

Sigmoid volvulus in pregnancy

Sabri Selçuk ATAMANALP, Gürkan ÖZTÜRK

Aim: To review the clinical outcomes of 9 patients with sigmoid volvulus (SV), a rare complication during pregnancy.

Materials and methods: The clinical records of the patients were reviewed retrospectively.

Results: The age range of the patients was 24-39 years (mean: 30.6 years). All patients were multiparous, and 6 patients (66.7%) were in the third trimester when diagnosed with SV. The main clinical features were abdominal pain/tenderness, obstipation, and distention in all patients (100.0%). The correct diagnosis was achieved based on clinical examination in 66.7% of the cases. Endoscopic detorsion was attempted in 6 patients (66.7%), with an 83.3% success rate. Emergency surgery was required in 4 patients (44.4%) and resulted in 25.0% surgical mortality and morbidity rates.

Conclusion: SV during pregnancy is generally seen in multiparous women in the third trimester. The typical clinical presentation involves a triad of abdominal pain, distension, and constipation. Flexible endoscopic detorsion is the first-line treatment in the absence of peritonitis or bowel gangrene. For gangrenous cases, emergent sigmoid resection with diverting colostomy or primary anastomosis is performed, and surgical detorsion is reserved for nongangrenous cases. Effective resuscitation and prompt treatment improve the generally poor prognosis.

Key words: Sigmoid colon, volvulus, pregnancy

Gebelikte sigmoid volvulus

Amaç: Sigmoid volvulus (SV) gebelikte nadir görülen bir komplikasyondur. Bu çalışma 9 olgunun klinik sonuçlarını gözden geçirmektedir.

Yöntem ve gereç: Hastaların klinik kayıtları retrospektif olarak değerlendirildi.

Bulgular: Hastaların yaş dağılımı 24-39 arasındaydı (ortalama 30,6 yıl). Tüm hastalar multipar olup 6 hasta (% 66,7) SV tanısı konduğunda üçüncü trimestirdiydi. Başlıca klinik göstergeler tüm hastalarda (% 100,0) karın ağrısı/hassasiyeti, gaz-gaita çıkaramama ve şişkinlikti. Klinik muayeneye dayanarak doğru tanı, olguların % 66,7'sinde konuldu. Endoskopik detorsiyon, % 83,3'lük başarı oranı ile 6 hastada (% 66,7) uygulandı. Acil ameliyata 4 hastada (% 44,4) gerek duyuldu ve % 25,0 cerrahi ölüm ve komplikasyon oranları ile sonuçlandı.

Sonuç: Gebelik esnasında SV, genellikle multipar kadınlarda ve üçüncü trimesterde görülür. Tipik klinik sunum, karın ağrısı, şişkinlik ve kabızlık üçlüsünü kapsar. Peritonit ya da barsak gangreni yoksa, fleksibl endoskopik detorsiyon ilk tedavi seçeneğidir. Gangrenli olgularda, saptırıcı kolostomi veya primer anastomoz ile birlikte acil sigmoid kolon rezeksiyonu yapılırken, detorsiyon gangrensiz olgularda uygulanır. Etkili resusitasyon ve uygun tedavi genel olarak kötü olan prognozu düzeltebilir.

Anahtar sözcükler: Sigmoid kolon, volvulus, gebelik

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Department of General Surgery, Faculty of Medicine, Atatürk University, Erzurum - TURKEY

Correspondence: Sabri Selçuk ATAMANALP, Department of General Surgery, Faculty of Medicine, Atatürk University, Erzurum - TURKEY

E-mail: ssa@atauni.edu.tr

Introduction

Intestinal obstruction during pregnancy is a rare complication (1). Although sigmoid volvulus (SV), the wrapping of the sigmoid colon around itself and its mesentery, is one of the most common causes of intestinal obstruction during pregnancy (2), it is a rare condition. As of 2008, fewer than 80 cases had been reported in the literature (3). Delay in diagnosis and treatment of SV during pregnancy frequently leads to significant maternal and fetal mortality and morbidity (4). In this article, we report on our 44.5 years of experience and 9 cases of pregnancy complicated by SV in Eastern Anatolia, Turkey, a region in which SV is endemic.

Materials and methods

We retrospectively reviewed the clinical records of 159 female patients with SV, including 9 pregnant women, who were treated under emergency conditions in the Department of General Surgery of the Faculty of Medicine of Atatürk University over the 44.5-year period between June 1966 and January 2011. The age, gender, comorbidities, SV recurrence, duration of symptoms, clinical and endoscopic findings, diagnosis, treatment modalities, mortality, morbidity, and length of hospitalization were noted.

After resuscitation, maternal/fetal examination, and tocolytic agent administration or delivery with oxytocin augmentation in some patients, stable patients, those in whom peritonitis or bowel gangrene was not present, underwent rigid or flexible endoscopy for both diagnostic and therapeutic purposes. In detorsioned patients, a rectal tube was placed in the sigmoid colon, and the tube was withdrawn 12 or 24 h later. We avoided abdominal radiography to prevent radiation risks to the fetus. Emergency surgery was performed for those patients with muscular guarding or rebound tenderness upon clinical examination or with uncertain diagnoses. Patients who did not have evidence of gangrene underwent detorsion, whereas resection with stoma or primary anastomosis was used in gangrenous cases. Patients who experienced successful endoscopic or operative detorsion were recommended for elective surgery in the postpartum period.

Fisher's exact and Mann-Whitney tests were used for statistical analysis. Statistical significance was set at $P < 0.05$.

Results

Of the total 921 SV cases, 159 (17.3%) were female and 43 (4.7%) were of reproductive age. Among these cases, 9 female patients (5.7% of the total female patients and 20.9% of the fertile patients) were pregnant at the time of SV diagnosis. The characteristics of the female patients are given in Table 1, and individual data about the pregnant patients are given in Table 2. The pregnant patients' ages were between 24 and 39 years (mean: 30.6 years). All patients were multiparous, 6 patients (66.7%) were in the third trimester, 2 (22.2%) were in the second trimester, and 1 (11.1%) was in the first trimester. Of these 9 patients, 1 (11.1%) had an associated disease (chronic obstructive pulmonary disease), and 1 had recurrent volvulus. Although rates were lower in pregnant patients, the differences between the pregnant and nonpregnant patients were not statistically significant (11.1% versus 24.7% and 11.1% versus 19.3%, respectively; $P > 0.05$).

The mean period between the onset of symptoms and admission to the hospital was 29.3 h (range: 12-72 h). The mean duration of symptoms was shorter for pregnant women than nonpregnant female patients (29.3 h versus 39.9 h, $P < 0.05$). Among the patients, 1 (11.1%) suffered from shock; 9 patients (100.0%) had abdominal pain, obstipation, and distention; and 7 (77.8%) had vomiting. Upon clinical examination, abdominal tenderness and distention were noted in 9 patients (100.0%), while abnormal bowel sounds were reported in 7 (77.8%), empty rectal vault in 3 (33.3%), muscular guarding with rebound tenderness and fever in 2 (22.2%), and melanic stool in 1 (11.1%). When SV was endoscopically and/or surgically confirmed, the correct diagnosis was made in 6 patients (66.7%) based on the medical history and clinical examination. Although the clinical features were less diagnostic in pregnant patients, the difference in the diagnosis rate was not statistically significant (66.7% versus 76.0%, $P > 0.05$). Misdiagnoses of SV were later revealed to be mechanical intestinal obstruction.

Table 1. Characteristics of this series of female patients with sigmoid volvulus.

Characteristic	Pregnant patients	Nonpregnant patients	Statistical analysis
Number	9/159 (5.7%)	150/159 (94.3%)	-
Associated disease*	1/9 (11.1%)	37/150 (24.7%)	Fisher's exact test, P > 0.05
History of torsion	1/9 (11.1%)	29/150 (19.3%)	Fisher's exact test, P > 0.05
Symptom duration (h)	12-72 (mean: 29.3)	12-168 (mean: 39.9)	Mann-Whitney test, P < 0.05
Shock	1/9 (11.1%)	19/150 (12.7%)	Fisher's exact test, P > 0.05
Diagnostic value of the clinical features	6/9 (66.7%)	114/150 (76.0%)	Fisher's exact test, P > 0.05
Nonoperative detorsion	6/9 (66.7%)	104/150 (69.3%)	Fisher's exact test, P > 0.05
Success of nonoperative detorsion	5/6 (83.3%)	83/104 (79.8%)	Fisher's exact test, P > 0.05
Emergency surgery	4/9 (44.4%)	71/150 (47.3%)	Fisher's exact test, P > 0.05
Mortality of emergency surgery	1/4 (25.0%)	11/71 (15.5%)	Fisher's exact test, P > 0.05
Morbidity of emergency surgery	1/4 (25.0%)	24/71 (33.8%)	Fisher's exact test, P > 0.05
Hospitalization period of emergency surgery (days)	8-15 (mean: 10.7)	5-48 (mean: 11.8)	Mann-Whitney test, P > 0.05

*: chronic obstructive pulmonary disease, hypertension, cardiac or coronary disease, diabetes mellitus, neurological diseases, renal insufficiency

Table 2. The characteristics of pregnant patients with sigmoid volvulus.

No.	Age	Trimester	Recurrent volvulus	Comorbidity	Symptom period (h)	Shock	Bowel gangrene	Endoscopic detorsion	Operation	Mortality	Morbidity	Stay period (days)
1	36	Third	-	-	24	-	-	-	Detorsion	-	Wound infection	15
2	26	Second	-	-	36	-	-	Successful	-	-	-	2
3	39	Third	-	COPD	72	+	+	-	Resection, colostomy	First day, toxic shock	-	-
4	30	Third	-	-	20	-	-	Unsuccessful	Detorsion	-	-	8
5	31	Third	-	-	24	-	-	Successful	-	-	-	2
6	27	Second	-	-	36	-	+	-	Resection, anastomosis	-	-	9
7	24	Third	-	-	12	-	-	Successful	-	-	-	2
8	33	First	+	-	22	-	-	Successful	-	-	-	1
9	29	Third	-	-	18	-	-	Successful	-	-	-	1

COPD: chronic obstructive pulmonary disease

Rigid or flexible endoscopy was performed in 6 patients (66.7%). After delivery with oxytocin augmentation, 1 patient, who was at 38 weeks gestation upon presentation with SV, underwent this procedure. The procedure was performed successfully in 5 patients (83.3%), and the success rate for pregnant patients was statistically similar to that of the nonpregnant patients (83.3% versus 79.8%, $P > 0.05$). Emergency surgery was required in 4 patients; 1 patient underwent emergency laparotomy after unsuccessful endoscopy and 3 were taken to surgery as the initial treatment. One of the 2 gangrenous patients was treated by sigmoid resection with Hartmann's colostomy, and the other underwent sigmoid resection with primary anastomosis. Detorsion was the sole surgical procedure used to treat 2 patients with no bowel gangrene.

One pregnant patient with SV died because of toxic shock. The surgical mortality rate was 25.0%, and the total mortality rate was 11.1%. Although the postoperative mortality rate was higher in pregnant patients, the difference was not statistically significant (25.0% versus 15.5%, $P > 0.05$). In the case of the fatality, the fetus was delivered stillborn in the early postoperative period. A wound infection developed in 1 patient, resulting in a surgical morbidity rate of 25.0%. The postoperative morbidity rates were similar in pregnant and nonpregnant patients (25.0% versus 33.8%, $P > 0.05$). The mean duration of hospitalization was 1.6 days for patients treated nonoperatively and 10.7 days for those who underwent surgical treatment. The mean postoperative hospitalization periods were similar for surgically treated pregnant and nonpregnant patients (10.7 days versus 11.8 days, $P > 0.05$).

Elective treatment in the postpartum period was recommended for 7 patients who had undergone successful endoscopic or operative detorsion. One patient opted for definitive treatment and underwent sigmoid resection with anastomosis. Early recurrence in the hospitalization period was not seen, while late recurrence occurred in one patient with nonoperative detorsion, and she was treated surgically.

Discussion

SV is less common in females, at ratios ranging from 1:2 to 1:10 (5-7). In addition to sigmoid mesocolon that is longer than wide, or dolichomesocolic, which is common in males and causes SV (5,6), the major causes of this distribution are capacious pelvis with lax abdominal wall, which is common in females and allows spontaneous untwisting of SV (5), and irregular emptying with fecal overload, which is common in males and predisposes to SV (5,7).

Intestinal obstruction during pregnancy, which was first reported by Houston in 1830, is a rare complication with an incidence ranging from 1 in 1500 to 1 in 66,431 deliveries (8). SV is the first (1,9) or second (8,10) most common cause of intestinal obstruction during pregnancy, occurring at rates between 24% and 44%. SV occurs more commonly in pregnant than in nonpregnant women (6,9). Of female SV patients, various studies have reported the percentage of pregnant patients to be between 3.1% and 12.5% in different series (2,11,12). In this study, 5.7% of the women were pregnant. Although some cases are likely not reported (13), only 87 cases have been reported in the literature (3,4,10,12,14-18) since the first report by Braun in 1885 (1,14,16). One report describes SV in a patient with an ectopic pregnancy (19). Together with the present report, which is among the largest series of SV in a pregnant population, the total number of reported cases worldwide rose to 96 in 2011 (Table 3).

According to reports from the last few years, affected women were 15 to 35 years of age, nearly 75% of them were multiparous, and approximately 66% were in the third trimester (1-4,10,14-17,20). Our series showed similar characteristics. Pregnancy itself increases the likelihood of SV because the enlarged uterus causes a redundant sigmoid colon, pushes the sigmoid colon out of the pelvis, and causes twisting (1,6,14-17). In addition, since the abdominal wall tonus is minimal in multiparous females (15) and the size of the uterus is maximal in the third trimester (10), the disease occurs more commonly in multiparous females in the third trimester. Furthermore, serious comorbidities and recurrent disease are reportedly less commonly for pregnant patients with SV (1-4,10,14-17), possibly because these patients are younger than the nonpregnant population.

Table 3. Reports of pregnant patients with sigmoid volvulus.

Author(s)	Year	Number
Harer and Harer, Lazaro et al., Keating and Jackson, Lord et al., Joshi et al. (14)	Before 2005	76
De and De (14)	2005	1
Alshawi (16)	2005	1
Dua et al. (15)	2007	1
Iwamoto et al. (4)	2007	1
Heis et al. (12)	2008	1
Narjis et al. (3)	2008	1
Vo et al. (10)	2008	1
Mirza et al. (17)	2009	1
Kolusari et al. (18)	2009	3
Present series	2011	9
Total	Until 2011	96

The mean duration of symptoms for pregnant patients in the literature is 48 h (1), with a range from 1 h to 3 days (1,3,10,14,15,20). In our series, pregnant patients experienced a shorter duration of symptoms than described in the literature and shorter than that of the nonpregnant patients. The enlarged uterus narrows the intraabdominal area, which may cause symptoms to appear earlier in pregnant patients.

The typical symptoms of SV are intermittent, severe, diffuse, or lower abdominal pain; distention; and worsening, severe constipation. In addition to the above triad, nausea, vomiting, or retching may be seen in some patients. The common signs of SV are abdominal tenderness, distention, hyperkinetic or hypo/akinetic bowel sounds, empty rectum, fever, and dehydration (1,3,4,10,14,17). Some authors assert that abdominal pain, nausea, and vomiting, which are normal findings in pregnancy, may cloud the clinical picture, and, therefore, the clinical features are less diagnostic in pregnant SV patients (1,4,10,16). In our experience, the clinical features of SV in pregnant patients are not difficult to distinguish because abdominal pain in SV is severe, and nausea and

vomiting are not prominent pregnancy symptoms outside of the first trimester.

In laboratory investigations, leukocytosis is common, but not pathognomonic, in pregnant women with SV (1,4,10,14). Although a single plain abdominal X-ray may be used in a few necessary cases (4,20), it is generally avoided because of the radiation risks to the fetus (1,10,17). In contrast, abdominal and obstetric ultrasonography may eliminate other potential pathologies, in addition to providing information about the fetus (10).

Although the diagnosis of SV is suspected when a pregnant woman presents with a clinical triad of abdominal pain, distension, and constipation, proper diagnosis is often delayed because SV in pregnancy is rare, clinical features are not specific, and providers avoid diagnostic radiographic studies (1,4,10,14,16). Usually, nonspecific clinical diagnosis of intestinal obstruction is made (14,17), as occurred in our series.

The management of SV in pregnancy requires a multidisciplinary approach involving general surgeons, obstetricians, and neonatologists (10). An early and effective resuscitation is necessary,

involving fluid replacement, electrolyte balance correction, prophylactic antibiotic, and nasogastric decompression. Tocolytics can be used if uterine irritability is observed, and steroids can be used to promote fetal lung maturity. Induction of delivery in mature pregnancies or abortion in patients with a dead fetus before nonoperative or operative treatment is controversial and is dependent on maternal and fetal conditions (1,10). Although it would seem reasonable to attempt nonoperative detorsion with flexible endoscopy as the initial treatment in the absence of peritoneal irritation or bowel ischemia and gangrene signs (1,3,16,17), endoscopic decompression is often unsuccessful in patients, except for patients in the first trimester, since the enlarged uterus acts as a mechanical impediment (10,14,20). In contrast to these reports, we used endoscopic detorsion with a high success rate in our pregnant patients with first, second, and third trimester pregnancies, and the success rate was found to be statistically similar to that of the nonpregnant patients. Therefore, we recommend gentle flexible endoscopy under careful premedication and monitoring as the primary choice for treatment of SV in pregnant patients without bowel gangrene and perforation.

In SV during pregnancy, emergency surgery is required for patients with peritonitis, bowel gangrene, or perforation, or those for whom endoscopic detorsion is unsuccessful (1,10,14,15,19,20). In surgical treatment, a standard midline incision allows maximal exposure with minimal uterine manipulation (1,10). Cesarean procedures for operative management in mature pregnancies are controversial, and the decision regarding this approach depends on maternal and fetal conditions (10). In gangrenous cases, the nonviable sigmoid colon must be resected and a diverting colostomy added (1,3,10,20). Although some authors discourage primary anastomosis (20), we feel that it may be performed if the patient and fetus are stable, and it is technically possible, particularly in patients in the first and second trimesters. If the sigmoid colon

is viable, sigmoidostomy (1) or sigmoidopexy (15) may be performed, but simple detorsion with or without rectal tube placement is generally preferred (1,10,14,15,19). This was the method we chose for our patients.

The prognosis of SV in pregnancy is poor. Globally, from 1900 to 1937, the maternal mortality rate was 21%-60% and the fetal mortality rate was 50% (8,13,16). In recent years, the maternal mortality has decreased to 6%-12% and fetal mortality to 20%-26% (13). The major causes of maternal mortality are toxic and/or hypovolemic shock, whereas impairment of placental blood flow due to increased intraabdominal pressure affects fetal mortality (10,11).

SV tends to recur during or after pregnancy in detorsioned cases (1,14,16). Although elective surgery in the second trimester has been recommended by some authors (16), it is generally advocated 2 or more weeks after delivery (1,14). In elective surgery, sigmoid resection with anastomosis is the preferred procedure (21).

In conclusion, SV during pregnancy is a rare complication. It is generally seen in multiparous women and in the third trimester. Suspicion is raised for this condition in a pregnant patient who presents with a clinical triad of severe abdominal pain, distension, and constipation. Although the normal findings of pregnancy, including abdominal pain and vomiting, are thought to cloud the clinical picture, the abdominal pain of SV is severe. Furthermore, nausea and vomiting are prominent symptoms only in early pregnancy. It seems reasonable to attempt flexible endoscopic detorsion as the initial treatment in the absence of peritonitis or bowel gangrene. When emergency surgery is needed, sigmoid resection with diverting colostomy or primary anastomosis is used in gangrenous cases, while detorsion is preferred in nongangrenous cases. SV in pregnancy has a poor prognosis. Effective resuscitation and prompt treatment minimize maternal and fetal mortality and morbidity.

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