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CASE REPORT | SMALL BOWEL

Midgut Volvulus in a Pregnant Patient Presenting With Abdominal Pain

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ABSTRACT

Abdominal pain is a common symptom during pregnancy, but bowel obstruction as the cause is a rare phenomenon. Moreover, intestinal volvulus is an even more unusual cause of obstruction during pregnancy and normally involves the sigmoid colon. We report a unique case of midgut volvulus in a pregnant patient entering her third trimester who presented to the hospital with abdominal pain. Our case demonstrates the safety of computed topography in pregnancy while restricting radiation dose and highlights the need to have a high index of suspicion for bowel obstruction when approaching a pregnant patient with abdominal pain.

KEYWORDS: bowel obstruction; midgut volvulus; pregnancy; third trimester

INTRODUCTION

Abdominal pain in pregnancy is a symptom almost all pregnant patients encounter. However, the condition is not always benign and can be because of various etiologies, including medical emergencies that warrant immediate management. The ambiguity of this presentation provides a challenge to clinicians to make prompt, accurate diagnoses in this vulnerable patient population. Common causes of nonobstetric abdominal pain include gastroesophageal reflux disease (incidence around 80%), acute appendicitis, and gallbladder disease.[1] Obstetric-related etiologies of abdominal pain commonly involve fetal movement, stretching of the round ligament, and contractions. Bowel obstruction is an infrequent cause of abdominal pain in pregnancy, with an incidence of 1 in 10,000.[2] The most common etiology of small bowel obstruction during pregnancy is because of adhesions, making up approximately 50%–60% of all cases.[2–4] Far less often, small bowel obstruction can be caused by intestinal volvulus. Most cases of volvulus typically concern the sigmoid colon.[2] On review of the current literature, less than 25 cases of small bowel volvulus have been published.[5] Midgut volvulus is not only exceedingly rare but also poses the greatest threat to anatomy.

Volvulus in pregnancy can be extremely dangerous not only because of its similarity to other causes of abdominal pain but also because of physician hesitancy to proceed with radiographic imaging, ultimately delaying diagnosis. In this study, we report such a case, managed in a timely manner.

CASE REPORT

A 33-year-old woman in her 27th week of pregnancy was admitted for 1 month of abdominal pain. Her medical history was significant for 2 ectopic pregnancies, with 1 requiring a left salpingectomy. The patient initially described the pain as an intermittent, burning quality in the epigastric region that radiated to her back and worsened with food intake. She endorsed 3 similar prior episodes of pain that resolved spontaneously. She underwent ultrasound and basic laboratory work at an outside facility, which were normal, and was prescribed famotidine. She reported no change in bowel movements, including a normal bowel movement the morning of her admission. Previously, her pain would go away after an hour, but it became constant on the day of admission and could not be alleviated by famotidine. Her symptoms steadily worsened, developing nausea with multiple episodes of nonbloody,

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occasionally bilious emesis. This prompted her to present to our facility. At the emergency department, she preferred to stand because her pain was worse with lying flat and sitting down. Initial laboratory test results and ultrasound were unrevealing. Vitals remained stable throughout presentation; however, her pain was unable to be controlled by intravenous (IV) acetaminophen and morphine.

Because the patient was pregnant, there was reservation by the primary team regarding pursuing further imaging. However, after a multidisciplinary discussion involving obstetrics, gastroenterology, surgery, and radiology, she ultimately underwent abdominal computed tomography (CT) with IV and oral contrast with restricted radiation dose. Imaging had to be performed under anesthesia because the patient was unable to tolerate severe pain at the supine position. Sagittal imaging revealed swirling of the mesentery, highly suspicious for volvulus (Figure 1). In addition, compression and compromise of the superior mesenteric artery and vein at the site of twisting was appreciated (Figure 2). The patient was taken emergently to the operating room for exploratory laparotomy. The fetal heart rate was monitored closely during the procedure, and multiple physicians from the obstetrics/maternal fetal medicine team were present or available by the operating room to ensure baby safety. She was found to have a malrotation of the small bowel and underwent a Ladd procedure to correct her anatomy. The patient tolerated the procedure well without any complication and had complete resolution of her symptoms. At the 18-month telephone follow-up, she reported that both she and her baby had been doing well.

Figure 1. Swirling of the mesentery best visualized on sagittal imaging and highly suspicious for volvulus or internal hernia. (white arrow marks the mesenteric swirl)

Figure 2. There is compression and/or partial thrombosis of the SMA at the site of volvulus. (white arrow marks the supererior mesenteric artery [SMA])

DISCUSSION

Bowel obstruction is uncommon during pregnancy with adhesions typically being the most common cause. Midgut volvulus represents approximately 25% of all intestinal volvulus, but in pregnancy, only makes up 1%–3% of all cases.[2,5,6] Bowel obstruction can be detrimental in pregnancy. In fact, studies found fetal loss in 17% of cases, along with a 2% maternal mortality.[3] Of the 23 reported cases of midgut volvulus in pregnancy, our case is the first to the best of our knowledge of occurring before the third trimester. Interestingly, intestinal volvulus is most likely to develop when the uterus rapidly changes in size. Rapid growth occurs during 16–20 weeks and 32–36 weeks; the postpartum period represents another time of risk as the uterus quickly returns to normal size.[5,7] Our case is exceedingly uncommon, in that our patient presented outside of that typical window, during her 27th week.

Small bowel volvulus requires prompt diagnosis and intervention because delay can lead to catastrophic consequences due to compromise of the superior mesenteric vascular flow. Clinical manifestations of abdominal pain in pregnancy are far-reaching; however, in a woman with severe periumbilical pain that is out of proportion to physical examination, clinicians should be suspicious of volvulus.[8] Late in normal pregnancy, the uterus grows and displaces the bowel to the epigastrium. Owing to the colicky nature of abdominal

pain associated with volvulus, it is often initially confused for intermittent uterine contractions.[2,9] There are many similarities between physiological changes in pregnancy and volvulus, such as leukocytosis, nausea, vomiting, back pain, and even tachycardia. Leukocytosis and tachycardia are common in late pregnancy. Patients in active labor have an average white blood cell count of around 12,450 cells/μL.[9–11] Notably, volvulus will result in a dramatic rise in the white blood cell count over the course of 24 hours compared with physiological leukocytosis of pregnancy. In addition, while many pregnant women experiencing abdominal pain may be tachycardic, infarcted bowel seen in volvulus progresses to constant abdominal pain radiating to the back and bilious vomiting.[2] Owing to the varying clinical manifestations, the diagnosis of volvulus relies heavily on radiographic imaging. Although ultrasound is the imaging study of choice in pregnancy because of its availability and lack of ionizing radiation, it can be limited for the evaluation of bowel, especially with a gradual increase in uterine size. On CT, volvulus can be identified with dilated and thickened loops of bowel, intramural gas, and the classic "whirlpool" sign of the mesentery twisting itself around the superior mesenteric artery.[5,7,12,13] In the general population, ultrasound is not recommended for diagnosing volvulus because this whirlpool finding is rarely visualized. However, even with a high clinical suspicion, the fear of fetal teratogenicity from ionizing radiation can make utilization of imaging modalities, such as CT, challenging.

The decision to proceed with radiographic imaging in a pregnant patient is complex. However, a study by Ratnapalan et al[14] showed that physicians and obstetricians had unrealistically high perception of risk of fetal teratogenicity for CT and plain radiographs. Radiation injury during the first trimester of embryo development has long been linked with fetal defects. As the pregnancy advances into the second and third trimesters, the fetus becomes more tolerant to radiation.[15] Both the American College of Radiology and the American Congress of Obstetricians and Gynecologists support the claim that fetal injury at any point during the pregnancy from ionizing radiation is inconsequential at 50 mGy or less and that risks of malformations tend to increase significantly at doses of greater than 100–150 mGy.[13,14] Not surprisingly, the amount of radiation exposure to the fetus is highest in abdominal imaging when shields cannot be used in the field of view. The diagnosis of midgut volvulus is classically made with an abdominal CT scan, which carries a radiation exposure of 30 mGy, much less than what is expected to cause malformations, cancer, and interruption to the nervous system at any stage in pregnancy.[13,14,16] Therefore, it is reasonable to consider abdominal CT imaging in pregnant patients if the benefit is clearly present. Appropriate counseling regarding the relatively low risk to the fetus will not only ease the anxiety of patients but physicians as well.

Magnetic resonance imaging (MRI) is preferable to CT in general during pregnancy because it provides excellent soft-tissue imaging without the risk of ionizing radiation, ensuring gadolinium contrast is avoided. Gadolinium is well known to cross the placenta and enter fetal circulation. However, the safety in pregnant women has not been well established, so its use cannot be recommended because of lack of data. Matsuoka et al[17] found that with IV contrast, MRI and CT had similar efficacies in diagnosing bowel obstruction, 92.6% and 88.5%, respectively. Using MRI without contrast limits the yield in identifying anatomical abnormalities within the abdomen when the etiology remains unclear. Major disadvantages of MRI include high costs and more limited scheduling inpatient.[17] Given that small bowel obstruction in the setting of volvulus is a surgical emergency that frequently presents indistinguishable to other causes of acute abdominal pain, we favor CT given its clinically accuracy, lower cost, and easier availability.

Our case demonstrates both the safety and the utility of CT in pregnancy when restricting radiation dose. Furthermore, because cases like ours are very rare, no standard protocol is in place, and the decision with how to proceed is up to the discretion of the managing physicians. This case highlights the importance of a multidisciplinary approach with members of multiple specialties to coordinate the decision together in a timely manner.

DISCLOSURES

Author contributions: N. Scalzo wrote the manuscript. Z. Lin and F. Yick edited the manuscript. N. Scalzo and Z Lin reviewed the literature. V. Tewari revised the manuscript for intellectual content, approved the final manuscript, and is the article guarantor.

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