

Case Report

Sigmoid volvulus during late pregnancy: a case report and literature review

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Abstract: Sigmoid volvulus complicating pregnancy is a very rare but severe clinical situation which involves significant maternal and fetal mortality. In this report, we described and discussed a case of a female patient suffered intestinal obstruction caused by sigmoid volvulus during 34-week pregnancy who accepted labor induction and was treated with an elective sigmoid colectomy conservatively after sustained gastrointestinal decompression. Both the patient made an uneventful recovery, with the symptoms associated with sigmoid volvulus and intestinal obstruction relieved, according to our follow-up survey. The literature on this subject is also reviewed in this report.

Keywords: Sigmoid volvulus (SV), pregnancy, elective colectomy

Introduction

Intestinal obstruction during pregnancy occurs rarely in clinical practices, with an incidence rate ranging from 1 in 3,600 to 1 in 66,431 maternities [1, 2]. Intestinal obstruction in pregnancy can be present as a result of intra-peritoneal adhesion, intestinal volvulus, intussusception, carcinoma, hernia, or appendicitis. Among them, intestinal volvulus is ranked as the first or second most common cause and sigmoid volvulus (SV) accounts for the majority of intestinal volvulus [3]. Despite rare, SV complicating pregnancy, especially with delayed diagnosis and treatment, is a very serious clinical situation, which could result in devastating outcomes, including intestinal ischemia, perforation, contamination in abdominal cavity and uterus, even maternal and fetal death [4]. In this case we report a case of the SV complication in a 34-week pregnant woman, who was treated with non-operatively sustained gastrointestinal decompression, an induced preterm labor, and a postpartum elective sigmoid colectomy.

Case report

A 27-year-old female at 34 weeks of gestation, gravida 2, para 0, whose last menstrual period

(LMP) was 12/9/2015, was transferred to the department of obstetrics of our hospital from the local hospital at 22:00 PM on 12/5/2016. The patient had a 6-day history of abdominal distention and frequent vomiting of stomach contents and also had been aggravated for one day. The pregnancy had been uncomplicated thus far and the patient did not have previous history of abdominal surgery. The abdominal ultrasonography from the local hospital showed a normal single fetus. An increment of gas content beneath the xiphoid process was noticed but gastrointestinal perforation could not be excluded.

During physical examination, the patient was conscious and afebrile. Her body temperature was 36.6°C, with a pulse rate of 82 and a blood pressure of 116/84 mmHg. The abdominal examination revealed a distended and tympanic abdomen, with no apparent tenderness and rebound pain on palpation, and detected normal bowel sound. The uterus was enlarged and compatible with a 34-week pregnancy. Routine laboratory examination indicated an elevated white blood cell (WBC) count of $14.1 \times 10^3/\mu\text{L}$, an increase in C-Reaction Protein (CRP) value and urinary amylase. A plain abdominal radiograph showed enlargements of multiple intesti-

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Figure 1. The distended abdomen of the patient after the vaginal labor, with an abdominal girth of 105 cm.

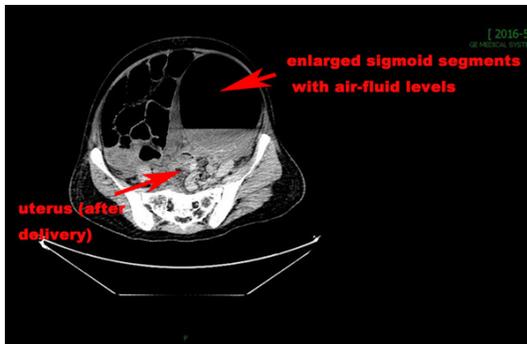


Figure 2. CT scanning shows enlarged sigmoid segments with air-fluid levels. The uterus and the enlarged sigmoid segments were indicated by the red arrows.

nal lumen segments with gas accumulation and detected air-fluid levels. Intravenous fluid infusion was started at 2 AM on 13/5/2016 to relieve the abdominal symptoms but the patient experienced no obvious alleviation. In addition, constipation had occurred since she arrived to our hospital. A nasogastric tube was inserted to perform gastrointestinal decompression at 10:21 AM on 13/5/2016.

A gastroenterology team had been consulted and had performed abdominal exams on the patient. Intestinal obstruction was highly suspected based on the clinical manifestations and the radiograph result. With no evidence of acute peritonitis, the two teams decided to apply sustained non-operative gastrointestinal decompression and enema to relieve the abdominal symptoms and to prepare an induced preterm labor. Propress was given in vagina at 15:51 PM and at 20:50 PM on



Figure 3. The exposed ischemic dilated loops of sigmoid colon with visible volvulus. The sigmoid colon was necrotic and the color became dark brown due to poor circulation.

13/5/2016, and the patient performed a vaginal labor and delivered a 2.1 kg female infant with an Apgar score of 7-8.

After labor, the abdominal symptoms of the patient had been progressively worsening with an onset of severe abdominal pain and bloating. The constipation continued and no flatus was passed. Laxative was applied to the patient at 8:20 AM on 14/5/2016 but not effective. An abdominal radiograph was performed again at 14:37 PM, which indicated multiple distended bowel loops with air accumulation within the intestinal lumen. Multiple air-fluid levels were also detected and became wider than the previous one. Physical examination revealed an apparent distended and tympanic abdomen with abdominal girth of 105 cm (**Figure 1**), and also detected bowel sounds. The gastroenterology team decided to transfer the patient to the department of gastroenterology for further treatment.

At the department of gastroenterology, the abdominal pain and distention was still not relieved after intravenous infusion and sus-

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Table 1. Reported cases of sigmoid volvulus associated with pregnancy and parturition from 1983 to 2016

| Authors | Year | Cases | Gestational age (weeks) | Duration of symptoms (hours) | Outcome | |
|----------------|------|---------|-------------------------|------------------------------|---------|-------|
| | | | | | Mother | Fetus |
| Fraser JL | 1983 | 1 | 32 | 24 | Healthy | Alive |
| Hofmeyr GJ | 1985 | 2 | 33 | 72 | Healthy | IUD |
| Keating JP | 1985 | 1 | 34 | 24 | Healthy | Alive |
| Allen JC | 1990 | 1 | 28 | 24 | Healthy | Alive |
| Lord SA | 1996 | 1 | 36 | 24 | Healthy | Alive |
| Joshi MA | 1999 | 1 | 28 | 24 | Healthy | IUD |
| De U | 2005 | 1 | 24 | 72 | Healthy | IUD |
| Alshawi JS | 2005 | 1 | 28 and 35 | 24 | Healthy | Alive |
| Iwamoto I | 2007 | 1 | 35 | 72 | Expired | IUD |
| Vo TM | 2008 | 1 | 28 | 24 | Healthy | Alive |
| Narjis Y | 2008 | 1 | 24 | - | Healthy | Alive |
| Atamanalp SS | 2008 | 9 | 3rd trimester | 24 | Healthy | - |
| | | | 2nd trimester | 36 | Healthy | - |
| | | | 3rd trimester | 72 | Expired | - |
| | | | 3rd trimester | 20 | Healthy | - |
| | | | 3rd trimester | 24 | Healthy | - |
| | | | 2nd trimester | 36 | Healthy | - |
| | | | 3rd trimester | 12 | Healthy | - |
| | | | 1st trimester | 22 | Healthy | - |
| 3rd trimester | 18 | Healthy | - | | | |
| Kolusari A | 2009 | 3 | 7 | 24 | Healthy | Alive |
| | | | 31 | 48 | Healthy | IUD |
| | | | 32 | 48 | Healthy | Alive |
| Machado NO | 2009 | 1 | 18 | 18 | Expired | Alive |
| Togo A | 2011 | 1 | 25 | 48 | Expired | Alive |
| Khan MR | 2012 | 1 | 30 | 144 | Expired | IUD |
| Dray X | 2012 | 1 | 37 | 12 | Expired | Alive |
| Nascimento EFR | 2012 | 1 | 33 | 72 | Expired | IUD |
| Di Carlo I | 2014 | 1 | 32 | 48 | Healthy | Alive |
| Kumar, S | 2014 | 1 | 37 | - | Healthy | Alive |
| Atamanalp SS | 2015 | 1 | 16 | 18 | Healthy | Alive |
| Al Maksoud AM | 2015 | 1 | 26 | 120 | Healthy | Alive |
| Serafeimidis C | 2016 | 1 | 30 | 48 | Healthy | Alive |
| Our case | 2016 | 1 | 34 | - | Healthy | Alive |

tained gastrointestinal decompression. An abdominal CT scanning performed at 10 AM on 15/5/2016 showed enlarged sigmoid segments with air-fluid levels (**Figure 2**).

Due to the progressive aggravation of symptoms and the futility of non-operative treatments, an exploratory laparotomy under general anesthesia was performed at 20:00 PM on 15/5/2016. The abdominal cavity was acce-

ssed by midline incision. After opening the peritoneum, the ischemic dilated loops of sigmoid colon were exposed, the volvulus were observed, and the sigmoid colon was necrotic with a dark brown color due to the poor circulation (**Figure 3**). Intense distension of sigmoid loops above the volvulus was found. Fortunately, no perforation had occurred. An elective sigmoid colectomy and descending colostomy were performed. The rectal stump was closed with mechanical suture. After confirming that the blood supply to both ends was good, the abdominal cavity was closed by layered suture and a stoma was formed on the anterior abdominal wall.

After surgery, the patient made an uneventful post-operative recovery. The symptoms of abdominal pain and distention had been relieved. Flatus and stool began to pass through the stoma on the third day after operation. The patient was discharged on the eighth day after operation. The abdominal stoma was closed and a colorectal anastomosis was performed successfully after

three months. Both the mother and the baby recovered well according to our follow-up survey.

Discussion

Intestinal obstruction during pregnancy is a rare complication with an incidence rate [1-3]. Sigmoid volvulus (SV) accounts for 25% to 44% of the cases, making it the first or second most

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common cause of intestinal obstruction during pregnancy. Most cases of sigmoid volvulus complicating pregnancy occur during the third trimester of pregnancy [4].

Since the first case of SV during pregnancy was described by Braun in 1885, only 101 cases have been reported in literature until 2016. Thirty-five cases were reported after 1983 with relatively detailed data about gestation weeks, symptom duration, and maternal and fetal status [1-16]. Among the 35 cases, 26 happened during the third trimester of pregnancy, and 7 eventually resulted to the maternal death. Eight cases of fetal Intrauterine Device (IUD) are also included [2, 5, 8, 10, 14, 17, 18] (**Table 1**).

The incidence of SV is increased during pregnancy, especially at the third trimester. It is speculated that the reason is that the enlarging uterus can lead to an increase in the length of sigmoid colon and cause a displacement of sigmoid colon by pushing the redundant or abnormally motile segment out of the pelvis, thus enhancing the risk of the rotation of extra-pelvic segment around its fixation point on the mesenteric axis, resulting in volvulus [19]. This can also explain, to a certain extent, that most cases occurred during the third trimester of gestation, the stage at which the uterus would reach its maximum size.

SV during pregnancy is often associated with critical situations and must be treated with great attention. Because SV usually leads to closed-loop obstruction of the sigmoid colon and may cause vascular compromise and sigmoid ischemia. Delay in diagnosis and treatment would exacerbate the ischemia and could result in intestinal necrosis, enlargement of bowel lumen, and even perforation, which are tightly linked to the maternal and fetal mortalities [17, 20, 21]. Maternal mortality for SV has been reported to be 5% if the bowel is viable, but rises to over 50% if perforation has occurred.

Another possible predisposing factor of maternal and fetal mortality in SV is the duration of symptoms. Among the 36 cases after 1983, 6 of the 8 cases with the maternal death and 7 of the 8 cases of fetus IUD occurred when the duration of symptoms is over 48 h, indicating that the duration of symptoms could be one of the determinant factors for the maternal and

fetal mortality of SV during pregnancy. The average duration of symptoms of SV in pregnancy based on the literature record is 48 h, suggesting that delay in diagnosis and treatment is a common issue in clinical practice for SV during pregnancy [8, 18, 22].

The diagnosis of SV during pregnancy is often delayed because the diagnostic difficulty is greatly increased due to rare incidence and the similarity of symptoms between an SV and a pregnancy. Moreover, reluctance to obtain radiological evaluation in pregnancy could also contribute to the delayed diagnosis [23].

Common symptoms of SV include a triad of abdominal pain, distension, and obstipation [24]. Many reports pointed out that SV should be suspected during pregnancy when the triad of symptom appears. However, according to the literature, presence of all three symptoms is uncommon in clinical practice. Most cases only reported occurrence of one or two classical symptoms, suggesting that a high index of suspicion should be raised when encountering any one of the three common symptoms, and appropriate clinical examinations should be adopted as soon as possible to verify the diagnosis.

Several imaging examinations had been proved to be useful for the detection or exclusion of intestinal obstruction. A detailed ultrasound examination usually confirms the presence of free fluids in the abdominal cavity and the viability of the fetus [23]. A plain abdominal radiograph could illustrate typical patterns of intestinal obstruction, such as the characteristic "coffee bean" sign, in 80-91% of the cases, which can be extremely useful in the diagnosis of intestinal obstruction. Many patients and some physicians are reluctant to perform an abdominal radiography because they concern that the radiation exposure might cause hazardous effects to the fetus. However, the average radiation dose contained in a radiograph is as low as 0.001 Gy per film, which could not cause substantial risk for the fetus in the third trimester. Due to the severity of SV and intestinal obstruction in pregnancy and the difficulty to detect it with other means, when the diagnosis could not be verified or when the symptoms could not be relieved after initial treatment, an abdominal radiograph should be adopted promptly. Magnetic resonance imaging (MRI) is

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also proposed to be an effective tool for the diagnosis of SV in some literature.

A marked elevation of WBC count was noticed in almost all the reported cases, which manifests that leukocytosis is associated with intestinal obstruction. However, some scholars claimed that it is a non-pathognomonic indicator because many other factors during pregnancy can also cause leukocytosis. We propose that a combination of an elevated WBC count with classical symptoms and typical imaging patterns could be highly indicative of intestinal obstruction [8, 25-37].

SV during pregnancy should be treated promptly with great cautiousness. A multidisciplinary cooperation among general surgeons, obstetricians, and neonatologists is often required to maximize the effect of treatment and to minimize the danger of severe complications. Managements vary according to the seriousness of symptoms and pregnancy situation. Potential treatments include sufficient fluid infusion, gastrointestinal decompression, volvulus detorsion, and emergency surgeries. During the third trimester of pregnancy, when there is no ischemic necrosis of SV, the principle of treatment agreed in most cases is to relieve the symptoms first with non-operative treatments, such as gastrointestinal decompression or endoscopic detorsion, and then to apply surgical interventions after the parturition is finished. A cesarean section and subsequent sigmoid fixation and resection is a commonly used surgical method to treat SV in pregnancy. This is because the enlarged sigmoid colon could compress the uterus and increase the intraperitoneal pressure, making vaginal labor more difficult than usual. Sometimes, if the condition of the mother and fetus is stable and the symptoms of SV are less severe, induced vaginal labor followed by sigmoid colectomy can also be performed, as presented in our case.

Conclusion

SV during pregnancy is a rare but serious situation in clinical practice. Delay in diagnosis and treatment could significantly increase fetal and maternal mortality. Diagnosis should be suspected when patient presents one of the triad symptoms of SV. Ultrasonography, abdominal radiograph, and abdominal MRI examinations

are important for the diagnosis. Treatments should be adopted promptly with great cautiousness to achieve an optimal effect and to minimize the incidence of devastating outcomes.

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Disclosure of conflict of interest

None.

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