



Sigmoid Volvulus: 10-year Report from Maharat Nakhon Ratchasima Hospital

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Abstract

Introduction: Sigmoid volvulus, the torsion or twisting of the sigmoid colon on its mesenteric pedicle, is an uncommon cause of colonic obstruction in adults. This study aimed to review patient characteristics and outcomes of sigmoid volvulus at Maharat Nakhon Ratchasima Hospital, Thailand.

Methods: Retrospective medical record reviews were conducted for adult patients (age \geq 18 years) who had been diagnosed with sigmoid volvulus from January 2010 to December 2019. Data were analyzed using the Stata program.

Results: Forty-two patients were diagnosed with sigmoid volvulus during the 10-year period; 34 (80%) were males with an average age of 64.6 \pm 11.7 years. The two most common comorbidities were hypertension (33.3%) and bedridden status (14.2%). Colonoscopic detorsion was attempted in 17 patients (40.5%) and was successful in 13 of 17 patients (success rate 76.5%). Sigmoidectomy was performed in 32 patients, including 5 cases of elective surgery after colonoscopic detorsion and 27 cases of urgent surgery or failed detorsion. Primary anastomosis was done in 15 patients and end colostomy was done in 17 patients. The 30-day mortality rate was 9.5%. Sigmoid necrosis was associated with a risk of mortality (P=0.018). Cases presenting between 2015-2019 had a significantly higher rate of colonoscopic detorsion and less sigmoidectomy with end colostomy than those presenting between 2010-2014.

Conclusion: Our data indicate that a move toward standard management of sigmoid volvulus can be seen in our hospital. Endoscopic detorsion should be the initial management of patients without peritonitis. Sigmoidectomy should be done in the same index admission.

Keywords: Sigmoid disease, Volvulus, Thailand

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Introduction

Sigmoid volvulus, the torsion or twisting of the sigmoid colon on its mesenteric pedicle, is an uncommon cause of colonic obstruction in adults. Sigmoid volvulus patients typically present in the

sixth to eighth decades of life (mean age of 70 years) and usually have chronic medical diseases, neurological disorders, or paralysis (1). Since 1947 (2), endoscopic detorsion has become the standard initial management when peritonitis is absent. Due to a high recurrence rate, operative intervention

(preferably sigmoidectomy) should be considered during the index admission (3). Sigmoid volvulus accounts for roughly 5% and 50% of large intestine obstructions in developed countries and developing countries, respectively (4). There have been fewer reports of sigmoid volvulus in Thailand.

This study aimed to review patient characteristics and outcomes of sigmoid volvulus at Maharat Nakhon Ratchasima Hospital, the largest public hospital in Thailand, over a 10-year period.

Methods

Patients

After obtaining ethical approval from the Maharat Nakhon Ratchasima Hospital Institutional Review Board, retrospective medical record reviews were conducted for adult patients (age ≥ 18 years) who had been diagnosed with sigmoid volvulus from January 2010 to December 2019 at the Maharat Nakhon Ratchasima Hospital, Thailand.

Outcome Measurement and Data Collection

Primary outcomes included the characteristics and outcomes of treatment in patients who had been diagnosed with sigmoid volvulus. Therefore, the collected data included patients' characteristics, investigations for diagnosis, operative details, and postoperative outcomes. Medical records of patients who had been diagnosed with sigmoid volvulus from January 1st, 2010 to December 31st, 2019 were retrieved from the Maharat Nakhon Ratchasima Hospital database.

Statistical Analysis

Data were prepared and compiled using the Stata program version 16 for Windows. Continuous variables were expressed as mean \pm standard deviation and were compared using the student t-test or Mann-Whitney U test. Categorical data were expressed as numbers (percentages) and were compared using the Pearson chi-square test or Fisher's exact probability test. A P value of <0.05 was considered statistically significant.

Results

Forty-two patients were diagnosed with sigmoid volvulus during the 10-year period. Of them, 34 (80%) were males with an average age of 64.6 \pm 11.7 years. The youngest patient was 33 years old and there was no report of sigmoid volvulus in patients less than 18 years of age. Males were slightly older than females (66 vs. 54 years). Ninety percent of patients were 50 years or older and 35 percent were over 70. The two most common comorbidities were hypertension (33.3%) and bedridden status (14.2%) (Table 1).

The duration of symptoms ranged from 1 to 10 days (average 3.8 days). All patients complained of

abdominal pain with constipation or obstipation. On physical examination, all patients had abdominal distension and five patients (11.9%) also had signs of peritonitis. Five patients (11.9%) had a fever and 15 (33.6%) patients had leukocytosis. Notably, 33 patients (78.6%) were diagnosed with sigmoid volvulus with plain abdominal radiography showing the classic "coffee bean" sign. However, 9 patients (21.4%) had equivocal plain radiography and were diagnosed with sigmoid volvulus after undergoing an abdominal CT scan.

Colonoscopic detorsion was attempted in 17 patients (40.5%) and was successful in 13 of 17 patients (success rate 76.5%). Colonoscopic detorsion failed in two patients and was stopped in another two cases after mucosal necrosis was observed; all of them subsequently underwent exploratory laparotomy. Of the 13 patients who had successful detorsion, only 5 patients (38.5%) underwent sigmoidectomy with primary anastomosis in the same index admission. The most common reason for not performing surgery after colonoscopic detorsion was the patient not consenting to surgery. At follow-up, 3 of 8 patients (37.5%) who denied surgery had a recorded recurrence of sigmoid volvulus at intervals ranging from 53 to 253 days.

Twenty-five patients (59.5%) underwent exploratory laparotomy without colonoscopic detorsion. Of them, 5 patients (20%) presented with signs of peritonitis. The reason for not performing colonoscopic detorsion was not recorded in 20 patients. Sigmoid gangrene was found in 5 patients (20%) and sigmoidectomy with end colostomy was performed in all of these cases. Sigmoidectomy with primary anastomosis was performed in 8 patients (32%) and mesosigmoidopexy was performed in 2 patients (8%). One patient who underwent mesosigmoidopexy had a recorded recurrence of sigmoid volvulus at 20 months after surgery.

Overall, sigmoidectomy was performed in 32 patients, including 5 cases of elective surgery after colonoscopic detorsion and 27 cases of urgent surgery or failed detorsion. Primary anastomosis was done in 15 patients and end colostomy was done in 17 patients. Reasons for performing end colostomy were: sigmoid necroses (five cases), bedridden status (one patient), and unknown (11 cases). There was no leakage in the primary anastomosis group and no recurrence after follow-up. In the end colostomy group, the colostomy closure rate was 58% (10 of 17 patients) with a complication rate of 40% (3 cases of postoperative ileus and 1 case of anastomosis stricture).

The overall 30-day mortality rate was 9.5% (4 of 42 patients), while the mortality rate for emergency surgery was 10.3% (3 of 29 patients). Chi-square analysis showed that the presence of sigmoid necrosis was significantly associated with the risk of mortality ($P=0.018$).

We performed further analysis between the two groups of patients who presented in 2010-2014

Table 1: Characteristics and outcomes

	All (n=42)	Alive (n=38)	death (n=4)	P value
Male (%)	34 (80%)	31 (81%)	3 (75%)	0.586
Age (years)	64.6±11.7	65.2±11.9	59.2±8.2	0.127
BMI	20.7±3.5	20.6±3.5	21.8±2.1	0.177
Comorbidities				
DM	3 (7.1%)	2 (5.2%)	1 (25%)	
HT	14 (33.3%)	13 (34.2%)	1 (25%)	
CKD	1 (2.4%)	1 (2.6%)	0	
COPD	3 (7.1%)	3 (7.9%)	0	
Bedridden status	6 (14.2%)	4 (10.5%)	2 (50%)	
Symptoms (days)	3.8±1.9	3.9±2.0	2.7±0.9	0.082
Mean blood pressure (mmHg)	101.7±20.2	101.5±20.0	104.0±24.5	0.425
Pulse rate	84.9±20.4	84.8±21.2	86.2±13.2	0.427
Body temperature	36.8±0.6	36.7±0.5	37.2±1.2	0.076
Peritonitis	5 (11.9%)	3 (7.9%)	2 (50%)	0.063
WBC	10,938±4,041	11,052±4,132	9,850±3,307	0.286
Diagnosis by				0.366
X-ray only	33 (78.6%)	29 (76.3%)	4 (100%)	
CT	9 (21.4%)	9 (23.7%)	0	
Colonoscopic detorsion				0.411
Not done	25 (59.5%)	23 (65.5%)	2 (50%)	
Completed	13 (30.9%)	12 (31.6%)	1 (25%)	
Failed	2 (4.8%)	2 (5.2%)	0	
Seen gangrene	2 (4.8%)	1 (2.6%)	2 (25%)	
Sigmoid necrosis	8 (19.5%)	5 (13.2%)	3 (75%)	0.018
Surgery				0.375
Not done	8 (19%)	7 (18.5%)	1 (25%)	
Sigmoidectomy with anastomosis	15 (35.7%)	15 (39.5%)	0	
Sigmoidectomy with Hartmann's	17 (40.5%)	14 (36.8%)	3 (75%)	
Mesosigmoidoplasty	2 (4.8%)	2 (5.2%)	0	
Complications				
Wound infection	2	1	1	
CVS	3	0	3	
RS	2	2	0	
PO ileus	5	4	1	
Length of stay (days)	7.5±4.1	7.7±4.2	6±2.7	0.157

and 2015-2019 (Table 2). Initial treatment with colonoscopic detorsion was significantly higher in the latter group (5% vs 72.7%; $P < 0.001$), with a success rate of 75%. The rate of sigmoidectomy with end colostomy was also lower in the latter group (60% vs 22.7%; $P = 0.375$). However, complications, length of stay, and 30-day mortality rate were not different between the two groups.

Discussion

Sigmoid volvulus is a torsion or twisting of the sigmoid colon on its mesenteric pedicle. The concept of intestinal volvulus is based on the fact that when the bowel loops become distended, they also become elongated. The antimesenteric border of the bowel elongates more than the mesenteric border (30% vs 10%) (5). As the bowel distends, it rotates in response to the need to accommodate this disproportionate elongation. In order for the sigmoid colon to twist on itself, it must be long and floppy, with a narrow mesenteric root. Furthermore,

the twist must be at least 180 degrees for significant obstruction to occur (6).

In western countries, sigmoid volvulus is a rare cause of intestinal obstruction, accounting for only 1-7% of cases (1, 7). However, developing countries report a higher incidence of sigmoid volvulus, accounting for 20-79% of intestinal obstruction (8-10). Sigmoid volvulus patients usually present in the 6th - 8th decade of life and typically have chronic medical diseases, neurological disorders, or paralysis. The characteristics, signs, and symptoms of our patients were similar to those of previous reports (11, 12).

Plain abdominal radiographs are usually useful in the initial diagnostic evaluation (3). The "coffee bean sign", "bent inner tube sign", or "northern exposure sign" are considered suggestive of sigmoid volvulus. However, in 30-40% of the cases, plain radiographs can be equivocal. Contrast-enhanced CT imaging is the preferred confirmatory diagnostic study. In our study, about 80% of cases were diagnosed with only plain abdominal radiographs. Contrast-enhanced CT

Table 2: Comparison of cases between 2010-2014 and 2015-2019

	All (n=42)	2010-2014 (n=20)	2015-2019 (n=22)	P value
Male (%)	34 (80%)	15 (75%)	19 (86.4%)	0.294
Age (years)	64.6±11.7	62.2±12.3	66.8±10.9	0.209
BMI	20.7±3.5	21.4±4.1	20.1±2.6	0.261
Comorbidities				
DM	3 (7.1%)	1 (5%)	2 (9.1%)	
HT	14 (33.3%)	5 (25%)	8 (36.4%)	
CKD	1 (2.4%)	0	1 (4.5%)	
COPD	3 (7.1%)	0	3 (13.6%)	
Bedridden status	6 (14.2%)	4 (20%)	2 (9.1%)	
Symptoms (days)	3.8±1.9	3.3±1.5	4.3±2.2	0.092
Mean blood pressure (mmHg)	101.7±20.2	101.9±15.2	101.5±24.2	0.943
Pulse rate	84.9±20.4	85.8±23.2	84.2±18.1	0.804
Body temperature	36.8±0.6	36.9±0.5	36.7±0.6	0.221
Peritonitis	5 (11.9%)	5 (25%)	0	0.018
WBC	10,938±4,041	11,600±5,068	10,336±2,803	0.332
Diagnosis by				0.135
X-ray only	33 (78.6%)	18 (90%)	15 (68.2%)	
CT	9 (21.4%)	2 (20%)	7 (31.8%)	
Colonoscopic detorsion				< 0.001
Not done	25 (59.5%)	19 (95%)	6 (27.3%)	
Completed	13 (30.9%)	1 (5%)	12 (54.5%)	
Failed	2 (4.8%)	0	2 (9.1%)	
Seen gangrene	2 (4.8%)	0	2 (9.1%)	
Sigmoid necrosis	8 (19.5%)	4 (20%)	4 (18.2%)	0.594
Surgery				0.375
Not done	8 (19%)	0	8 (36.4%)	
Sigmoidectomy with anastomosis	15 (35.7%)	6 (30%)	9 (40.9%)	
Sigmoidectomy with Hartmann's	17 (40.5%)	12 (60%)	5 (22.7%)	
Mesosigmoidoplasty	2 (4.8%)	2 (10%)	0	
Complications				
Wound infection	2	1	1	
CVS	3	2	1	
RS	2	1	1	
PO ileus	5	2	3	
Length of stay (days)	7.5±4.1	8.1±4.6	7.0±3.5	0.420
30-day mortality	4 (9.5%)	2 (10%)	2 (9.09%)	0.659

was reserved for those equivocally diagnosed from plain radiographs.

In the absence of colonic ischemia or perforation, the initial treatment of sigmoid volvulus is endoscopic detorsion, which is effective in 60-95% of patients (3). In our study, endoscopic detorsion was attempted in only 40.5% of patients with a success rate of 76.5%. When we performed further analysis, endoscopic detorsion was attempted in only 5% of patients who presented in 2010-2014. However, between 2015-2019, the endoscopic detorsion rate was significantly higher (72.7%). This represents an improvement of our practice towards the standard treatment of sigmoid volvulus; nonetheless, the rates of attempted endoscopic detorsion and success were lower relative to other studies (11, 13,14).

After successful detorsion, a decompression tube should be left in place for a period of 1 to 3 days to maintain the reduction ahead of operative intervention (preferably sigmoidectomy), which should be considered during the index admission or soon thereafter (3). In our study, silicone rectal

tubes were placed in all 13 patients after successful colonoscopic detorsion.

Because sigmoid volvulus often occurs in elderly and fragile patients, many families are reluctant to proceed with definitive surgery. In our study, only 38.5% underwent sigmoidectomy with primary anastomosis in the same index admission. Our rate of elective surgery in the index admission was lower than a previous study (13), resulting in a long-term recurrence rate of 37.5%.

Limitations of this study include the fact that we performed a retrospective analysis from the medical records of many surgeons. The decisions for attempted colonoscopic detorsion or choices of definitive surgery vary between surgeons. This study will prompt our surgeons to manage sigmoid volvulus patients according to practice guidelines (3).

Conclusion

Sigmoid volvulus usually presents in elderly patients. Diagnosis is possible based on history, physical

examination, and imaging. Endoscopic detorsion should be the initial management of patients without peritonitis. Sigmoidectomy should be done in the

same index admission.

Conflicts of interests: None declared.

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