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Research Article

Large Bowel Obstruction: Management and Outcome in Omdurman Teaching Hospital

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Abstract: Large bowel obstruction (LBO) constitutes 15% of intestinal obstruction. The most common causes are colorectal cancer (CRC) and sigmoid volvulus (SV). CRC in Sudan was found in young age group. Clinical features are almost the same with symptoms of SV tend to occur in recurrent episodes. Surgical procedures for colonic obstruction include multi stage procedures and single stage procedureusing primary anastomosis with or without colonic lavage. The objective was to study the management and outcome of LBO in Omdurman teaching hospital. This is a prospective observational study conducted at Omdurman teaching hospital including all patients presented with LBO from Jun. 2013-Sep. 2014. Paediatric patients were excluded. Data collected through a preformed questionnaire and analyzed using computer programme package for social sciences (SPSS) version 20. LBO accounted for 21.6% of intestinal obstruction. Volvulus formed 35.6% of cases and malignancy 64.4%. The mean age was 51.73±20.18 years. There is overall male preponderance with M: F ratio of 2.8:1. Gangrenous bowel was found in 8.9% of patients and all were cases of volvulus. Obstructing CRC was commonest in the left colon with the highest percent at the rectosigmoid junction (33.3%). Hartmann's procedure (HP) and primary anastomosis were done in 57.8% and 13.3% of patients respectively. The mortality of HP was 15.4% and of the primary anastomosis was 50%. In conclusion; the pattern of LBO in Sudan is changing over years towards CRC. There is overall male preponderance. CRC tends to affect younger age groups. HP is the commonest procedure with mortality rate lower than primary anastomosis.
Keywords: Colorectal cancer, Large bowel obstruction, Sigmoid volvulus.

INTRODUCTION

Large bowel obstruction (LBO) constitutes approximately 15% of intestinal obstruction in the western world [1]. The three most common causes of colonic obstruction are adenocarcinoma of the colon and rectum, volvulus, and benign stricture from diverticulitis. These three conditions account for about 90% of cases of colorectal obstructions [2]. In the western world, CRC accounts for 50% of large bowel obstructions. Malignant LBO occurs in up to 20% of patients with colorectal cancer [2-5]. Although colonic volvulus accounts for only 5% of LBO presenting as an emergency in the West, the frequency is higher in other parts of the world, particularly in the so-called ''Volvulus belt'' [3, 6-9]. In Africa and India, volvulus of the large bowel is the primary cause of obstruction [2]. Most cases of obstructing CRC involve the left side of the colon (predominantly the recto sigmoid region) [2, 10-12]. Predisposing factors for SV are a redundant sigmoid colon with an elongated mesentery and a narrow base,high-fiber diets [7, 13, 14], chronic constipation, systemic and local neurologic and psychiatric disease, adhesions, pregnancy, megacolon and Hirshcsprung's disease and drugs (anticholinergic drugs, sedatives, and anti-Parkinson agents) [1, 3, 6, 7, 9, 10, 14-26]. Many of the clinical manifestations of colonic obstruction are similar regardless of aetiology [2, 10]. Endoscopy may be both diagnostic and therapeutic and may play a role in the management of colonic obstruction [3, 7, 27]. Colonic stents have been used for palliation or as a bridge to surgery [3, 5, 27-35]. Colonoscopic or sigmoidoscopic decompression is the primary emergency treatment of choice in uncomplicated acute SV followed by elective sigmoidectomy [3, 7, 14, 20, 36]. The majority of right-sided obstructions are treated with single-staged procedures. A primary anastomosis should be avoided in the presence of gross faecal contamination and an ileostomy is formed with a colonic mucus fistula [3, 37-39]. Surgical options for left colonic lesions include three-stage procedure as a) Loopcolostomy to relieve obstruction followed by resection with anastomosis and finally, colostomy closure [4, 5, 17, 38-41]; b) Hartmann's procedure (HP) [1, 4, 7, 9, 11, 19, 23, 26,

32, 46]; c) Resection with primary anastomosis and covering loop colostomy or ileostomy [37]; d) End colostomy and mucus fistula. Single stage procedures includes; Resection and primary anastomosis with on table lavage [1, 3, 5, 9, 10, 37] or resection and primary anastomosis without lavage [17, 41, 43, 44].

PATIENTS AND METHODS

This is a prospective observational study of large bowel obstruction (LBO) in Omdurman teaching hospital (Khartoum-Sudan) in the period from June 2013 - September 2014. All patients presented with acute LBO to the emergency department were included. Patients less than 12 years of age were excluded from the study. Data collected through a preformed questionnaire and analyzed using computer programme package SPSS version 20.

RESULTS:

Out of 208 patients presented with intestinal obstruction, 45 (21.6%) patients were found to have large bowel obstruction (LBO). Of them 16 (35.6%) patients were found to have colonic volvulus, and this group of patients regarded as volvulus group (VG). Fifteen patients (33.3%) had SV while, only one (2.2%) had caecal volvulus. The cause in the remaining 29 (64.4%) patients was malignant and this group regarded as malignant group (MG). Of them 27 (60%) were found to have CRC, while malignancies other than CRC (ovarian and bladder cancer) were found in two (4.4%) patients.

The mean age was 51.13±20.81 years (range 17- 95 years). In CRC 29.6% of patients were less than 40 years of age while 59.3% were less than 60 years in SV group. There were 33 (73.3%) males and 12 (26.7%) females with M: F ratio of 2.8:1. All of the 16 patients in VG were males (p value=0.003) (Table 1).

Table 1: Gender distribution in large bowel obstruction in the study group

Cause		Male	Female	Total
Benign	Sigmoid volvulus	15 (33.3%)	00 (0.0%)	15 (33.3%)
	Caecal volvulus	01 (02.2%)	00 (0.0%)	01(02.2%)
Malignant	Colorectal cancer	16 (35.6%)	11 (24.4%)	27 (60.0%)
	Ovarian cancer	---------	01 (02.2%)	01(02.2%)
	Bladder cancer	01 (02.2%)	00 (0.0%)	01(02.2%)
Total		33 (73.3%)	12 (26.7%)	45(100%)

p value= 0.00

Bleeding or mucus per rectum were present in 12 (26.7%) of patients, one (6.2%) belong to the volvulus group while 11 (37.9%) belong to the malignant group and this difference was statistically significant (p value 0.021). History of previous similar attack was present in 15 (33.3%) patients, 12 (75%) of VG, while in MG it was present only in three (10.3%) patients and this difference was statistically significant (p value 0.001).

At presentation to hospital, shock was evident in 9 (20%) patients, six (37.5%) patients from VG, in comparison to 3(10.3%) patients from MG and this was statistically significant (P value 0.029). Signs of ischemia or peritonitis were present in 6(13.3%), all of them were from VG while no patient from MG had these signs, and this difference was statistically significant (p value 0.003)

The plain radiograph was diagnostic in 23 (51.1%) patients. All cases of VG (16 patients) were diagnosed by plain radiograph. However in 22 (75.9%) patient from MG plain X-ray was not diagnostic and this difference is statistically significant (p value 0.000).

Obstructing CRC was commonest in the left colon with the highest percent (33.3%) at the rectosigmoid junction (Table 2).

Table 2: Sites of obstruction in patients with colorectal cancer in the study group

Site	Frequency	Percent
Rectosigmoid	09	33.3%
Splenic flexure	06	22.2%
Sigmoid	05	18.5%
Rectal	02	07.4%
Caecal	02	07.4%
Descending colon	01	03.7%
Transverse	01	03.7%
Hepatic flexure	01	03.7%
Total	27	100%

Emergency resection was done in 36 patients (80%); this included all cases of volvulus. Twenty (69%) patients from MG underwent emergency resection and the remainder nine (31%) patients underwent palliative procedure as loop colostomy, ileostomy or ileosigmoid bypass in 20.7%, 6.9% and 3.4% respectively**.** Of the 36 patients who underwent resection, 26 patients (72.2%) had Hartmann's procedure, 12 of VG (75%) and 14 (48.3%) patients of MG. All four patients with gangrenous bowel underwent Hartmann's procedure. Other procedures were done in ten patients include: anastomosis without on-table lavage in six patients (16.7%), colostomy with mucus fistula in three patients (8.3%) and anastomosis with protective transverse loop colostomy in a single (2.8%)patient (Table 3).

Twenty nine (64.4%) of patients were discharged uneventfully, while complications and mortality were seen in eight (17.8%) patients each. The statistical difference for outcome was insignificant (p value>0.1). Twelve (75%) patients from VG and 17 (58.6%) from MG were discharged uneventfully. Complications occurred in one (6.25%) patient in the volvulus group and in seven (24.1%) patients of the malignant group. Complications encountered include systemic inflammatory response syndrome (SIRS) occurred in five (11.1%) patients; the single patient from VG and four (13.8%) from MG. DVT, pulmonary embolism and wound dehiscence were each diagnosed in one (3.4%) from MG.

Table 3: Surgical procedures according to cause of large bowel obstruction in the study group

Surgical procedure	Volvulus	Cancer	Total
Hartmann's procedure	12 (75%)	14 (48.3%)	26 (57.8%)
Colostomy and mucus fistula	01 (6.2%)	02 (6.9%)	03 (6.7%)
Resection and anastomosis	03 (18.8%)	03 (10.3)	06 (13.3%)
RA[a] with protective colostomy	0.0 (0%)	01 (3.4%)	01 (2.2%)
Palliative colostomy	0.0 (0%)	06 (20.7%)	06 (13.3%)
Palliative ileostomy	0.0 (0%)	02 (6.9%)	02 (4.4%)
Palliative ileosigmoid bypass	0.0 (0%)	01 (3.4%)	01 (2.2%)
Total	16 (100%)	29 (100%)	45 (100%)

[a]Resection and anastomosis, p value=0.290

Death occurred in 8 (17.8%) patients, three (18.8%) belong to VG and five (17.2%) patients belong to MG. Septicemia was the commonest cause of death (75%) and pulmonary embolism and ischemic heart disease accounted 21.5%. Mortality for patients underwent Hartmann's procedure, primary resection and anastomosis and palliative loop colostomy were 15.4%, 50% and 16.7% respectively.

DISCUSSION

In our study LBO constituted 21.6% of intestinal obstruction. SV constituted 7.2% of all intestinal occlusions. In Elmasri and Khalil study in Khrtoum in 1976, SV accounted for 17.8% of all cases of acute intestinal obstruction and in Sourkati et al study, 20 years later, SV accounted for 11% [45, 46]. In our study CRC accounted for 13% of intestinal obstruction while Doumi and Mohamed IM, in 2008 [47] showed that bowel tumors constitute 8% of intestinal obstruction cases in El-Obeid hospital and Sourkati *et al*. in 1996 [46] regarded large bowel tumors as less frequent cause of intestinal obstruction. This indicates that the pattern is changing towards CRC with regression of SV.

The most common cause of malignant LBO in our study was CRC (adenocarcinoma) (93.1%) ongoing with other study [40]. The left colon was the most common site of CRC in our study and this is in concordance with other reported values [2, 10-12].

The overall male preponderance in SV is similar to that reported previously in Sudan [9, 48, 49]. In our study male: female ratio with CRC was 1.5:1, which is the same as that concluded in a study done in Khartoum Hospital [50]. In our study in CRC, 29.6% of patients were less than 40 years of age while 59.3% were less than 60 years. This is in concordance to the findings in local and regional. This indicates that CRC in Sudan is found in young age group.

The clinical manifestations are almost the same in both volvulus and malignant groups with the difference seen in the presence of previous similar attack in 75% of cases of volvulus which is statistically significant (p value< 0.001). Lal K *S et al*. found that 40-60% of patients with SV had history of prior attack [7].

The diagnosis of all cases of volvulus in our study was obvious in the plain radiograph as coffee bean sign which is quite enough for confirmation. This is comparable to that revealed by the study of Taha and Suleiman in 1980 [48] and Lal K S *et al.* [7]. However, in our study plain X ray findings were nonspecific in 22 (75.9%) patient from MG. While in other study the suspicion of mechanical malignant large bowel obstruction based on plain radiograph was confirmed in only 60-63% [4]. This indicates that the plain radiograph is poor in confirming the cause and site of malignant large bowel obstruction. The addition of a contrast study to the plain radiograph improves the

diagnostic accuracy in suspected large bowel obstruction.

CT scanning provides further information than plain and contrast radiographs in patients with suspected malignant large bowel obstruction. In our study CT was done in 41.4% of patients in MG and it confirmed the diagnosis in 91.7% and this value is almost in accordance with other study [4]. CT with oral and or rectal contrast is the principal imaging technique in acute colonic conditions. It may confirm the site of obstruction and in addition may show the underlying aetiology [3].

In this study no patient with SV underwent sigmoidoscopic decompression. Taha and Suleiman showed success in 76% of 25 patients while in Mahmoud Abdelbadie study this was only tried in only 2 (5%) patients with success. Colonoscopic or sigmoidoscopic (rigid or flexible) decompression and derotation is the primary emergency treatment of choice in uncomplicated acute SV, when the colon is viable, followed by elective sigmoidectomy. SV has been successfully relieved in 70% to 90% of cases [3, 7, 14, 20, 23].

Self-expanding metallic stent (SEMS), percutaneous endoscopic colostomy (PEC), laser ablation (recanalization) and other forms of endoscopic treatment procedures were not tried in this study. Although SEMS has the advantages of converting emergency procedure into an elective one, allow staging of the disease, permits time for neoadjuvant therapy and permits colonoscopy to exclude synchronous lesions [3-5, 11, 12, 27, 30, 32, 40, 51]. The 25% of gangrenous bowel in VG in our study is near to the 27.3% mentioned by Doumi *et al*. [49] but lower than the 34% in Mahmoud Abdelbadie study [9].

Hartmann's procedure (HP) was the most common form of surgical management of LBO in this study constituting 57.8% of all procedures. It accounted for 75% of the management procedures for VG and 48.3% for MG (p value <0.1). In our study, primary resection and anastomosis constituted 13.6% of all procedures, 18.8% of VG and 10.3% of MG.

Compared to several universal studies, single stage resection and primary anastomosis is a safe and reliable current treatment modality for the emergency surgical management of viable sigmoid volvulus and malignant left-sided large bowel obstruction without bowel cleansing or faecal diversion with low morbidity and mortality [4, 40]. Patients presenting with evidence of non-viable bowel confirmed at laparotomy have a poorer prognosis; however, in such cases, surgical resection with formation of a stoma may carry a better prognosis than primary anastomosis [16, 17, 19]. Mortality of staged procedures is similar to one-stage procedure.

Nine (31%) patients of the malignant group in our study underwent palliative procedures because of unresectable tumors. These palliative procedures were all surgical (loop colostomy, ileostomy and ileosigmoid bypass). In a study comparing SEMS to colostomy as palliative measures in unresectable CRC, SEMS were found to be effective and acceptable as initial palliative therapy for malignant colorectal obstruction because of an earlier recovery, shorter hospital stay, lower rate of early complications, and no need for colostomy compared with palliative surgery [52].

The mortality of 17.8% in our study is near to that seen in other studies [7, 40, 53]. Seventy five percent of operative deaths in our study were 70 years or more and this is ongoing with other study [54]. In our study septicemia was the most common cause of death (75%). Mahmoud Abdelbadie reported septicemia as the cause of death in 75% [9]. No patient with gangrenous bowel died and this is in contrast to other studies which found bowel gangrene as important risk of mortality [9, 56]. In our study the mortality of HP (15.4%) was lower than primary anastomosis (50%) for both benign and malignant causes. This is in contrast to other studies which have not shown Hartmann's operation to have any benefit in mortality over primary anastomosis indeed; most studies have shown Hartmann's operation to be associated with a poorer prognosis which is most likely related to selection bias as anastomosis is avoided in high risk patients [41].

In our study anastomotic leak leading to septicemia and death after emergency resection and primary anastomosis accounted for 33.3%. Trencheva K *et al*. reported mortality of anastomotic leak between 12% and 27% [55]. These statistical differences in the mortality may be due to the fact that in our country, emergency resection and anastomosis is done by junior staff rather than colorectal surgeons.

CONCLUSION

The pattern of LBO in Sudan is changing over years with regression of volvulus as the major cause of obstruction and increase in CRC. There is male preponderance in both volvulus and CRC with male: female ratio of 2.8:1. Obstructing CRC in Sudan occurs in young age group. The use of CT in LBO is highly indicated in patients with non-specific findings on plain radiographs. Endoscopic management is neglected in our country. HP is the prevalent procedure in spite of that the universal literature favoring primary anastomosis in non-complicated cases. Mortality of HP is better than primary anastomosis in the emergency settings.

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