Sigmoid volvulus in a pregnant female: case presentation

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Abstract

Intestinal obstruction (IO) in pregnancy is uncommon with an incidence ranging from 1 in 1500 to 1 in 66 431 deliveries. Sigmoid volvulus (SV) in pregnancy is a very rare entity that can be associated with extremely high rates of morbidity and mortality for both mother and fetus.

A 24-year-old pregnant woman presented to the emergency department with a 4-day history of abdominal pain, absolute constipation, and persisting vomiting that were associated with chills. Ultrasound showed marked dilatation of the bowel loops all over the abdomen with notable mass like doughnut-shaped bowel at the left side of the abdomen. Magnetic resonance imaging (MRI) showed a picture of mechanical large bowel obstruction likely due to adhesion vs. volvulus of the splenic flexure. Laparotomy through a midline incision was performed and revealed a gangrenous highly ballooned sigmoid with 360-degree volvulus behind the gravid uterus and reaching the epigastrium. A cesarean section was done. The vascularity of sigmoid was compromised; thus, a resection and Hartman's was done. Closure of colostomy with restoration of intestinal continuity was successfully done 3 months later.

Keywords:
intestinal obstruction, pregnancy, sigmoid volvulus

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Background

Intestinal obstruction (IO) in pregnancy is uncommon with an incidence ranging from 1 in 1500 to 1 in 66 431 deliveries. The most common causes are adhesions, volvulus, intussusceptions, carcinoma, and hernia [1,2].

Sigmoid volvulus (SV) in pregnancy is a very rare entity that can be associated with extremely high rates of morbidity and mortality for both mother and fetus [3,4]. Delay in presentation and diagnosis can result in bowel ischemia that may require colectomy and formation of a stoma, and also put pregnancy in jeopardy [1]. Maternal complications include bowel perforation, peritonitis, and sepsis. Fetal complications may also occur including preterm delivery, intrauterine fetal death, and neonatal sepsis. A high index of suspicion and the use of modern imaging modalities are required for achieving a better outcome for both mother and fetus [2].

We report here the management of a pregnant woman who presented with SV.

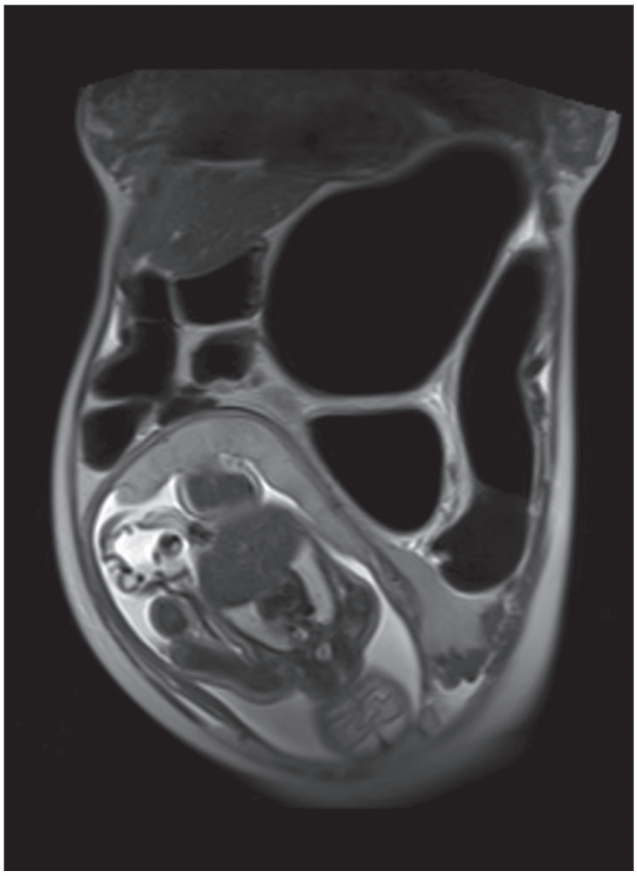
Case presentation

A 24-year-old pregnant woman presented to the emergency department of Dr. Soliman Fakeeh Hospital KSA with a 4-day history of abdominal pain, absolute constipation, and persisting vomiting that were associated with chills. She was referred to the general surgery from the obstetrics and gynecology team. She was in the 32nd week of gestation. There was no relevant medical history except the presence of epigastric hernia since childhood. She was afebrile but with tachycardia (118/min). Abdominal examination revealed marked distension, with tenderness all over the abdomen.

Routine laboratory tests were normal except for an elevated white blood cell count of $17.5 \times 10^3/\mu l$. Ultrasound showed marked dilatation of the bowel loops all over the abdomen with notable mass like doughnut-shaped bowel at the left side of the abdomen and a collapsed bowel distally. It also showed a gravid uterus with single viable fetus of 32-week gestational age. Magnetic resonance imaging (MRI) showed a picture of mechanical large bowel obstruction likely due to adhesion vs. volvulus of the splenic flexure (Figs. 1 and 2).

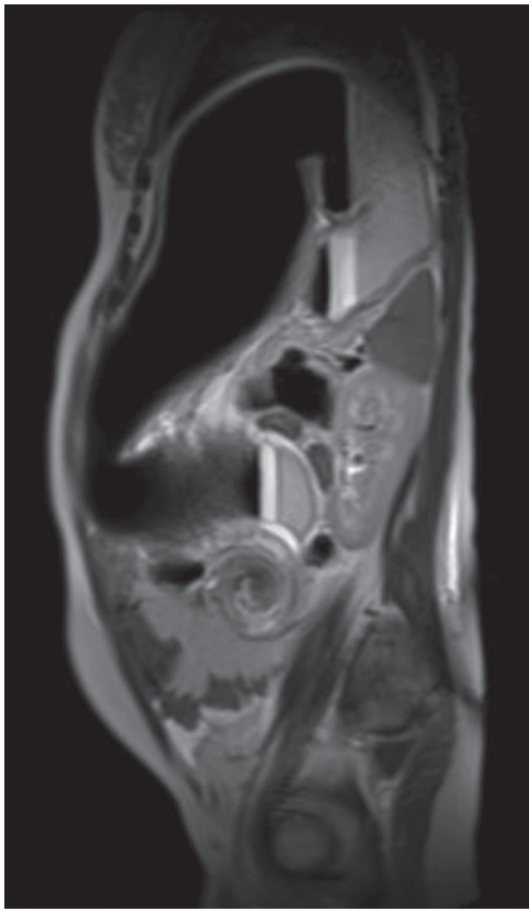
Patient was resuscitated with intravenous (IV) fluids and shifted directly to the operating theater with simultaneous preparation of a neonatal intensive care unit (ICU) bed. A laparotomy through a midline

Figure 1



Coronal T2-weighted HASTE image of the abdomen showing markedly distended haustral sigmoid loop extending in an inverted U configuration up to the left hemidiaphragm (northern-exposure sign). The transition point of the sigmoid colon twisting is shown (arrow). Fetus is seen in the uterus and mild free fluid is seen in the lower abdomen.

Figure 2



Sagital T2-weighted HASTE image of the abdomen showing whorled appearance of twisting sigmoid loop and mesenteric vessels within constituting the whirl sign.

incision was performed and revealed a gangrenous highly ballooned sigmoid (Fig. 3) with 360-degree volvulus (Fig. 4) behind the gravid uterus and reaching the epigastrium. A cesarean section was done then the severely distended sigmoid was delivered. The vascularity was compromised; thus, a resection was done. Using staplers, Hartman's pouch was created and marked by polypropylene 2/0 stitch and terminal colostomy was exteriorized. Abdominal lavage was done followed by insertion of 3 J-Vacs preceding mass closure of the abdomen using polypropylene 1.

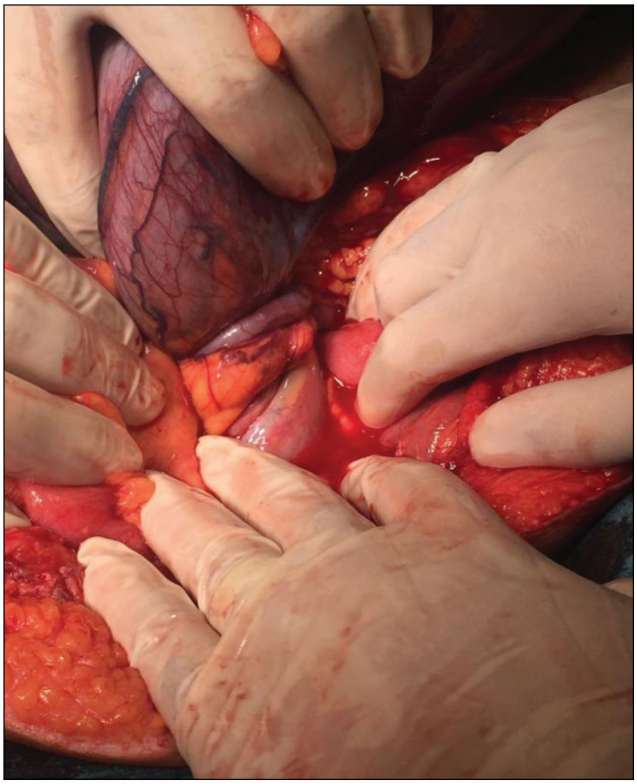
The fetus was a preterm girl of 1.55 kg with an appearance, pulse, grimace, activity, and respiration (APGAR) score of 2, 6, and 8 at 1, 5, and 10 min; respectively.

The postoperative course was uneventful. Drains were removed on the sixth postoperative day after starting oral intake then the patient was discharged on the seventh postoperative day.

Figure 3

Gangrenous highly ballooned sigmoid.

Figure 4



A 36A0-degree volvulus.

During follow-up, wound was clean with no pain and good ambulation. Closure of colostomy with restoration of intestinal continuity was successfully done 3 months later.

Discussion

The first case of IO during pregnancy was reported by Houston in 1830. It is rare with an incidence ranging from 1 in 1500 to 1 in 66 431 deliveries [3]. The first case of SV in pregnancy was documented by Braun in 1885 [5]. To date, only 109 cases have been reported in literature [2,6–9]. Aftab *et al.* [2] reported 95 cases in their comprehensive literature review up to June 2013. From June 2013 to July 2015, additional 11 cases were reviewed, by Al Maksoud *et al.* [6]. Since July 2015, another 3 studies reported additional 3 cases [7–9]. In the current report, we present another case managed at our institution.

SV affects mainly chronically constipated patients with a long redundant sigmoid colon [10]. High-fiber diet is also a predisposing factor [11]. Pregnancy increases the incidence of SV through displacement, compression, and partial obstruction of a sigmoid colon abnormally elongated by the gravid uterus [12]. This probably explains the increased incidence of SV associated with pregnancy in the third trimester [3]. However, there have been reports of SV developing in early pregnancy as well as during the puerperium [12–15].

The diagnosis of SV in pregnancy is often delayed because the symptoms mimic typical pregnancy-associated complaints. It is suggested to suspect the diagnosis of SV when a pregnant patient presents with abdominal distention, pain, absolute constipation, vomiting, and intolerance to oral intake of food or water [13]. The laboratory findings are not pathognomonic in pregnant SV cases [16,17].

The use of radiological tools can be useful to establish the diagnosis, but many clinicians are reluctant to use them for fear of fetal complications. It has been recommended that the cumulative radiation dose to the fetus during pregnancy should be less than 5–10 rads [18]. In general, no single diagnostic study exceeds 5 rads of radiation exposure. As an example, the radiation dose to the fetus for a plain abdominal radiograph averages 0.1–0.3 rads, whereas a computerized tomography (CT) of the pelvis and abdomen yields up to 5 rads of fetal exposure [19]. Significant radiation exposure may lead to chromosomal mutations, neurologic abnormalities, mental retardation, and increased risk of childhood leukemia. Cumulating radiation dosage is the primary risk factor for adverse fetal effects, but fetal age at exposure is also important [20,21].

Abdominal and obstetric ultrasonography may provide information about the fetus, in addition to excluding other pathologies [22]. MRI, a nonionizing radiation modality, is also reported by some authors to be helpful in diagnosing SV during pregnancy [23,24].

Management of IO during pregnancy is generally similar to that in the nonpregnant status. 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 [22]. The management involves aggressive fluid resuscitation, decompression of the proximal bowel, and recognition of this entity as an acute surgical emergency [3,25,26]. After initial stabilization of the patient's condition, further surgical intervention depends on the integrity of the distended bowel [2]. In the absence of peritoneal signs or mucosal ischemia, it would seem reasonable to attempt detorsion and decompression through sigmoidoscopic placement of a soft rectal tube [27,28]. 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 [29]. In the third trimester, if adequate intestinal exposure cannot be obtained, caesarean section must be

Table 1 Worldwide documented cases of sigmoid volvulus in pregnancy and the outcome.

Authors	Year	Cases	Gestational age (weeks)	Duration of symptoms (h)	Outcome		Type of management
					Mother	Fetus	
Lambert [37]	Before 1931	29	–	–	–	–	–
Kohn [38]	1931–1944	12	–	–	–	–	–
Harer [12]	1944–1958	11	–	–	–	–	–
Lazaro [39]	1958–1969	13	–	–	–	–	–
Fraser [35]	1983	1	32	24	Healthy	Alive	Laparotomy + decompression
Hofmeyr [36]	1985	2	33	72	Healthy	IUD	–
			26	72	Expired	IUD	–
Keating [25]	1985	1	34	24	Healthy	Alive	Sigmoidectomy + double barrel colostomy
Allen [28]	1990	1	28	24	Healthy	Alive	Colonoscopic detorsion and rectal tube decompression
Lord [26]	1996	1	36	24	Healthy	Alive	Sigmoidectomy + Hartman's colostomy
Joshi [30]	1999	1	28	24	Healthy	IUD	Sigmoidectomy + Hartman's colostomy
De [17]	2005	1	24	72	Healthy	IUD	Sigmoidectomy + Hartman's colostomy
Alshawi [27]	2005	1	28 and 35	24	Healthy	Alive	Colonoscopic detorsion and rectal tube decompression
Iwamoto [4]	2007	1	35	72	Expired	IUD	–
Vo [22]	2008	1	28	24	Healthy	Alive	–
Narjis [22]	2008	1	24	–	Healthy	Alive	Sigmoidectomy + double barrel colostomy
Kolusari [13]	2009	3	7	24	Healthy	Alive	Resection + anastomosis
			31	48	Healthy	IUD	Sigmoidectomy + Hartman's colostomy
			32	48	Healthy	Alive	Sigmoidectomy + Hartman's colostomy
Machado [29]	2009	1	18	18	Expired	Alive	–
Togo [34]	2011	1	25	48	Expired	Alive	Resection + anastomosis
Khan [1]	2012	1	30	144	Expired	IUD	Total colectomy + diverting ileostomy
Atamanalp [16]	2008	9	3rd trimester	24	Healthy	–	Laparotomy + Detorsion
			2nd trimester	36	Healthy	–	Endoscopic detorsion
			3rd trimester	72	Expired	–	Sigmoidectomy + Hartman's colostomy
			3rd trimester	20	Healthy	–	Laparotomy + Detorsion
			3rd trimester	24	Healthy	–	Endoscopic detorsion
			2nd trimester	36	Healthy	–	Resection + anastomosis
			3rd trimester	12	Healthy	–	Endoscopic detorsion
			1st trimester	22	Healthy	–	Endoscopic detorsion
			3rd trimester	18	Healthy	–	Endoscopic detorsion
Dray [40]	2012	1	37	12	Healthy	Alive	Endoscopic detorsion
Nascimento [41]	2012	1	33	72	Expired	IUD	Sigmoidectomy + Hartman's colostomy
Aftab [2]	2013	1	32	48	Healthy	Alive	Endoscopic detorsion
Al Maksoud [6]	2013–2015	11	37	72	Healthy	Alive	Sigmoidectomy + Hartman's colostomy
			31	72	Healthy	Alive	Laparotomy + Detorsion
			26 and 35	24	Healthy	Alive	Endoscopic detorsion
			–	–	–	–	
			16	48	Healthy	–	Resection + anastomosis
			30	24	Healthy	Expired	Sigmoidectomy + Hartman's colostomy
			38	120	Healthy	Alive	Resection + anastomosis
			28	120	Healthy	Alive	Sigmoidectomy + double barrel colostomy
			18	48	Healthy	IUD	Laparotomy + Detorsion
			34	48	Healthy	Alive	Laparotomy + Detorsion
			26	120	Healthy	Alive	Sigmoidectomy + Hartman's colostomy
Serafeimidis [7]	2016	1	30	48	Healthy	–	Laparotomy + Detorsion
Ashraf [8]	2016	1	22	72	Healthy	Alive	Laparotomy + Detorsion + Sigmoidopexy
Ramalingam [9]	2016	1	34	72	Healthy	Alive	Resection + anastomosis
This article	2017	1	32	96	Healthy	Alive	Sigmoidectomy + Hartman's colostomy

IUD, intrauterine death.

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 [30–32].

Some authors prefer to perform a primary anastomosis with or without colonic washout intraoperatively when there is no contamination of the peritoneal cavity [31,33]. However, primary anastomosis of an unprepared distended paretic and edematous colon is generally avoided as it carries more risks to both mother and fetus [25].

In recurrent cases, elective sigmoidectomy can be performed safely in the second trimester [34]. Otherwise, surgery can be postponed to be performed electively after delivery.

The best strategy for the fetus is still a matter of debate. Obstetric intervention should strictly depend on the condition of the fetus. In cases of fetal maturity, a vaginal delivery can be induced if the condition of both mother and fetus 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 [35].

Maternal mortality for SV has been reported to be 5% if the bowel is viable, but rises to over 50% if perforation has occurred [30].

Fetal mortality in SV is ~30%. The fetal death could be caused by reduction in placental blood flow in hypovolemia, or by reduction of the abdominal and pelvic blood flow due to increased intra-abdominal pressure as a result of massive sigmoid dilatation [36].

Conclusion

SV during pregnancy is a rare nonobstetric complication with high mortality rates. Diagnosis of SV in pregnancy is a challenge, but a delay in diagnosis increases the rates of fetomaternal mortality. A high incidence of clinical suspicion and timely surgical intervention are the key to a favorable outcome (Table 1).

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Conflicts of interest

There are no conflicts of interest.

References

1 Khan MR, Ur Rehman S. Sigmoid volvulus in pregnancy and puerperium: a surgical and obstetric catastrophe. Report of a case and review of the world literature. World J Emerg Surg 2012; 7:10.

2 Aftab A, Toro A, Abdelaal A, Dasovky M, Gehani S, Abdel Mola A, *et al*. Endoscopic reduction of a volvulus of the sigmoid colon in pregnancy: case report and a comprehensive review of the literature. World J Emerg Surg 2014; 9:41.

3 Perdue PW, Johnson HW Jr, Stafford PW. Intestinal obstruction complicating pregnancy. Am J Surg 1992; 164:384–388.

4 Iwamoto I, Miwa K, Fujino T, Douchi T. Perforated colon volvulus coiling around the uterus in a pregnant woman with a history of severe constipation. J Obstet Gynaecol Res 2007:33:731–733.

5 Braun G. Die Enlerostenosen in IIner Beziehung zur Graviditaet und Geburt. Wie1l Med Wochenschr 1885; 35:761–765.

6 Al Maksoud AM, Barsoumb AK, Moneer b MM. Sigmoid volvulus during pregnancy: a rare non-obstetric complication. Report of a case and review of the literature. Int J Surg Case Rep 2015; 17:61–64.

7 Serafeimidis C, Waqainabete I, Creaton A, Vakamacawai E, Kumar R. Sigmoid volvulus in pregnancy: case report and review of literature. Clin Case Rep 2016; 4:759–761.

8 Ashraf O, Peer S, Fayaz M, Saleem Dar M, Illahi I, Shaf F. Sigmoid volvulus during second trimester of pregnancy in a primigravida: report of a rare case with review of imaging of sigmoid volvulus. Int J Case Rep Images 2016; 7:436–440.

9 Ramalingam R, Pradiba S, Michael A. A rare case of sigmoid volvulus complicating pregnancy in a tertiary care centre: a case report. Int J Reprod Contracept Obstet Gynecol 2016; 5:1273–1275.

10 Ballantyne GH, Brandner MD, Beart RWJr, Ilstrup DM. Volvulus of the colon. Incidence and mortality. Ann Surg 1985; 202:83–92.

11 Elmasri SH, Khalil T. Volvulus of the sigmoid in Khartoum, Sudan. Trop Geogr Med 1976; 28:297–302.

12 Harer WB, Harer WB. Volvulus complicating pregnancy and puerperium; report of three cases and review of literature. Obstet Gynecol 1958; 12:399–406.

13 Kolusari A, Kurdoglu M, Adali E, Yildizhan R, Sahin HG, Kotan C. Sigmoid volvulus in pregnancy and puerperium: a case series. Cases J 2009; 2:9275.

14 Sascha Dua R, Rothnie ND, Gray EA. Sigmoid volvulus in the Puerperium. Int J Gynaecol Obstet 2007; 97:195–210.

15 Fuller JK, Larrieu AJ. Sigmoid volvulus in the young: a case following cesarean section. Arch Surg 1978; 113:316–317.

16 Atamanalp SS, Ozturk G. Sigmoid volvulus in pregnancy. Turk J Med Sci 2012; 42:9–15.

17 De U, De KK. Sigmoid volvulus complicating pregnancy. Indian J Med Sci 2005; 59:317–319.

18 Karam PA. Determining and reporting fetal radiation exposure from diagnostic radiation. Health Phys 2000; 79:S85–S90.

19 Chen MM, Coakley FV, Kaimal A, Laros RK. Guidelines for computed tomography and magnetic resonance imaging use during pregnancy and lactation. Obstet Gynecol 2008; 112:333–340.

20 Kennedy A. Assessment of acute abdominal pain in the pregnant patient. Semin Ultrasound CT MR 2000; 21:64–77.

21 Timins JK. Radiation during pregnancy. N J Med 2001; 98:29–33.

22 Vo TM, Gyaneshwar R, Mayer C. Concurrent sigmoid volvulus and herniation through broad ligament defect during pregnancy: case report and literature review. J Obstet Gynaecol 2008; 34:658–662.

23 Kumar S, Gautam S, Prakash R, *et al*. Volvulus of sigmoid colon during full term pregnancy with rectovaginal fistula: a case report. J Clin Diagn Res 2014; 8:10.

24 Palmucci S, Lanza ML, Gulino F, Scilletta B, Ettorre GC. Diagnosis of a sigmoid volvulus in pregnancy: ultrasonography and magnetic resonance imaging findings. J Radiol Case Rep 2014; 8:54–62.

25 Keating JP, Jackson DS. Sigmoid volvulus in late pregnancy. J R Army Med Corps 1985; 131:72–74.

26 Lord SA, Boswell WC, Hungerpiller JC. Sigmoid volvulus in pregnancy. Am Surg 1996; 62:380–382.

27 Alshawi JS. Recurrent sigmoid volvulus in pregnancy. Report of a case and review of the literature. Dis Colon Rectum 2005; 48:1811–1813.

28 Allen JC. Sigmoid volvulus in pregnancy. J R Army Med Corps 1990; 136:55–56.

29 Machado NO, Machado LS. Sigmoid volvulus complicating pregnancy managed by resection and primary anastomosis: case report with literature review. Sultan Qaboos Univ Med J 2009; 9:84–88.

30 Joshi MA, Balsarkar D, Avasare N, Pradhan C, Pereira G, Subramanyan P, *et al*. Gangrenous sigmoid volvulus in a pregnant woman. Trop Gastroenterol 1999; 20:141–142.

31 Redlich A, Rickes S, Costa SD, Wolff S. Small bowel obstruction in pregnancy. Arch Gynecol Obstet 2007; 275:381–383.

32 Mirza MS, Mulla M, Hall RI. Large bowel obstruction in pregnancy: a rare entity, an unusual cause. Arch Gynecol Obstet 2009; 279:177–178.

33 Safioleas M, Chatziconstantinou C, Felekouras E, *et al*. Clinical considerations and therapeutic strategy for sigmoid volvulus in the elderly: a study of 33 cases. World J Gastroenterol 2007; 13: 921–924.

34 Togo A, Traore M, Coulibaly Y, Samake B, Diallo G. Sigmoid volvulus in pregnancy. S Afr J Surg 2011; 49:204–205.

35 Fraser JL, Eckert LA. Volvulus complicating pregnancy. Can Med Assoc J 1983; 128:1045–1048.

36 Hofmeyr GJ, Sonnendecker EW. Sigmoid volvulus in advanced pregnancy. Report of 2 cases. S Afr Med J 1985; 67:63–64.

37 Lambert AC. Paris Thesis. Paris, France: University of Paris 1931.

38 Kohern SG, Briele HA, Douglas LH. Volvulus in pregnancy. Am J Obst Gynecol 1944; 48:398.

39 Lazaro EJ, Das PB, Abraham PV. Volvulus of the sigmoid colon complicating pregnancy. Obstet Gynecol 1969; 33:553–557.

40 Dray X, Hamzi L, Lo Dico R, Barranger E. Endoscopic reduction of a volvulus of the sigmoid colon in a pregnant woman. Dig Liver Dis 2012; 44:447.

41 Nascimento EFR, Chechter M, Fonte FP, Puls N, Valenciano JS, Filho CLPF, *et al*. Volvulus of the sigmoid colon during pregnancy: a case report. Case Rep Obstet Gynecol 2012; 2012:5p.