REVIEW OF SIGMOID VOLVULUS: A 5 YEARS EXPERIENCE IN TERTIARY CARE HOSPITAL, VISAKHAPATNAM

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ABSTRACT

BACKGROUND

Sigmoid volvulus is a common cause of large bowel obstruction in developing countries where it affects relatively young people compared to developed countries and its mortality remains significant in patients with late diagnosis. The aim of this work is to assess the clinical presentation, management and outcome of sigmoid volvulus.

MATERIALS AND METHODS

A retrospective clinical study including all the patients treated for sigmoid volvulus in the Department of General Surgery, King George Hospital, Visakhapatnam, from January 2013 to January 2018.

RESULTS

A total of 128 patients (M:F = 3:1) representing 11.63% (128/1100) of all cases of colonic obstruction were studied. The median age at presentation was 52 years. The disease significantly affected the older males compared with females. The majority of the patients 108 (84.37%) presented acutely and had to undergo emergency surgical intervention, the rest were either sub-acute or chronic. The majority of patients, 93 (72.65%) were treated with Hartman's procedure, of which all were emergency cases. Resection and primary anastomosis was offered to 35 (27.35%) cases, of which 15 (42.85%) were emergency with remaining being elective. No patient had sigmoidoscopic derotation and sigmoidopexy. The overall median length of hospital stay was 12 days. Overall morbidity rate was 39.84% (51), surgical site infection being the predominant cause. Overall mortality rate was 14.84% (19). The main predictors of mortality were advanced age (>60 years), concomitant medical illness, late presentation (≥24 hours), presence of shock on admission and presence of gangrenous bowel.

CONCLUSION

Sigmoid volvulus is not uncommon in our setting and commonly affects males than females. Most of the patients presented acutely, requiring immediate resuscitation and surgical approach. Findings from this study suggest that temporary colostomy should be considered if the bowel is gangrenous or perforated or patient conditions precluding primary anastomosis like shock. Early diagnosis and timely definitive treatment are essential in order to decrease the morbidity and mortality associated with this disease.

KEYWORDS

Volvulus, Sigmoid, Colostomy, Hartmann's Procedure.

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BACKGROUND

Volvulus is an abnormal twisting of the bowel on its mesenteric axis greater than 180 degrees,[1] which produces an obstruction of the intestinal lumen and mesenteric vessels. Sigmoid volvulus was first described by Von Rokitansky in 1836.[1] It is a condition in which the sigmoid colon wraps around itself and its own mesentery, causing a closed-loop obstruction which, if left untreated, often results in life threatening complications, such as bowel ischemia, gangrene, and perforation.[2,3] It is an important cause of colonic obstruction worldwide.[1-3] In developed countries, sigmoid volvulus ranks the third among large intestine obstructions following cancer and diverticular diseases.[4] It represents 4% of all cases in developed countries and 50% in developing countries.[5] The aetiology of sigmoid volvulus is multifactorial and controversial.[4,6-9] Those who possess a sigmoid colon with a long loop and narrow base of mesenteric attachment would be more prone to volvulus.[8] Anatomical predispositions, advanced age, a high-fibre diet, medications altering intestinal motility, chronic constipation, neurological or psychiatric illness, pregnancy and megacolon have all been reported in association with development of the condition.[4, 6-9]

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Aims and Objectives

The purpose of this study is to highlight the clinical presentation, management of sigmoid volvulus and its outcome in terms of morbidity and mortality.

MATERIALS AND METHODS

This study was conducted at King George Hospital (KGH) in Visakhapatnam, the capital of North Coastal Andhra Pradesh, during the calendar years 2013-2018. KGH is a 1085 bedded tertiary care hospital rendering services to the people of North Coastal Andhra Pradesh and adjacent districts of Orissa and Chhattisgarh. The hospital has a 24 hours casualty department, 20-bedded surgical intensive care unit, several open wards with capacity for around 250 surgical patients, and equipped with two emergency operating rooms.[10] A retrospective study of 128 patients of sigmoid volvulus was done over a period of last five years (January 2013- January 2018).

Inclusion Criteria

All cases found to have sigmoid volvulus either clinically or by radiological evaluation were included in study.

Exclusion Criteria

All the other causes of large bowel obstruction and pseudo obstruction were excluded.

All cases were studied in terms of clinical presentation, radiological evaluation, operative findings, and postoperative course. Data was collected from outpatient department, casualty records, emergency operation theatre, postoperative ward records, and death records. Data includes gender, age, date of admission, date of surgery, date of discharge or death, date of onset, and type of symptoms, presence of guarding, rebound tenderness or rigidity, abdominal quadrant(s) affected, vital signs on presentation including heart rate, blood pressure and respiratory rate, operative diagnosis, and surgical procedure. The results of initial complete blood counts, results of abdominal ultrasound, x-ray erect abdomen, CECT abdomen, biochemical values (creatinine and potassium values) were also taken into consideration.

RESULTS

Of the 128 cases that were studied, the mean age of presentation was 52 years (range from 35 to 80 years) with majority of patients being males 96 (75%) and the remaining 32 (25%) being females. The male predominance over female (male/female-3:1) is similar to other studies (1, 2). The peak age incidence was in the age group 51-60 years. Sigmoid volvulus represents 11.63% (128/1100) of all cases of colonic obstruction which were studied for 5 years period.

Majority of patients, 108 (84.37%) presented with acute bowel obstruction and the remaining 20 (15.63%) patients presented with sub-acute/chronic bowel obstruction. Among 108 patients who presented with acute intestinal obstruction 49 patients had signs of guarding and rigidity suggestive of peritonitis either due to perforation of colon or ischemic gangrene of colon (Figure 1). The duration of symptoms ranged from 2 to 22 days with a median duration of 9 days. Gross abdominal distension in 120 (93.75%) patients, colicky abdominal pain in 118 (92.18%), constipation in 98 (76.56%), vomiting in 88 (68.75%) and fever in 46 (35.93%) patients were the main symptoms; while dehydration in 68 (53.12%) patients, abdominal tenderness in 60 (46.87%) and visible peristalsis in 62 (48.43%) patients were the main signs. The classic triad of abdominal pain, abdominal distension and constipation was reported in 120 (93.75%) patients. Thirty-one (24.21%) patients were in shock (with a diastolic blood pressure of less than 90 mmHg) on admission (Table 1). Twenty-eight (21.87%) patients had history suggestive of previous episodes, who were treated medically in peripheral hospitals. Among them 8 presented with acute obstruction, who needed emergency treatment. Concomitant medical illness such as respiratory diseases (12), cardiovascular diseases (10), diabetes mellitus (8) and renal diseases (5) was reported in 35 (27.34%) patients.

Figure 1

Figure 2

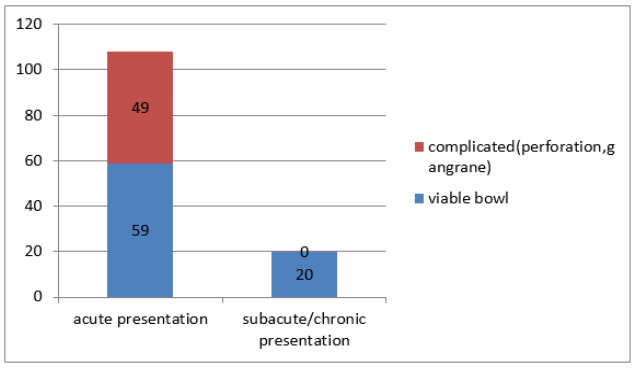

Figure 3. Mode of Presentation of Sigmoid Volvulus

Symptoms and Signs	Number of Patients Affected
Gross abdominal distension	120 (93.75%)
Colicky abdominal pain	118 (92.18%)
Constipation in	98 (76.56%)
Vomiting	88 (68.75%)
Fever	46 (35.93%)
Dehydration	68 (53.12%)
Abdominal tenderness	60 (46.87%)
Visible peristalsis	62 (48.43%)
The classic triad of abdominal pain, abdominal dissention and constipation	120 (93.75%

Table 1. Clinical Presentation

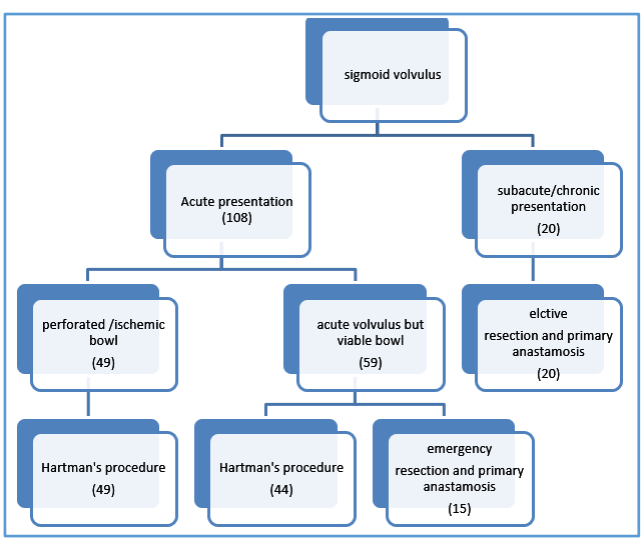

Figure 4. Flow Chart for Management of Volvulus

Postoperative Complications	Frequency
Surgical site infection	29 (56.86%)
Chest infection	15 (29.41%)
Wound dehiscence	1 (1.96%)
Prolonged paralytic ileus	5 (9.80%)
Intraabdominal abscess	1 (1.96%)
Anastamotic leak	0 ( )
Colostomy complications	11 (21.56)

Table 2. Post-Operative Complications (n-51)

Preoperative diagnosis of sigmoid volvulus was made clinically and radiologically which was confirmed at laparotomy. All patients in this study had plain abdominal x-ray films available for review and demonstrated the classical plain abdominal x-ray features of sigmoid volvulus (grossly distended and twisted sigmoid loop filling the abdomen, with multiple air fluid levels and the 'omega' or 'coffee bean' sign; bent inner tube appearance) in 82 (64.06%) patients. Abdominal computed tomography (CT) was performed in only 10 (12.8%) patients and demonstrated a twisted and dilated sigmoid colon with whirled sigmoid mesentery, in addition to twisted and dilated small intestinal segments. None of our patients had sigmoidoscopy for diagnosis of sigmoid volvulus.

All patients were resuscitated starting with insertion of two 16-gauge intravenous cannulas, nasogastric tube, and Foley's catheter. All patients received adequate fluid replacement, analgesic support, and adequate antibiotic coverage depending upon the local sensitivity of organisms. With the confirmation of the initial diagnosis of sigmoid volvulus, emergency laparotomy was performed in 108 patients. The peritoneal cavity was irrigated with an average of 3 litres of warm normal saline and drains were left in abdomen and wound was closed in layers. Patients were monitored postoperatively for recovery and early detection and management of complications.

All the 128 patients underwent laparotomy. The majority of them, 108 (84.37%) were operated on emergency basis and required immediate resuscitation and relief of the sigmoid obstruction, while 20 (15.63%) patients had an elective surgery. Among the 108 cases that underwent emergency laparotomy 49 cases had gangrenous/ perforated bowel due to closed loop obstruction; all were treated with Hartman's procedure. Among the 59 cases of 108 who had viable bowel, 44 were treated with Hartman's procedure; remaining 15 cases were treated with resection and primary anastomosis. All the patients who presented with sub-acute obstruction/chronic were treated with primary resection and anastomosis. The majority of patients, 93 (72.65%) were treated with end colostomy, of which all were emergency cases. Resection and primary anastomosis was offered to 35 (27.35%) cases. Among these 35 emergency cases were 15 and the remaining 20 were operated on selective basis (Figure -2). None of our patients in this study had sigmoidoscopic derotation or laparotomy and sigmoidopexy.

A total of 51 (39.84%) patients developed postoperative complications, of which surgical site infection was the most common accounting for 56.86% (29 cases). Complication rate was significantly higher in emergency operations than in elective operations (29.9% versus 10.6%) and in patients with gangrenous bowel undergoing bowel resection (41.1% v/s 10.2%). All complications resolved on conservative treatment alone except in one patient who required re-operation for wound dehiscence with intra-abdominal abscess. The length of hospital stay (LOS) ranged from 4 to 34 days with a median of 12 days. The length of hospital stay was significantly longer in patients with advanced age,

concomitant medical illness and presence of complications (Table-2).

Mortality rate in this study was 14.84% (19 cases); all deaths are in postoperative period and no intraoperative mortality. All deaths belonged to emergency group, who were complicated with perforation or gangrenous bowel and no mortality in patients who are treated with primary resection and anastomosis. Most common cause of death was septic shock with MODS complicated by surgical stress followed by pneumonia. Mortality was more in patients with complicated sigmoid volvulus, cases operated in emergency setting and pre-existing medical illness. Most deaths occurred within 48 hrs of surgery. According to multivariate logistic regression analysis, advanced age (>60 years), concomitant medical illness, late presentation (≥24 hours), presence of shock on admission and presence of gangrenous bowel were significantly associated with mortality.

Out of the 109 survivors 74 were discharged with colostomies and 35 were discharged without colostomies. All patients who presented for colostomy closure were evaluated with colonoscopy.

DISCUSSION

Since it was first described by von Rokitansky in 1836,[1] sigmoid volvulus remains a major cause of colonic intestinal obstruction, which results from twisting of the sigmoid colon on its own mesentery.[2] Globally, sigmoid volvulus shows geographic variation being higher in developing countries than in developed world.[2,4,7] It accounts for 2% to 5% of colonic obstructions in Western countries and 20% to 50% of obstructions in Eastern Countries.[4,7] In this study, sigmoid volvulus accounted for 11.63% of all diagnosed colonic obstruction seen during the study period in our setting. This concurs with figures of 14.1% that was reported by Jumbi and Kuremu[11] in Kenya. There is no satisfactory explanation for the geographical distribution. It has been suggested that high fiber diet may contribute to the high incidence in eastern countries where the high fiber results in heavy loading of the sigmoid colon.[12,13] Most often this condition is observed in adults, but the age at which it is most common also varies geographically. In developing countries, a man aged between 40 and 60 years is usually reported, whereas in developed countries, the mean age is between 60 and 70 years.[5,14] As reported in other studies,[11,14,15,16] the median age of 52 years in this study was younger than the age described in most developed countries; about 10 years difference has been noted. We could not establish the reason for this age differences.

The male predominance demonstrated in this study was in keeping with previous observations reported in studies performed elsewhere.[11,14,15,16] There is a marked over-all preponderance of male patients with sigmoid volvulus, with a reported ratio of 2.5-9.1:1 (male: female). It is suggested that the more spacious female pelvic area allowed a greater possibility of spontaneous reduction of a beginning volvulus.[17] Another predisposing factor is the mesocolon, which is longer in men but wider in women.[8] Clinically, sigmoid volvulus may present acutely as an emergency or subacutely especially when it is associated with recurrent symptoms of constipation and distension. As reported by other authors in developing countries,[15,16] more than eighty percent of patients in this study presented with acute bowel obstruction. In developing countries like ours where over 60% of the population cannot afford hospital treatment, patients seek hospitalization only when they had developed irreversible intestinal obstruction.[13-15] This observation is reflected in our study where around 84.37% of patients presented late with acute intestinal obstruction and bowel perforations. This delayed presentation increases morbidity and mortality many-folds, as is evident from our results. We could not establish the reasons for the late presentation in this study, but it is likely attributed to the lack of awareness of condition in patient and treating doctor, lack of transportation and health care facilities in rural area. The clinical presentation of sigmoid volvulus in our patients is not different from those in other studies,[3-5,11,16] with abdominal pain, constipation and abdominal distension being common to all the patients. In this study, the classic triad of abdominal pain, abdominal distension and constipation was reported in 120 (93.75%) of the patients.

The diagnosis of acute sigmoid volvulus is established by clinical and radiological findings. In the majority of patients, a thorough physical examination and abdominal radiographs are adequate to achieve the diagnosis. Typical symptoms include sudden abdominal pain and distension followed by constipation. The most common signs are abdominal tenderness and asymmetrical abdominal distension. Other findings include abnormal bowel sounds, abdominal tympani, empty rectum, and dehydration.[18] Plain radiographs are diagnostic in 82 (64.06%) of cases in our study which is comparable to other studies with 57%-90% of results.[19,20] The classical sign of acute sigmoid volvulus is the coffee bean sign and bent inner tube appearance. Abdominal Computed Tomography (CT) usually reveals a dilated colon with an air/fluid level and the "whirl sign", which represents twisted colon and mesentery.[21] The classical plain abdominal x-ray features of sigmoid volvulus in this study were demonstrated in more than three quarters of patients. Abdominal CT scan was performed in 12.8% (10) of cases.

Initial non operative management that is, sigmoidoscopic decompression as advocated by Bruudsgaard,[21] followed by semi-elective sigmoidectomy and primary anastomosis has been widely accepted as standard management.[14,22] The non resectional procedures such as sigmoidopexy and mesosigmoidoplasty have lower morbidity and mortality rates but have high incidence of recurrence.[22] Where the decompression fails and there are signs of colonic gangrene, sigmoid resection and Hartmann's procedure or double barrelled colostomy is done to avoid the high mortality associated with primary anastomosis in this situation.[22,23] Recently laparoscopic resection has been used in high-risk or elderly patients who may not tolerate conventional surgery.[23] A more critical appraisal is however needed for its general use. The treatment of choice at this time is resection with primary anastomosis in patients with

viable sigmoid colon and Hartmann's procedure in those with gangrenous bowel.[24] Recurrence of sigmoid volvulus among patients treated with non-operative approach is a common happening which ought to influence the choice of procedure to be performed. Many authors now prefer one stage primary resection and anastomosis procedure and colostomy if there are complications. Colostomy is often advised in cases where the gut is gangrenous and medical conditions precluding anastomosis.[15,16] In the present study, the majority of patients (72.65%) were treated with colostomy of which all patients were emergency cases. Among them 49 cases underwent colostomy due to gangrenous bowel, 44 cases with viable bowel underwent colostomy in view of conditions precluding the primary anastomosis. Resection and primary anastomosis was offered to 27.35% of cases who had viable bowel, stable, no pre-existing medical conditions (figure-2).

The presence of complications has an impact on the final outcome of patients presenting with bowel obstruction due to sigmoid volvulus. In keeping with other studies,[11,14,16] surgical site infection was the most common postoperative complications in the present study (table-2). In our series, the complication rate was significantly higher in emergency operations than in elective operations and in patients with gangrenous bowel undergoing bowel resection. The median duration of hospital stay in our study was 12 days, which is higher than that reported in other studies.[11,16] The length of hospital stay was significantly longer in patients with advanced age, concomitant medical illness and presence of complications. Overall, the mortality of sigmoid volvulus in our setting was 14.84%, a figure that is comparable with other studies like 15.9% and 15.8% reported by Okello et al[16] and Oren et al.[25] The high mortality rate in our study may be attributed to advanced age, presence of concomitant medical illness, late presentation (≥24 hours), presence of shock on admission and presence of gangrenous bowels. A total of 85.16% of our patients recovered well and were discharged. This figure is comparable with 84.1% reported by Okello et al[16] in Uganda. However, in this study the follow-up of patients was generally poor as more than half of patients (survivors) were lost to follow-up by the end of study period. Similarly, poor follow up visits after discharge from hospitals remain a cause for concern. These issues are often the results of poverty, long distance from the hospitals and ignorance. Delayed presentation and large number of loss to follow up were the major limitations in this study.

CONCLUSION

Sigmoid volvulus remains a common cause of colonic bowel obstruction and contributes significantly to high morbidity and mortality. Most of the patients presented acutely, requiring immediate resuscitation and surgical approach. It is suggested that in stable patients with viable bowel sigmoid, resection and primary anastomosis is feasible as it may not adversely affect outcome. Temporary colostomy should be considered if the bowel is gangrenous or perforated and conditions precluding the primary anastomosis. Early diagnosis and timely definitive treatment are essential in order to decrease the morbidity and mortality associated with this disease.

REFERENCES

[1] Avots-Avotins KV, Waugh DE. Colon volvulus and the geriatric patient. Surg Clin North Am 1982;62(2):249-260.

[2] Katsikogiannis N, Machairiotis N, Zarogoulidis P, et al. Management of sigmoid volvulus avoiding sigmoid resection. Case Rep Gastroenterol 2012;6(2):293-299.

[3] Raveenthiran V. Observations on the pattern of vomiting and morbidity in patients with acute sigmoid volvulus. J Postgrad Med 2004;50(1):27-29.

[4] Lal SK, Morgenstern R, Vinjirayer EP, et al. Sigmoid volvulus an update. Gastrointest Endosc Clin N Am 2006;16(1):175-187.

[5] Onder A, Kapan M, Arikanoglu Z, et al. Sigmoid colon torsion: mortality and relevant risk factors. Eur Rev Med Pharmacol Sci 2013;17 Suppl 1:127-132.

[6] Akinkuotu A, Samuel JC, Msiska N, et al. The role of the anatomy of the sigmoid colon in developing sigmoid volvulus: a case-control study. Clin Anat 2011;24(5):634-637.

[7] Raveenthiran R, Madiba TE, Atamanalp SS, et al. Volvulus of the sigmoid colon. Colorectal Dis 2010;12(7 Online):e1-17.

[8] Bhatnagar BN, Sharma CL, Gupta SN, et al. Study on the anatomical dimensions of the human sigmoid colon. Clin Anat 2004;17(3):236-243.

[9] Madiba TE, Haffajee MR, Sikhosana MH. Radiological anatomy of the sigmoid colon. Surg Radiol Anat 2008;30(5):409-415.

[10] Konkena JR, Vayalapalli MR, Podili NK, et al. Spectrum of secondary peritonitis in north coastal Andhra Pradesh, India. J Evid Based Med Healthc 2016;3(65):3536-3541.

[11] Jumbi G, Kuremu RT. Emergency resection of sigmoid volvulus. East Afr Med J 2008;85(8):398-405.

[12] Berry AR. Volvulus of the colon. In: Morris PJ, Wood WC, eds. Oxford textbook of surgery. 2nd edn. Oxford Press 2000:1515-1519.

[13] Lou Z, Yu ED, Zhang W, et al. Appropriate treatment of acute sigmoid volvulus in the emergency setting. World J Gastroenterol 2013;19(30):4979-4983.

[14] Sule AZ, Ajibade A. Adult large bowel obstruction: a review of clinical experience. Ann Afr Med 2011;10(1):45-50.

[15] Kotisso B, Bekele A. A three-year comprehensive retrospective analysis of ilio-sigmoid knotting in Addis Ababa. Ethiop Med J 2006;44(4):377-383.

[16] Okello TR, Ogwang DM, Kisa P, et al. Sigmoid volvulus and ileosigmoid knotting at St. Mary's Hospital Lacor in Gulu, Uganda. East Cent Afr J Surg 2009;14(2):58-64.

[17] Bac B, Aldemir M, Tacyildiz I, et al. Predicting factors for mortality in sigmoid volvulus. Dicle Tip Dergisi 2004;31:9-15.

[18] Atamanalp SS, Ozturk G. Sigmoid volvulus in the elderly: outcomes of a 43-year, 453-patient experience. Surg Today 2011;41(4):514-519.
[19] Osiro SB, Cunningham D, Shoja MM, et al. The twisted colon: a review of sigmoid volvulus. Am Surg 2012;78(3):271-219.
[20] Burrell HC, Baker DM, Wardrop P, et al. Significant plain film findings in sigmoid volvulus. Clin Radiol 1994;49(5):317-319.
[21] Bruusgaard C. Volvulus of the sigmoid colon and its treatment. Surgery 1947;22(3):466-478.
[22] Nuhu A, Jah A. Acute sigmoid volvulus in a West African population. Ann Afr Med 2010;9(2):86-90.
[23] Liang JT, Lai HS, Lee PH. Elective laparoscopically assisted sigmoidectomy for the sigmoid volvulus. Surg Endosc 2006;20(11):1772-1773.
[24] Madiba TE, Thomson SR. The management of sigmoid volvulus. J R Coll Surg Edinb 2000;45(2):74-80.
[25] Oren D, Atamanalp SS, Aydinli B, et al. An algorithm for the management of sigmoid colon volvulus and the safety of primary resection: experience with 827 cases. Dis Colon Rectum 2007;50(4):489-497.