Sigmoid volvulus during second trimester of pregnancy in a primigravida: Report of a rare case with review of imaging of sigmoid volvulus

Obaid Ashraf, Sameer Peer, Mohsin Fayaz, Mohammad Saleem Dar, Inayat Illahi, Fahad Shafi

ABSTRACT

Introduction: Intestinal obstruction is a rare cause of acute abdomen in pregnancy. The incidence of intestinal obstruction in pregnancy ranges from 1:1500 to 1:66431. The differential diagnosis for intestinal obstruction in pregnancy includes congenital or postoperative adhesions, volvulus, hernia, intussusception, malignancy and appendicitis. Sigmoid volvulus is the most common cause of intestinal obstruction accounting for 25–44% of the reported cases in literature. It is extremely important to diagnose this condition early as a delay in diagnosis can lead to maternal as well as fetal complications.

Case Report: A case of 20-year-old female, primigravida, in 22nd week of pregnancy who presented to our hospital with a three-day history of colicky abdominal pain, few episodes of vomiting and obstipation. Ultrasound showed a single live intrauterine fetus and a dilated gut loop extending from left hypochondrium to the left iliac fossa. T2-weighted TRUFI and HASTE MR Images in axial and coronal plane showed radiological signs highly suggestive of sigmoid volvulus. The radiological findings were confirmed on laparotomy and detorsion of the sigmoid loop with decompression followed by sigmoidopexy was performed. No maternal or fetal complications occurred in the perioperative period.

Conclusion: Sigmoid volvulus is a rare non-obstetric complication of pregnancy which requires an early diagnosis and prompt intervention to prevent maternal and fetal complications. Magnetic resonance imaging scan can provide an accurate diagnosis of sigmoid volvulus and its use is safe in pregnancy with respect to the risks of radiation exposure in pregnancy.

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CASE REPORT

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Keywords: Crossed-fused renal ectopia, Intestinal obstruction, Pregnancy, Sigmoid volvulus

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INTRODUCTION

Intestinal obstruction is a rare cause of acute abdomen in pregnancy. The incidence of intestinal obstruction in pregnancy ranges from 1:1500 to 1:66431 [1–4]. The differential diagnosis for intestinal obstruction in pregnancy includes congenital or postoperative adhesions, volvulus, hernia, intussusception, malignancy and appendicitis [1, 2, 4, 5]. Sigmoid volvulus is the most common cause of intestinal obstruction accounting for 25–44% of the reported cases in literature [1–4, 5–7]. It is extremely important to diagnose this condition early as a delay in diagnosis can lead to maternal as well as fetal complications. Maternal complications include bowel infarction and necrosis with hypovolemia, electrolyte disturbances, septic shock, multi-organ dysfunction and death [1, 3, 5, 6]. Fetal complications include preterm delivery, intrauterine death and neonatal sepsis [5]. Maternal mortality for sigmoid volvulus depends upon the status of the bowel and it ranges from 5% in cases of viable bowel to 50% in those cases where perforation has occurred. Fetal mortality in sigmoid volvulus is estimated to be approximately 30% [1, 6]. The diagnosis of sigmoid volvulus in pregnancy is challenging as the symptoms and signs of intestinal obstruction could be masked by pregnancy itself [1, 3, 4, 6, 8]. Another problem faced by the clinicians is regarding the choice of the diagnostic imaging modality. Radiation exposure to the developing fetus increases the risk of chromosomal abnormalities, neurological malformations and hematological malignancies [5]. Ultrasound is a diagnostic modality which is free of radiation hazard. However, gaseous distension of bowel loops limits its utility in establishing an accurate preoperative diagnosis. It can be useful in the assessment of fetal status, ascites and any other alternative diagnosis of acute abdomen. Magnetic resonance imaging scan could be used as a problem solving tool in the diagnosis of the cause of intestinal obstruction. It is not only free of radiation hazard but can also provide an accurate preoperative diagnosis of the etiology [3, 4]. However, availability of MRI scan in many centers across developing countries is a limiting factor. All these factors lead to a delay in reaching an early diagnosis and thus the risk of complications is increased.

CASE REPORT

A 20-year-old female, primigravida, in 22nd week of pregnancy, presented to our hospital with a three-day history of colicky abdominal pain, few episodes of vomiting and obstipation. On examination, she was conscious, oriented in time, place and person. She looked pale and was in distress. Her pulse rate was 120/min and blood pressure was 110/70 mmHg. Her respiratory rate was 27/min and SpO₂ was 96%. Her abdomen was distended and tense but non-tender. Fetal heart sounds were heard with stethoscope. She looked dehydrated.

Digital rectal examination revealed an empty rectum. There was no bleeding per vaginum and the os was closed.

Initial resuscitation with IV fluids was done. The patient was catheterized and a nasogastric tube was put in. A flatus tube was inserted into the rectum but no gas came out. Her laboratory investigations were unremarkable except for a total leucocyte count of 17000/ μ l (N85L15). Cardiotocography was unremarkable and there was no evidence of fetal distress.

Ultrasound of the abdomen in emergency lab showed a single live intrauterine fetus in cephalic presentation at the time of scan with a fetal heart rate of 145/min. A dilated gut loop was seen in the left hypochondrium which was extending into the left iliac fossa. Gaseous distension of the bowel loops precluded the examination of rest of the abdomen.

At our institution, X-ray exposure in pregnancy is avoided unless it is absolutely necessary for the management of the patient and since MRI scan is available in our institution, so it was decided to get an MRI scan done. Scan was performed on Siemens Magnetom Avanto 1.5 Tesla scanner. T2-weighted TRUFI and HASTE sequences were obtained in coronal and axial planes. Magnetic resonance imaging scan revealed a massively distended loop of sigmoid colon in an “inverted U-shaped” configuration extending from the left iliac fossa to the left hemidiaphragm with apposition of the walls of two adjacent loops giving a “coffee bean” appearance (Figure 1). The sigmoid colon was seen to extend above the transverse colon (“northern-exposure sign”) which was displaced to the right side. A transition point in the sigmoid loop was noted in the left iliac fossa with narrowing and twisting of the loop. “Split-wall sign” i.e., separation of the intestinal walls by mesenteric fat, was also noted at the transition point (Figure 2). An incidental finding of crossed-fused renal ectopia was also detected on MRI scan (Figure 3). Mild ascites was also noted. Hence a diagnosis of sigmoid volvulus was made and the patient was taken by the surgical team for laparotomy. Magnetic resonance imaging findings were

Figure 1: (A) T2-weighted coronal HASTE image showing a massively dilated sigmoid loop (arrow) in an “inverted-U” configuration extending up to the left hemidiaphragm (northern-exposure sign), (B) T2-weighted coronal TRUFI image showing apposition of the walls of the two adjacent dilated gut loops giving a “coffee-bean” appearance (arrow). Fetus can also be seen in the image. Mild free fluid is also seen in the pelvis.

confirmed intraoperatively. Massively dilated sigmoid colon with four anticlockwise mesenteroaxial turns was seen (Figure 4). Mild ascites was also noted. Bowel was

Figure 2: (A) T2-weighted axial HASTE image showing narrowing of the sigmoid colon at the transition point (arrow). The intestinal walls are seen to be separated by the mesenteric fat (split-wall sign), (B) T2-weighted coronal HASTE image showing the twisting of the sigmoid loop at the transition point (arrow).

Figure 3: T2-weighted coronal TRUFI image showing maternal crossed-fused renal ectopia on the right side (arrow).

Figure 4: Intraoperative photograph showing massively dilated sigmoid colon delivered through the laparotomy incision. No evidence of gut ischemia, infarction or perforation seen.

viable and no signs of ischemia or infarction were seen. Gravid uterus, ovaries and fallopian tubes were normal. The surgical team performed detorsion of the sigmoid loop with decompression followed by sigmoidopexy. The postoperative period was uneventful. Postoperative ultrasound showed normal live fetus. No maternal or fetal complication occurred.

DISCUSSION

The first case of intestinal obstruction during pregnancy was reported by Houston in 1830 [1]. The first case of sigmoid volvulus in pregnancy was documented by Braun in 1885 [4, 6]. The rarity of sigmoid volvulus in pregnancy can be judged from the fact that only 105 cases have been reported in literature till 2015 since the first case report in 1885 [6]. The sigmoid is the most common site of colonic volvulus and accounts for 60–75% of all cases of colonic volvulus [9]. It occurs when sigmoid colon undergoes a twist along its mesenteric axis leading to a closed loop obstruction which predisposes to ischemia, perforation and death [7]. Sigmoid volvulus usually occurs in chronically ill, debilitated and institutionalized patients. In India and Africa, a high-fiber diet predisposes to sigmoid volvulus while in South America, Chagas disease is a predisposing factor [4, 9]. A long redundant sigmoid colon with a narrow mesentery, also known as dolichosigmoid, predisposes to volvulus formation [8]. Pregnancy itself predisposes to sigmoid volvulus as enlarging uterus displaces an abnormally mobile sigmoid loop out of the pelvis causing it to twist around the sigmoid mesocolon leading to vascular compromise and obstruction. This could also be a possible explanation of higher frequency of sigmoid volvulus in third trimester of pregnancy [1, 2, 4–6, 8]. Among the reported cases of sigmoid volvulus in pregnancy, most of the patients are in the age group of 15–35 years with 75% of the cases being multiparous and 66% cases occurring in third trimester [3].

The presenting features of sigmoid volvulus in pregnancy include abdominal pain, distension and obstipation, the so-called sigmoid volvulus triad. Additionally, nausea and vomiting could also be the presenting complaints [1–9]. On examination, abdominal tenderness, hyperkinetic or absent/hypokinetic bowel sounds and empty rectum are the usual signs [3]. The mean duration of symptoms has been reported to range from 1 hour to 6 days with a mean duration of 40.6 hours [1]. Among laboratory investigations, leukocytosis could be considered as a consistent sign but in early phase of the disease, counts could be normal or slightly elevated and furthermore, in pregnancy counts could be normally elevated [1].

On a plain radiograph of abdomen, a large air-filled loop of sigmoid colon arising from the pelvis and extending cranially beyond the level of the transverse colon (the “northern exposure” sign) may be considered

diagnostic of sigmoid volvulus. Other features include the “coffee bean” sign, which refers to the coffee bean-like shape assumed by the dilated sigmoid colon [9].

In cases where diagnosis is uncertain, a contrast enema or CT scan may be done. Contrast enema shows the “beak sign” at the level of the twist beyond which no contrast passes. Contrast enema may help to reduce the volvulus. On CT scan, swirling of the mesentery may be seen at the site of the volvulus [9]. Levsky et al. described two imaging signs of volvulus: X-marks-the-spot-sign in which crossing sigmoid transition is seen and the split wall sign in which the intestinal walls are separated by adjacent mesenteric fat planes due to partial twisting of the sigmoid loop [7, 8].

The major concern regarding the use of radiography and CT in pregnancy is that of radiation exposure to the developing fetus. The recommended cumulative radiation dose to the fetus during pregnancy is 5–10 rads. The radiation dose to the fetus for a plain X-ray on average is 0.1–0.3 rads. In general no single examination, including CT, exceeds the recommended safe dose range [1, 5, 6]. Considering the harmful effects of radiation on organogenesis and the risk of hematological malignancies, some authors are of the opinion that the use of X-rays should be avoided during pregnancy [1]. However, when the benefit to the mother clearly outweighs the risk to the fetus, radiation may be used to establish an early diagnosis [5, 6].

Ultrasonography does not use ionizing radiations and hence is safe in pregnancy [1]. It provides information regarding the fetus and can help to exclude an alternative diagnosis for acute abdomen. Transition point may also be seen on ultrasound [8].

Magnetic resonance imaging can be used as a problem solving tool in the diagnosis of sigmoid volvulus. There is no risk of radiation exposure to the fetus. High contrast resolution in MRI scan can help in establishing the diagnosis accurately [8]. All the signs suggestive of sigmoid volvulus which are seen on radiograph or CT scan can be equally demonstrated on MRI as well [8]. However, availability of MRI scan in developing countries may be a limiting factor for its use in establishing a preoperative diagnosis in such cases.

A multidisciplinary approach is used in the management of sigmoid volvulus in pregnancy which involves obstetricians, neonatologists and general surgeons [3, 6]. Initial resuscitation includes administration of IV fluids, nasogastric decompression and correction of electrolyte imbalance if any [6]. Tocolytics may be used for uterine stability and steroids may be used in cases where fetal maturity is a concern [3, 6]. The surgical approach depends upon the status of the bowel. In cases with good colonic vascularization, no peritoneal signs and no signs of bowel ischemia, decompression of volvulus is an acceptable treatment with the aim of restoration of the colonic blood supply. Detorsion of the volvulus with a soft rectal tube placed endoscopically or during laparotomy could be attempted.

If bowel gangrene or perforation is suspected or is present, due to prolonged compromise of vascular supply, urgent resection is required [6, 8]. Aftab et al. reported a case of sigmoid volvulus in pregnancy which was managed by endoscopic reduction [1].

This case report highlights the need for establishing an early diagnosis and prompt intervention in cases of sigmoid volvulus presenting during pregnancy to prevent catastrophic complications. This case also emphasizes the role of MRI scan as a safe and accurate diagnostic tool for management of these cases.

CONCLUSION

Sigmoid volvulus is a rare non-obstetric complication of pregnancy which requires an early diagnosis and prompt intervention to prevent maternal and fetal complications. Magnetic resonance imaging can provide an accurate diagnosis of sigmoid volvulus and its use is safe in pregnancy with respect to the risks of radiation exposure in pregnancy.

Author Contributions

Obaid Ashraf – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Sameer Peer – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Mohsin Fayaz – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Mohammad Saleem Dar – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Inayat Illahi – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Fahad Shafi – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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