Role of Rigid Endoscopic Detorsion in the Management of Sigmoid Volvulus

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Abstract

Introduction: Sigmoid Volvulus (SV) is a common cause of bowel obstruction in Africa, affecting a relatively young and healthy population. There has been little research regarding the use of endoscopic detorsion in the management of SV from East Africa. The aim of this study was to determine the outcome of patients with SV managed by endoscopic detorsion at a single institution over a 9 year period. **Methods**: A retrospective review of all patients admitted with SV at Tenwek Hospital in Bomet, Kenya from January 2006 to October 2014 was done. Data were collected on demographics, clinical presentation, operative findings, management, and outcome. **Results**: There were 159 cases with a mean age of 41.1 years (range 15-87). Rigid endoscopic detorsion was attempted in 125 (79%) patients. The success, early recurrence, and mortality rate for rigid endoscopic detorsion was 79%, 6%, and 0% respectively. Eleven (13%, n=99) patients declined surgery after successful endoscopic detorsion, while 87 patients had semi-elective surgery, an average of 3.5 days post detorsion. Sixty patients had emergency surgery, with gangrenous bowel noted in 43 (72%) cases. Patients undergoing emergency surgery had a higher morbidity rate (27% vs. 5%, p=0.0002), and a higher mortality rate (12% vs. 0, p=0.002) compared to those having semi-elective surgery due to the presence of gangrenous bowel. **Conclusion**: Rigid endoscopic detorsion is appropriate in the initial management of any stable patient with clinical and radiological features suggestive of sigmoid volvulus without features of peritonitis.

Keywords: Sigmoid Volvulus, Endoscopic Detorsion, Rigid Sigmoidoscopy, Outcomes.

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Introduction

Sigmoid volvulus (SV) is an abnormal twisting of the sigmoid colon on its mesentery, leading to luminal obstruction, and vascular occlusion (1). It occurs in the face of a redundant sigmoid colon with a narrow mesenteric attachment secondary to chronic constipation, irregular bowel habits or a bulky, high fiber diet (2,3). In many series from Africa, SV is a common cause of acute intestinal obstruction and the leading cause of large bowel obstruction (2,4-6). Non-operative detorsion has been advocated for in the initial management of acute sigmoid volvulus in stable patients lacking features suggestive of bowel gangrene (7,8). Rigid or flexible colonoscopy allows for mechanical detorsion, decompression of massively distended proximal bowel, and assessment of bowel viability (1,7,9-11). SV commonly occurs 15-25 cm from the anal verge, thus easily accessible by rigid sigmoidoscopic examination and amenable to decompression (12). While flexible endoscopy has significant advantages over rigid sigmoidoscopy, the equipment and around the clock expertise required may be unavailable in many resource-limited settings (8-12). There has been little literature from East Africa on the use of endoscopic detorsion in the management of SV. The purpose of this study was to determine the outcome of patients with SV managed by endoscopic detortion at Tenwek Hospital in, Bomet, Kenya.

Methods

A retrospective review of all patients admitted with a diagnosis of SV at Tenwek Hospital, in Bomet County, Kenya over a 9 year period (January 2006 to October 2014). Cases were defined as patients with a diagnosis of SV based on clinical, radiological (plain, upright abdominal X-rays), endoscopic and, at times, operative findings. Patients with ileo-sigmoid knotting or those without a clear diagnosis of SV at rigid sigmoidoscopy or laparotomy were excluded. Data were extracted on age, gender, presenting signs and symptoms, non-operative and operative procedures, operative findings, complications and outcome. Data were assessed using Fisher's exact test and unpaired t test as appropriate. P-values less than or equal to 0.05 were accepted as significant.

All cases presenting with features of bowel

obstruction had intravenous (IV) fluid resuscitation, correction of electrolyte imbalances where present, and administration of IV antibiotics as appropriate. Patients with suspected SV but without features of peritonitis (i.e. rebound tenderness, rigidity or guarding) had endoscopic detortion attempted using rigid sigmoidoscopy. If detortion was successful and no features of bowel ischemia noted, a rectal tube was inserted and secured using a 1.0 non-absorbable suture. Non-operative detorsion were carried out by surgical residents with close consultant supervision. Bowel prep was initiated within 12-24 hours after successful detortion if the patient's vital signs remained stable, with no recurrence of symptoms or foul smelling bloody stool. A repeat plain abdominal X-ray was not routinely ordered after successful detorsion. Patients who had recurrence of symptoms due to a slipped flatus tube, but without features of peritonitis, underwent repeat rigid sigmoidoscopy. Semi-elective, open sigmoid resection and primary anastomosis were performed within 2-4 days of detorsion, unless the patient declined surgery.

Emergent explorative laparotomy was undertaken in patients with features of peritonitis on physical exam, strong consideration of other diagnosis apart from SV, after unsuccessful endoscopic detortion, or when features suggestive of bowel ischemia (dark mucosa and/or foul smelling bloody stool) were noted at detorsion. A primary anastomosis was performed after resection of viable or gangrenous sigmoid colon if the patient was stable, the resected bowel edges were well vascularized, there was no fecal peritonitis, and a tension free anastomosis could be achieved. On-table lavage was not performed in any patient.

Results

There were 159 cases during the study period comprising of 143 (90%) males and 16 (10%) females. The mean age was 41.1 years (range 15-87) with the majority (70%) of patients aged 50 years and below (Table 1).

The mean duration of symptoms was 2.7 days (range 6 hours-14 days). The most common signs and symptoms were abdominal distension (150, 94%), abdominal pain (143, 90%), abdominal tenderness (116, 73%), constipation (110, 69%), vomiting (102, 64%), empty rectal vault on digital exam (74, 47%), and peritonitis (28, 18%).

Rigid endoscopic detorsion was attempted in 125 (79%) patients who had clinical and radiologic features consistent with SV without features of peritonitis on physical exam, and was successful in 99 (79%) patients (Figure 1). Early SV recurrence was noted in 6 (6%) of these patients 1-2 days after detorsion due to a slipped flatus tube. Repeat rigid endoscopic detorsion was successful in all six cases. Of the 99 patients who had successful endoscopic detorsion, 87 (88%) had surgery, 11 (13%) declined surgery, and one, a 16 year-old female, had a rectal biopsy to evaluate for hirschprung's disease. The mean duration between successful rigid endoscopic detorsion and surgery was 3.5 days (range 1-7).At operation, a viable and redundant sigmoid colon was noted in all 87 patients. Resection and primary anastomosis was performed in 85 patients, resection and Hartman's colostomy in one patient (due to inability to achieve a tension free anastomosis in a patient with significant malnutrition), and sigmoidopexy in one patient. Morbidities following semi-elective surgery were noted in 5 (5%) patients including 4 cases of surgical site infection and one case of anastomotic leak. No mortalities occurred among this group.

Emergency surgery was undertaken in patients who had unsuccessful endoscopic detorsion (15), features suggestive of bowel gangrene at endoscopy (ischemic mucosa in 2, bloody, and foul smelling stools in 9), peritonitis (28) at presentation, or strong consideration of other diagnosis apart from SV (6). At laparotomy, 43 (72%) patients in this group had gangrenous bowel (Table 2). The incidence of bowel gangrene in patients with peritonitis at 89% was much higher than those without peritonitis who had unsuccessful rigid endoscopic detorsion at 33% (p=0.0003). Resection and primary anastomosis was performed in 39 cases with viable or gangrenous bowel, and a colostomy fashioned after resection of gangrenous bowel in 21 cases . Morbidities, in this group, were noted in 16 (27%) patients, with surgical site infection (11, 18%) being the most common complication . There were no case of anastomotic leak. Seven (11.6%) patients died (four with a colostomy after resection of gangrenous bowel, two after primary resection and anastomosis (PRA) of gangrenous bowel and one after PRA of viable bowel). Causes of death included severe sepsis (4), pulmonary embolism (2), and severe pneumonia (1). The mortality rate in this group, based on bowel status, was 5.9% in patients with viable bowel and 14% in patients with gangrenous bowel (P=0.7).

The overall morbidity rate, mortality rate and mean length of stay for all cases were 13%, 4% and 8.7 days (range 2-26) respectively. Patients who had emergency surgery had a higher morbidity rate (27% vs. 5%, p=0.0002), higher mortality rate (12% vs. 0, p=0.002) and a similar duration of stay (8.5 days vs. 9.3 days, p= 0.2) compared to patients undergoing semi-elective surgery due to the presence of gangrenous bowel.

Discussion

The management of SV involves appropriate correction of electrolyte and fluid imbalances, differentiation of strangulated from viable bowel, relief of bowel obstruction and prevention of recurrent attacks (12). While the use of endoscopic detorsion for the initial management of SV patients with no concerning features for bowel gangrene has been well established, its use in Africa has been controversial (7,8,12,13). Bagarani et al., argues against non-operative detorsion, citing increased risk of misdiagnosis at endoscopy due to higher incidence of bowel gangrene and/or ileo-sigmoid knotting, and better tolerance of emergency surgery by patients presenting with SV as they are young, healthy with few or no co-morbidities (4). Jumbi and Kuremu advocate for non-operative detorsion only in high risk patients with co-morbidities, so as to maximize time for optimization of the co-morbidities (2). However, other African studies support use of endoscopic detorsion as the first measure in the management of viable SV (14-17). The success rate of endoscopic detorsion in this series at 79% compares favorably with the reported success rate of rigid or flexible endoscopic detorsion at 48-93% (7,11,13,15-19).

Following successful rigid sigmoidoscopic detorsion (indicated by a gush of air and liquid non bloody, non-foul smelling stool), and with viable mucosa proximal to the point of twist, a rectal tube should be inserted and secured in place to allow for continued decompression and to prevent early recurrence (8). The rate of early recurrence in this series (6%), much higher than the reported 3-4% may have been due to poor technique in securing the rectal tubes (7,13). Repeat endoscopic detorsion can be attempted in these patients if peritonitis is absent and the patient remains stable. Instrumental perforation and reduction of gangrenous bowel should also be borne in mind (12). Patients with persistent or worsening abdominal pain or distension, or drainage of bloody, foul smelling stools should alert the clinician to the possibility of strangulated or perforated bowel.

Due to the high rates of recurrence of SV following non-operative detorsion alone, a definitive procedure is recommended (7,12,20). The importance of definitive surgery should be discussed with the patient as early as possible as patients may refuse to undergo surgery after relief of obstructive symptoms (20). Refusal of surgery after successful endoscopic detorsion was noted in 78% by Maddah et al., 51% by Turan et al., 21% by Alam et al., and at 8% in this case series (19,21,22).

A semi-elective, same admission surgery is preferable especially in limited resource settings where patient follow up is difficult (16,17). The interval between successful endoscopic detorsion and surgery should be individualized to allow for adequate resuscitation, correction of electrolyte and metabolic derangements, reduction of bowel distension and wall edema, evacuation of a large liquid stool load, and counseling of the patient for surgery (8,9). The mean duration between detorsion and surgery in this series was 3.4 days, well within the reported duration of 1-10 days (7,8,13,17,23).

The mortality rate noted in the patients who had semi-elective surgery after successful rigid endoscopic detorsion in this study, was comparable to the mortality rate reported by Atamalep et al. at 0.8%, and Oren et al. at 0.9% and much lower than mortality rates reported in other series from Africa at 3.3%-15% undertaking emergency surgery for viable SV (2,4,6,7,13,24).

An urgent laparotomy should be carried out in all patients with features suggestive of peritonitis or bowel perforation, or who had unsuccessful detortion or gangrenous bowel identified at endoscopy (7,8,12,18). Peritonitis was significantly associated with presence of bowel gangrene in this case series. Operative detorsion has been described when non-operative reduction cannot be established with elective operation in 4-6 weeks (12). In this series, this approach was not undertaken in this series due to ease of performing a definitive procedure at the initial laparotomy and the high rates of patients who are lost to follow up. Madda et al. noted nil follow up at 6 weeks in 37 patients who had undergone successful operative detorsion (21).

Primary anastomosis after resection can be undertaken irrespective of bowel status, provided the patient is hemodynamically stable, of good nutritional status, the resected bowel edges are well vascularized and can be anastomosed without undue tension, there is no purulent or fecal peritonitis, and sufficient expertise is available to undertake the anastomosis (8,13). The most feared complication in patients undergoing primary anastomosis for gangrenous bowel is anastomotic leak which can be minimized with good surgical technique in appropriately selected patients (4,6). In this series, the mortality rate of patients with gangrenous bowel having a primary anastomosis (11.7%) was similar to those having colostomy (13.3%) after resection of gangrenous bowel (p=1).

Higher morbidity and mortality rates have been reported in patients undergoing emergent surgery compared to those having semi-elective surgery

mainly due to the presence of gangrenous bowel (7,8,12,16,25). Similar findings were noted in this study.

Conclusion

Rigid endoscopic detorsion is appropriate in the initial management of any stable patient with clinical and radiological features suggestive of sigmoid volvulus without features of peritonitis. Refusal of definitive surgery is an important consideration in patients undergoing detorsion, that can be minimized by appropriate patient education commencing from admission.

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References

1. Cirocchi R, Farinella E, La Mura F, et al. The Sigmoid Volvulus: Surgical Timing and Mortality for Different Clinical Types. World J Emerg Surg. 2010; 5:1.
2. Jumbi G, Kuremu RT. Emergency Resection of Sigmoid Volvulus. East Afr Med J. 2008; 85:398-405.
3. Khan H, Khan MI, Gul A, et al. Sigmoid Volvulus; Is Primary Repair an Option? Pak J Surg 2011; 27:131-4
4. Bagarani M, Conde AS, Longo R, et al. Sigmoid Volvulus in West Africa: A Prospective Study on Surgical Treatments. Dis Colon Rectum. 1993; 36:186-90.
5. Samuel JC, Akinkuotu A, Msiska N, et al. Re-Examining Treatment Strategies for Sigmoid Volvulus: An Analysis of Treatment and Outcomes in Lilongwe, Malawi. Glob J Surg. 2010; 1:149-53.
6. Nuhu A, Jah A. Acute Sigmoid Volvulus in a West African Population. Ann Afr Med. 2010; 9:86-90.
7. Atamanalp SS, Oren D, Aydinli B, et al. Elective Treatment of Detorsioned Sigmoid Volvulus. Turk J Med Sci. 2008; 38: 227-34
8. Gingold D, Murrell Z. Management of Colonic Volvulus. Clin Colon Rectal Surg. 2012; 25:236-44.
9. Martin MJ, Steele SR. Twists and Turns: A Practical Approach to Volvulus and Intussusception. Scand J Surg. 2010; 99:93–102.
10. Safioleas M, Chatziconstantinou C, Felekouras E, et al. Clinical Consideration and Therapeutic Strategy for Sigmoid Volvulus in the Elderly: A Study of 33 Cases. World J Gastroenterol 2007; 13:921-4
11. Lou Z, Yu ED, Zhang W, et al. Appropriate Treatment of Acute Sigmoid Volvulus in the Emergency Setting. World J Gastroenterol. 2013; 19:4979-83.
12. Madiba TE, Thomson SR. The Management of Sigmoid Volvulus. J R Coll Surg Edinb; 2000; 45:74-80.
13. 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; 50:489-97.
14. Keller A, Aeberhard P. Emergency Resection and Primary Anastomosis for Sigmoid Volvulus in an African Population. Int J Colorectal Dis. 1990; 5:209-12.
15. Ali MK. Treatment of Sigmoid Volvulus: Experience in Gondar, North-West Ethiopia. Ethiop Med J. 1998; 36:47-52.
16. Mokoena TR, Madiba TE. Sigmoid Volvulus Among Africans in Durban. Trop Geogr Med. 1995; 47:216-7.
17. Ghariani B, Houissa H, Sebai F. Management of Sigmoid Volvulus. Tunis Med. 2010; 88:163-7.
18. Atamanalp SS. Treatment of Sigmoid Volvulus: A Single-Center Experience of 952 Patients over 46.5 years. Tech Coloproctol. 2013; 17:561-9.
19. Turan M, Sen M, Karadayi K, et al. Our Sigmoid Colon Volvulus Experience and Benefits of Colonoscope in Detortion Process. Rev Esp Enferm Dig. 2004; 96:32-5.
20. Suleyman O, Kessaf AA, Ayhan KM. Sigmoid Volvulus: Long-Term Surgical Outcomes and Review of the Literature. S Afr J Surg. 2012; 50:9–15.
21. Maddah G, Kazemzadeh GH, Abdollahi A, et al. Management of Sigmoid Volvulus: Options and Prognosis. J Coll Physicians Surg Pak. 2014; 24:13-7.
22. Alam MK, Fahim F, Al-Akeely MH, et al. Surgical Management of Colonic Volvulus During same Hospital Admission. Saudi Med J. 2008; 29:1438-42.
23. Tsai MS, Lin MT, Chang KJ, et al. Optimal Interval from Decompression to Semi-Elective Operation in Sigmoid Volvulus. Hepatogastroenterology. 2006; 53:354-6.
24. Sule AZ, Ajibade A. Adult Large Bowel Obstruction: A Review of Clinical Experience. Ann Afr Med. 2011; 10:45-50
25. Renzulli P, Maurer CA, Netzer P, et al. Preoperative Colonoscopic Derotation is Beneficial in Acute Colonic Volvulus. Dig Surg. 2002; 19:223-9.