders of the gynecologic, gastrointestinal, and genitourinary systems, can present with abdominal pain during pregnancy. Clinical diagnosis of intra-abdominal pathologic conditions in pregnant women is complicated by concurrent maternal physiologic and anatomic changes. Numerous physiologic changes in pregnancy may affect the presentation of abdominal pain in pregnancy. The diagnosis is usually made on a thorough history (including a gynecologic history) and physical exam (including a pelvic exam). Laboratory investigations will support the diagnosis and help guide the resuscitation and management.

A computed tomography (CT) scan is a useful diagnostic test in the setting of pregnancy and unremitting abdominal pain. It offers a more comprehensive examination of the abdomen and pelvis, as well as providing important diagnostic information in 30% of pregnant women whose ultrasound examination findings are normal. There has been a substantial increase in the use of the CT scan, which can be a valuable tool in imaging pregnant women when used appropriately. This article presents a case report of a 36-year-old, pregnant 32 + 3 weeks' gestation woman with rare mesentery band-like adhesion that resulted in entrapment of the duodenum at the duodenum-jejunum junction. The CT scan provided very important diagnostic information and helped us make the treatment plan.

The patient had a history of gastritis for a few years under irregular medical treatment. She had received an uneventful prenatal survey at a local clinic until severe lower abdominal pain began; severe nausea and vomiting followed the abdominal

pain. The plain Kidney-Ureter-Bladder film (KUB) revealed a suspiciously high level intestinal obstruction. The levels of white blood cell, amylase, and C-reactive protein were 10600/CUMM, 111 U/L, and 0.45 mg/dL, respectively. After consulting a general surgeon, no emergent laparotomy was indicated and a nasogastric tube was inserted. Unfortunately, symptoms increased in severity and we arranged an abdominal CT scan. The radiologist reported that a segment of reversed C-shape dilated bowel loop with fluid content was depicted at the duodenum-jejunum junction and that the internal herniation was highly suspicious (Fig. 1). Six hours after a second dose of steroid infusion (Rinderone 12 mg IM q24 h) for enhancing the maturity of the fetal lung, combined surgery was performed.

A band-like adhesion was found near the greater curvature, which formed a strange loop where the distal duodenum was entrapped (Figs. 2 and 3). No ischemic change of the duodenum was identified. The surgeon dissected the band and decompressed the intestine. We then performed a cesarean section, and one male baby weighing 1875 gm with Apgar score 3, 4, and 7 at 1, 5, and 10 minutes after birth, respectively. The pathology report showed necrosis surrounded by fibrosis and chronic inflammatory change; focal calcification was also noted. The band contained no obvious vascular components, and a congenital band was most likely. She was discharged 6 days after laparotomy and cesarean section without complication. The newborn was quite well and was discharged a few weeks later.

A wide variety of diseases, including disorders of the gynecologic, gastrointestinal, and genitourinary systems, can present as abdominal pain during pregnancy [1]. Clinical diagnosis of intra-abdominal pathologic conditions in pregnant women is complicated by concurrent maternal physiologic and

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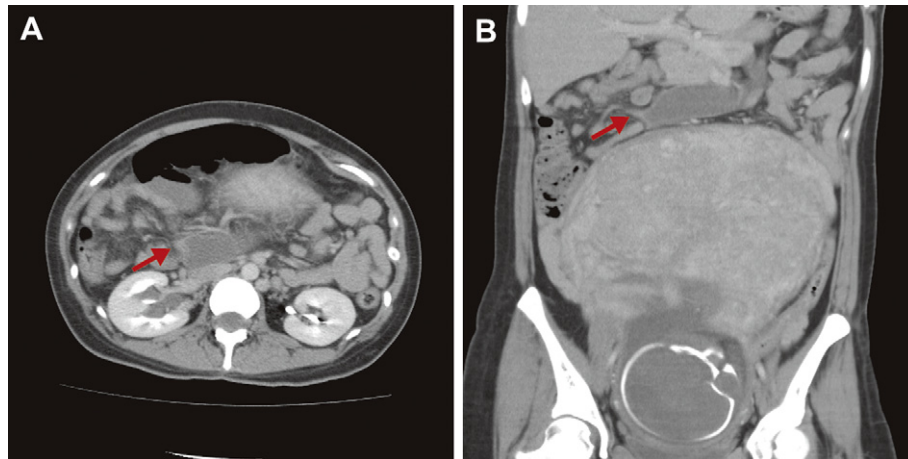


Fig. 1. (A) Axial view of upper abdominal computed tomography (CT) scan. The bird-beak shape indicates the obstructive level of duodenum-jejunum junction (red arrow). (B) Coronal view of upper abdominal CT scan. The same bird-beak shape could be identified (red arrow). The distended intestine was at the proximal end.

anatomic changes [1]. Numerous physiologic changes in pregnancy may affect the presentation of abdominal pain in pregnancy [2]. Hydronephrosis and displacement of intra-abdominal organs, including the appendix, by the gravid uterus may also confound the clinical presentation [1]. Leukocytosis is difficult to evaluate in pregnancy because the white blood cell count is typically elevated, ranging from 6000–16,000 cells/mL during the first and second trimester, to 20,000–30,000 cells/mL at the time of labor [1].

The acute abdomen remains a challenge for all physicians who take part in the care of women in pregnancy. The incidence of acute abdomen during pregnancy is 1 in 500–635 pregnancies [3]. A high index of suspicion must be used when evaluating a pregnant patient with abdominal pain. Despite advancements in medical technology, preoperative diagnosis of acute abdominal conditions is still inaccurate [3]. Laboratory parameters are not specific and are altered often as a physiologic consequence of pregnancy [3]. Common gynecologic emergencies can mimic general surgical conditions,

such as cholecystitis, and appendicitis [4]. Most patients with gynecologic emergencies complain of pelvic pain, abnormal vaginal bleeding, or both [4]. A complete history and physical exam will define the extent of the laboratory and radiologic work, along with the expediency of resuscitation. The diagnosis is usually made on a thorough history (including a gynecologic history) and physical exam (including a pelvic exam) [4]. Laboratory investigations will support the diagnosis and will help guide the resuscitation and management. In the case we presented, no specific abnormal laboratory data was noticed. The only clue was that she had suffered from epigastralgia for one week before severe nausea and vomiting. The discomfort area was referred to as the same point of the duodenum-jejunum junction. This symptom alerted us to the possibility of hollow organ perforation or intestinal obstruction. The KUB disclosed the same diagnosis. Nevertheless, the level and cause of the intestinal obstruction were still unclear.

A delay in the diagnosis of many of the causes of abdominal pain can be threatening to both the mother and fetus. Among the imaging modalities available, ultrasound is

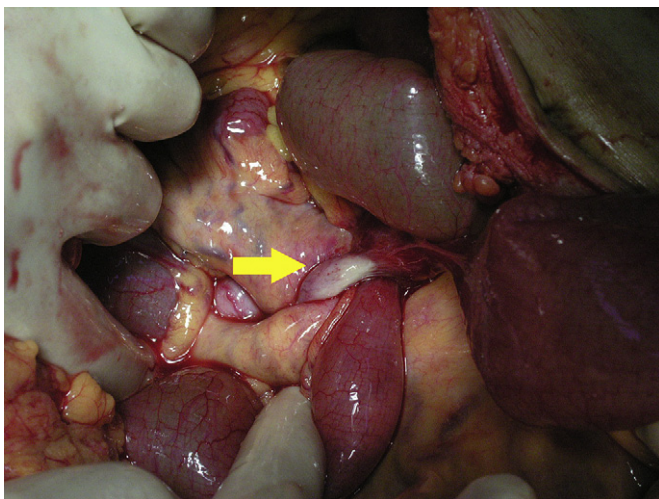


Fig. 2. The adhesion band was identified during operation (yellow arrow). We also noticed the distended proximal duodenum (above the adhesion band).



Fig. 3. The excised fibrotic tissue from mesentery and greater curvature.

the most powerful tool for assessing the gynecologic patient owing to its lack of radiation, and ability to demonstrate obstetric and gynecologic origins of abdominal pain. A CT scan is a sensitive diagnostic modality in the evaluation of common causes of abdominal pain, such as suspected appendicitis, bowel obstruction, pancreatitis, and urinary tract calculi in the nonpregnant adult patient population [1]. The CT scan has also been proven effective in increasing the physician's level of certainty and leading to more timely surgical intervention in patients with abdominal pain, which could reduce misdiagnosis. The average estimated fetal radiation exposure per examination is 4.3 mGy (range, 0.01–43.9 mGy) for CT scan [5]. A mean radiation dose of 1.6 cGy (1.6 rad) [range, 0.4–4.5 cGy (0.4–4.5 rad)] was delivered to the pelvis during the CT scan, as estimated from the CT dose index [1]. A CT scan can be, in the correct clinical scenario, an acceptable, useful, and relatively noninvasive test in the accurate assessment of the acute abdomen in pregnancy [6]. Most academic radiology departments have written policies regarding imaging of pregnant women [7]. Academic radiologists prefer the CT scan for imaging abdominal complaints in pregnant women, especially in the second and third trimesters [7]. Nevertheless, when physicians are going to perform a medical radiation procedure, the fetal radiation dose should be reduced while still obtaining the required diagnostic information [8]. For pregnant women with abdominal pain and normal ultrasound findings, CT scan findings provided important diagnostic information in 30% of all cases [1].

In this case, we chose the CT scan instead of magnetic resonance imaging (MRI) because of the clinical scenario. The symptoms of this patient were compatible with an acute abdomen condition. After discussion with the general surgeon, intussusceptions, or bowel obstruction was highly suspected. As the maturity of the fetus was concerned, we arranged a CT scan instead of MRI because the latter was time-consuming. We used a CT scan with 5-mm slice thickness, electric current 263 mA, voltage 120.0 kVp, rotation speed 26.5 mm/rotation, exposure time total 9.77 seconds, calculated fetal absorbed dose = CT dose index \times cm \times 0.0019 = $1.18 \times 25 \times 0.0019 = 0.5605$ mSv. The CT scan revealed a segment of reversed C-shape dilated bowel loop with fluid content at the duodenum-jejunum junction; internal herniation related intestinal obstruction could not be ruled out. The surgical exploration confirmed the imaging findings.

During pregnancy without emergency, however, other imaging procedures not associated with ionizing radiation (e.g., ultrasonography or MRI) should be considered first instead of X-rays (inclusive of CT scan) if clinically appropriate.

Exploratory laparotomy should be avoided during the first trimester because of the anesthetic risk. For a woman during late pregnancy, however, exploratory laparotomy was not absolutely contraindicated for acute abdomen. After serial steroid injection for enhancing lung maturity, fetal delivery via cesarean section could be performed at the same time with exploratory laparotomy.

The CT scan is a useful diagnostic test in the setting of pregnancy and unremitting abdominal pain. It offers a more comprehensive examination of the abdomen and pelvis, and it provides important diagnostic information. There has been a substantial increase in the use of the CT, which can be a valuable tool in imaging pregnant women when used appropriately [9]. Nevertheless, risks and benefits should always be considered and discussed with patients. Consultation with an expert in dosimetry calculation may be helpful in calculating the estimated fetal dose when multiple diagnostic X-rays are performed on a pregnant woman.

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