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## Sigmoid volvulus during pregnancy: A rare non-obstetric complication. Report of a case and review of the literature

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## ABSTRACT

**INTRODUCTION:** Sigmoid volvulus is a rare cause of intestinal obstruction during pregnancy associated with high maternal and foetal mortality. Effective management represents a challenge due to delayed presentation, obstructive symptoms regarded as pregnancy-related and hesitation in using radiological evaluation.

**PRESENTATION OF CASE:** We report a case of a lady, pregnant for 26 weeks and with a 5 day history of abdominal pain and constipation. She underwent concomitant caesarean section and laparotomy for intestinal obstruction. Intra-operatively, the sigmoid colon was extensively dilated and gangrenous. The ischemic colon was resected and a Hartmann's procedure was performed. A preterm male child was delivered and admitted to neonatal intensive care. The post operative course was uneventful and the patient was discharged home on the 9th post-operative day. Six months later she underwent an uneventful reversal of the Hartmann's procedure.

**DISCUSSION:** Sigmoid volvulus is the most common cause of bowel obstruction during pregnancy, accounting for up to 44% of reported cases. We have reviewed the available literature on this topic and present another case managed at our institution.

**CONCLUSION:** Diagnosis of sigmoid volvulus in pregnancy is a challenge, but a delay in diagnosis increases the rates of foeto-maternal mortality. A high incidence of clinical suspicion and timely surgical intervention are the key to a favourable outcome.

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## 1. Introduction

Since, first reported by Houston in 1830, intestinal obstruction (IO) in pregnancy is still uncommon with a reported incidence ranging from one in 1500 to one in 66,431 deliveries. The most common causes are adhesions, volvulus, intussusceptions, carcinoma and hernia [1,2].

Sigmoid volvulus (SV) in pregnancy is a rare occurrence, associated with significant foetal and maternal complications. As rare as it is, SV is the most common cause of bowel obstruction during pregnancy, accounting for up to 44% of reported cases [1,2].

The physiological changes during pregnancy may cloud the clinical presentation, thus making accurate diagnosis and timely intervention a challenging process. This in turn adds to the high morbidity and mortality associated with the condition. Early diagnosis and timely surgical intervention are crucial to improving the overall outcome [1–3].

We report a case of sigmoid volvulus during pregnancy and present an up-to-date literature review. We conducted our work in line with the CARE guide lines for clinical case reporting [4].

## 2. Case presentation

A 24 year-old, in the 26th week of her first pregnancy, presented to the emergency department with a 5 day history of abdominal pain, distension and constipation. The pain was gradually increasing in severity. She had no significant past medical or surgical history. Her menstrual and antenatal history was uneventful thus far. She was admitted and managed conservatively for these complaints at two different hospitals, with a diagnosis of preterm delivery.

The patient was evaluated by the surgical and obstetric teams in the emergency department. On physical examination she appeared dehydrated with hypotension, tachycardia and tachypnea. Her abdomen was asymmetrically distended with tenderness all over. The rectum was empty on digital examination.

Foetal viability was assessed by an obstetrician. Vaginal examination was not suggestive of threatened preterm labour.

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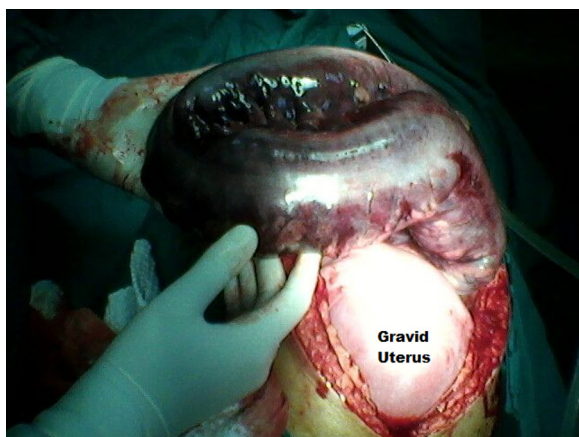


Fig. 1. Dilated ischemic sigmoid colon which had undergone volvulus.

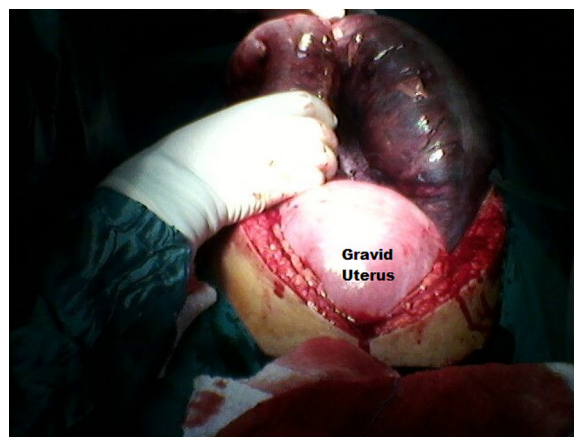


Fig. 2. Gangrenous colon displaced posteriorly by the gravid uterus.

Laboratory investigations were within normal ranges, apart from an elevated white cell count of  $16,000/\text{mm}^3$ . Her urine analysis was clear. Ultrasound scan of the abdomen and pelvis showed a distended bowel loop and a moderate amount of free fluid in the peritoneal cavity. It confirmed a single viable foetus.

At this stage a clinical diagnosis of IO was proposed. Further imaging was considered in order to identify the level of obstruction. After discussion between the surgeon and obstetrician, the decision was made to proceed with an abdominal X-ray. This was further discussed with the on-call radiologist.

A plain X-ray of the abdomen revealed a dilated large bowel with an abnormal gas pattern and a coffee bean appearance, suggesting a sigmoid volvulus.

The gastroenterology team was consulted and the patient consented to an emergency sigmoidoscopy, with the possibility of laparotomy in case of failure. The sigmoidoscopy confirmed the diagnosis of a twisted sigmoid colon. Unfortunately, it was not possible to negotiate the obstruction.

In view of foetal distress, evident from a deceleration in heart rate, the obstetric team's decision was to perform a concomitant caesarean section to deliver the premature foetus and explore the abdomen for IO. This management plan was further discussed with the neonatologist.

After initial resuscitation, the patient was taken to the emergency theatre for laparotomy. The abdomen was accessed through a midline laparotomy. Intra-operatively, an enormously distended sigmoid loop was found with ischemic and gangrenous changes. There were no signs of perforation (Fig. 1). The necrosis resulted from the presence of SV, due to a twisted sigmoid mesocolon. The necrotic colon was posteriorly displaced by the pregnant uterus (Fig. 2).

A lower segment caesarean section was performed to deliver a male preterm infant weighting 750 g. After delivery the infant was admitted to the neonatal ICU and placed on mechanical ventilation due to lung immaturity.

Faced with the gangrenous sigmoid colon, resection was performed, followed by a Hartmann's procedure. An end colostomy was fashioned with closure of the rectal stump below the peritoneal reflection.

The post-operative course was uneventful and the patient was discharged home on the 9th post-operative day. The child was discharged home following 10 weeks in the neonatal intensive care unit.

Six months later the patient underwent reversal of Hartmann's, with bowel continuity restored through colo-rectal anastomosis. The authors were involved in the second procedure.

### 3. Discussion

In 1885, Braun reported the first case of SV in pregnancy. To date, only 105 cases have been reported in literature, in this report we present another case managed at our institution. Aflab reported 95 cases up to June 2013 in his comprehensive literature review [1,2]. In our own literature search, using Medline and Google scholar, articles from January 2013 to July 2015 were identified and reviewed. The search terms used were: "sigmoid volvulus" and "pregnancy". Only cases of sigmoid volvulus in pregnancy were included. Irrelevant articles, evident from the title or abstract, were excluded. Nine articles were found, 5 of which were indexed in Medline [5–9] and 4 in Google scholar [10–13]. A total of 10 cases were reviewed.

In developed countries, sigmoid volvulus is usually reported in institutionalized, debilitated, or chronically constipated patients with long redundant sigmoid colons. A high incidence reported in Africa has been attributed to a high-fibre diet [14]. Pregnancy increases the incidence of SV through displacement, compression and partial obstruction of a sigmoid colon abnormally elongated by the gravid uterus [1]. This probably explains the increased incidence of SV in the third trimester of pregnancy. However, there have been reports of SV developing in early pregnancy as well as during the puerperium [2,3].

In the literature the duration between onset of symptoms and presentation ranges from 1 h to 6 days. The mean duration is 48 h [1–3]. Delay in the diagnosis of SV may lead to devastating outcomes for both mother and foetus.

Maternal mortality from SV has been reported to be 5% if the bowel is viable, but rises to over 50% if perforation has occurred. It is important to mention that almost all maternal deaths occurred in the patients where the delay in presentation and surgical intervention was more than 2 days. Foetal mortality in SV is approximately 30%. Foetal death can result from a reduction of placental blood flow in the hypovolemia, or increased intra abdominal pressure as a result of massive sigmoid dilatation [2,15,1]. From these figures, only early diagnosis and timely surgical intervention can improve both maternal and foetal outcomes.

The classical presentation of IO includes a triad of abdominal pain, distension and constipation. During pregnancy, these obstructive symptoms may be vague and regarded as pregnancy related [6]. The commonly reported symptoms of IO in pregnancy include abdominal pain (98%), vomiting (82%) and constipation (30%). Abdominal tenderness is found in 71% of the patients [16,3,14]. In our case worsening abdominal pain and constipation were the obstructive symptoms prior to presentation.

SV in pregnancy poses diagnostic challenges for the clinician. The first challenge lies in clinical examination. The gravid uterus

limits proper physical examination of various abdominal regions. The stretched anterior abdominal wall is less sensitive to parietal irritation and may mask signs of an acute abdomen [16].

The next challenge lies in selecting the appropriate radiological modality to establish the diagnosis [16]. There has long been a reluctance to use radiological diagnostic tools during pregnancy due to concerns about the radiation exposure to the foetus [2]. It has been recommended that the cumulative radiation dose to the foetus during pregnancy should be less than 5–10 rads of radiation. In general, no single diagnostic study exceeds 5 rads. The radiation dose to the foetus for a plain abdominal X-ray averages 0.1–0.3 rads. The foetal age at exposure is also an important factor. Exposure during the first week and between 10 and 17 weeks of gestation carries the highest risk of teratogenesis [2,6]. Generally, the health and life of the mother take priority over concern for the foetus, and judicious use of radiation may help in the making of an early diagnosis, with optimal outcome for both the mother and the foetus [2].

Abdominal X-ray for IO in pregnancy may be an acceptable and cost effective diagnostic modality [16]. Plain abdominal X-ray can identify up to 91% of typical patterns of IO [15,3]. Chiedozi et al., in a series of 10 cases of IOP, reported that the plain abdominal X-ray was used to diagnose all their cases [16]. Ultrasound examination can confirm the dilatation of the sigmoid colon and identify the transition point. It also confirms the presence of free fluids in the abdominal cavity and the viability of the fetus. MRI, a non-ionizing radiation modality, is also reported by some authors to be helpful in diagnosing SV during pregnancy [5,6].

Abdominal pain during pregnancy may be related to abdominal emergencies or gynaecologic emergencies [6]. In our patient, gynaecological examination was not suggestive of threatened preterm delivery. In addition, the absence of effacement and/or dilatation of the cervix suggested that a different cause of abdominal pain should be explored.

Management of IO in pregnancy is generally similar to that in the non-pregnant state. Choice of treatment depends on the duration of pregnancy and the state of the sigmoid colon. The management of SV in pregnancy requires a multidisciplinary approach involving general surgeon, obstetrician and neonatologist [1,13].

The initial management includes aggressive resuscitation with nasogastric decompression, fluids and electrolytes correction. Tocolytics should be used if uterine irritability is observed, and steroids initiated to promote foetal lung maturity. Following initial stabilization of the patient's condition, further surgical intervention depends on the integrity of the distended bowel [1].

In cases of bowel necrosis or perforation, surgical exploration is essential, preferably through midline laparotomy to provide good exposure with minimal manipulation of the gravid uterus. In the third trimester, if adequate intestinal exposure cannot be obtained, caesarean section must be performed. Bowel viability should be assessed carefully and examined for other areas of obstruction. Peritoneal lavage with bowel resection is mandatory, followed by stoma formation (Hartmann's procedure) in most cases, with the stoma being sited away from an area of a possible caesarean section [3,1].

Some authors prefer to perform a primary anastomosis with or without colonic washout intra-operatively when there is no contamination of the peritoneal cavity [3,17]. However, primary anastomosis of an unprepared distended parietic and edematous colon is generally avoided as it carries more risks to both mother and foetus. It is worth mentioning that early diagnosis would make resection and primary anastomosis a safe approach, with the distinct advantage of a reduced hospital stay and avoidance of further surgery [3].

In recurrent cases, elective sigmoidectomy can be performed safely in the second trimester. Otherwise, surgery can be postponed to be performed electively after delivery [1]. In early cases, with

no signs of peritonitis or bowel ischemia, endoscopy can be both diagnostic and therapeutic, allowing for detorsion and decompression. Despite being successful in 50–80% of non-pregnant patients [15,17], endoscopy during the third trimester, as in the present case, could be limited by the enlargement of the uterus [6]. However, some authors reported successful detorsion and decompression of SV in late pregnancy. Some described the use of a gastroscope, which was more flexible and tolerable without sedation [7,18].

The best strategy for the foetus is still a matter of debate. Obstetric intervention should strictly depend on the condition of the foetus. In cases of foetal maturity, a vaginal delivery can be induced if the condition of both mother and foetus is sufficiently stable. If caesarean section is indicated, the sigmoid resection can follow. Extra care should be taken to avoid uterine contamination as this can itself be a cause of high mortality due to consequent puerperal sepsis [3,1].

In conclusion, SV during pregnancy is a rare non-obstetric complication with high mortality rates. Diagnosis of SV in pregnancy is a challenge, but a delay in diagnosis increases the rates of foeto-maternal mortality. A high incidence of clinical suspicion and timely surgical intervention are the key to a favourable outcome.

### Conflicts of interest

None of the authors have any conflicts of interest to declare.

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### Ethical approval

No approval needed.

### Consent

Written informed consent was obtained from the patient prior to the writing of the case report.

### Authors contribution

Al Maksoud was involved in data collection and writing the manuscript draft. A. Barsoum was involved in the review of the manuscript. M. Moneer was involved in the conception of the study. All authors were involved in the final revision and approval of the final manuscript for publication.

### Guarantor

Mr. Ahmed Al Maksoud will act as the guarantor for this article.

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