Original paper

Various Modalities in the Management of Large Bowel Volvulus

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Abstract

ackground: Volvulus is twisting or axial rotation of a portion of bowel about its mesentery, colonic volvulus accounts for 10% to 30% of all large-bowel obstructions and occurs most commonly in the sigmoid colon.

Aim of study: To clarify factors contribute to the problem (large intestinal volvulus) and how can we manage these factors in various modalities of surgical treatment.

Patients and methods: A prospective study included (22) patients with large intestinal volvulus who were admitted to the emergency department and managed in the department of General Surgery, Baghdad Teaching Hospital Medical city, Iraq, during the period Oct. 2007 to Dec. 2009. In addition to demographic data, types of volvulus, and predisposing factors were identified. The diagnosis made according to the history, clinical features, and investigations; plain abdominal X-ray, hematological investigations and colonoscopy.

Results: The mean age of the patients was 60.7 ± 23.4 (range 28-95) years. Males were 15/22 and females were 7/22. Sigmoid volvulus was the most common reported type in (91%) of the patients while cecum volvulus in the remaining (9%). The main presenting symptoms and signs were absolute constipation in 20 (91%) patients, generalized abdominal distension in 20 (91%), and abdominal pain and tenderness in 19 (86%) patients. Emergency surgery performed in (63.6%) of patients and the other (37.4%) were subjected to elective surgery. During surgery viable bowel was found in (19) patients (86%), while non-viable bowel was found in (3) patients (14%). Post-operative complications were detected in 4 patients (18%) and unfortunately one patient (4.5%) died.

Conclusion: Volvulus of the colon is more frequent in males. Old age individuals seems to be the most affected group by sigmoid colon volvulus, Most cases can be treated conservatively, at first; by lower GIT endoscopy or by insert rectal tube to do reduction of colon then treated as elective definitive surgery after good preparation so can reduce the postoperative complications, in emergency surgery, if have viable bowel and stable patient we can do resection and primary anastomosis.

Key word: Large Bowel, Volvulus, Management, prospective study.

Introduction

Volvulus is twisting or axial rotation of a portion of bowel about its mesentery, and

when it is complete, it forms a closed loop obstruction with resultant ischemia secondary to vascular occlusion. Volvulus may be primary or secondary, the primary

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occurs due to congenital malrotation of gut (i.e. volvulus neonetorum), a secondary type which is a more common variety due to rotation of piece of bowel around an acquired adhesion or stoma. Colonic volvulus may present as an acute fulminates, sub-acute, or chronic recurrent order condition. In of decreasing frequency, the anatomical locations of primary colonic volvulus are the sigmoid colon, cecum, transverse colon. Because the mesentery is necessarily involved in the torsion, strangulation obstruction is a constant threat and a frequent occurrence. which makes this form of colonic obstruction particularly virulent. ⁽¹⁾Acute colonic volvulus accounts for 10% to 30% of all large-bowel obstructions and occurs most commonly in the sigmoid colon. Cecal volvulus is second only to sigmoid volvulus in its frequency of occurrence, accounts for 10 to 40 percent of colonic volvulus. The treatment of the large bowel volvulus depends on the acuity of presentation, whether an ischemic injury has occurred and the initial success of non-operative detorsion of the colon $^{(2)}$, so it is either conservative where de-torsion is usually most easily accomplished by using a rigid sigmoidoscopy, flexible sigmoidoscopy or colonoscopy, or surgical treatment especially for caecal volvulus because de-torsion cannot be achieved by endoscopy or in case of failure of conservative treatment in sigmoid Volvulus, or immediate surgery when ischemic bowel is highly suspected.

Patients and methods

This was a prospective study carried out during the period from Oct 2007 to Dec 2009, in the department of surgery in Baghdad Teaching Hospital, Medical city, Baghdad, Iraq. After verbal and signed consent were obtained, 22 patients (15 males and 7 females) with large intestinal volvulus who were admitted to the emergency department and managed in the department of General Surgery were enrolled in this study. Data were gathered in separated case sheet for each participant including the medical file number, age, gender, type of volvulus, predisposing factors including: (Chronic constipation dependency, Previous with laxative surgery (adhesion), Tumor, Pregnancy and high fiber), diagnostic and therapeutic measures, in addition to the mode of management; surgical or conservative. The diagnosis of volvulus depended on history, clinical features, and investigations. All patients had been investigated hematological and biochemical for parameters including Hb% and PCV, WBC count, serum electrolytes, blood sugar and renal function tests. Plain abdominal X-ray was done for all patients, in case of sigmoid volvulus revealed a markedly dilated sigmoid colon with the appearance of a bent inner tube with its apex in the right upper quadrant. An airfluid level may be seen in the dilated loop of colon, and gas is usually absent from the rectum, while in caecal volvulus the radiological findings revealed a dilated cecum that is usually displaced to the left side of the abdomen. The torsion resulted in obstruction of the small bowel, and the radio graphical pattern of dilated small intestine can cause diagnostic difficulty. Endoscopy of the colon, rigid or flexible, was used as diagnostic and therapeutic procedures that were very important especially in sigmoid volvulus. After establishing the diagnosis, all patients were managed by general measures for Correction of dehydration and electrolytes imbalance, and broad spectrum antibiotics single dose as prophylactic measurement if have toxic fluid during the surgery.

Management of patients with sigmoid volvulus depended on the clinical presentation, whether a vascular occlusion was suspected or not and whether the initial non-operative detorsion of the colon was successful or not. Non-operative reduction, sigmoid endoscopy; was used in (9) patients, and succeeded in (6) patients. The insertion of a rectal tubes either under vision by endoscopy or directly was successful in with patients the resultant (2)decompression and passage of large amounts of flatus and feces. When there were signs of strangulation, this was not attempted and the patient was submitted to an emergency surgery. In case of ceccal volvulus; shift for urgent surgery either was carried by right hemicolectomy and primary anastomosis or cecopexy with ceacal tube was done

Results

The study included (22) patients presented with clinical features of volvulus and submitted to emergency unit.

There were (15) male 68% and (7) female 32% patients, with male/female ratio 2.1/1. The mean age of the patients was $60.7\pm$ 23.4 (range: 28 – 95) years. Moreover, higher proportion of the patients, 8/22 patients (36%) aged (49-68) years, and only one patient aged above 89 years, (Table1).

Sigmoid volvulus was the most diagnosed type, it was found in 20 patients (91%), the remaining 2 patients (9%) had caecum volvulus while transverse volvulus was not reported (Fig. 1). The main presenting symptoms and signs were absolute constipation (20)patients 91%). generalized abdominal distension (20 patients 91%), abdominal pain and tenderness (19 patients 86%), nausea and vomiting (10)patients 45.5%) and tachycardia (9 patients 41%). The least encountered sign was fever in (2) patients (9.1%) (Table 2).

The risk factors that predispose to colonic volvulus (15) patients (68.2%) gave history of chronic constipation and laxative dependency, (4) patients (18.2%) had adhesive band from previous surgery, (2) patients (9.1%) had colonic tumor and (1) patient (4.5%) was pregnant (2nd trimester) (Fig.2).

Plain abdominal X-ray showed characteristic features in (80%) (16) patient out of the (20) patients with sigmoid volvulus, with the appearance of Omega sign of the dilated colon with the apex of the loop under the left hemi diaphragm and the convexity of the loop points towards the right upper quadrant. Furthermore, (2/20)patients (10%)showed distended colon and absent gas in the rectum in case of colonic tumor, and one patient (5%) from the sigmoid cases showed free air under diaphragm; which means there was perforation in the bowel, while the last one (5%) from the sigmoid cases had pregnancy diagnosed depend just on clinical features. In case of caecal volvulus (2) patients, the radiological findings were dilated caecum in midline and absent gas in the distal part of the colon. Regarding the hematological investigations (3) patients (14%) had significant Leukocytosis that was found later to have an underlying strangulation, gangrene and/or perforation, five patients (23%) had anemia (the Hemoglobin level was less than 10mg/dl).

About two thirds of the patients, (14/22)were subjected to emergency surgery; (12) sigmoid and (2) cecum), while (6) patients (27.3%) were subjected to elective surgery after detorsion by either endoscopy or rectal tube figure 3. Two patients (9.1%) refused the operation after successful detorsion. The surgical treatment of patients presented with sigmoid volvulus (12 patients) depended on the stability of the patients and the surgical option of the team on call; eleven patients were treated by sigmoid colectomy and stoma whether double barrel in (4) patients or Hartman's procedure in (7) patients. In only one patient just reduction with rectal tube was done because of instability of the patient' condition. The other (2) patients with volvulus of caecum, were managed by right hemicoloectomy and end-end anastomosis in one patient and reduction and cecopexy in the other patient. Nineteen patients had non - strangulated bowel (86%), while strangulated bowel was found in (3) patients (14%) (Fig. 4).

The postoperative complications, 2 of the patients (9%) had Atelectasis while 1 patient (4.5%) developed wound infection and 1 patient (4.5%) had wound dehiscence. The last 2 patients had history of strangulated bowel. All of them where treated conservatively and improved later on (Table 5). The mortality rate was (4.5%), where one male patient died in second postoperative day due to sepsis as he had an emergency surgery for gangrenous sigmoid volvulus.

 Table (1): Age and gender distribution of the cases with volvulus of colon

Total number of cases		22	
Male/female	n/n*		15/7
Age (years)	n (%)	28-48	6 (27.0)
		49 - 68	8 (36.0)
		69 - 88	7 (32.0)
		≥89	1 (5.0)
		$Mean \pm SD^{**}$	60.7 ± 23.4
		Range	28 - 95

*n: number of cases, **SD : standard deviation



Figure 1. : types of volvulus

Table(2): The presenting symptoms and signs of volvulus in our patients

Presenting symptoms and signs	No. of patients	%
Absolute constipation	20	91.0
Generalized abdominal distension	20	91.0
Abdominal tenderness	19	86.0
Nausea and vomiting	10	45.5
Tachycardia	9	41.0
Fever	2	9.1



Figure 2. Predisposing factors and causes of volvulus

Table (3): Status of surgical intervention

Surgical intervention	No. of patients	%
Emergency	14	63.6
Elective	6	27.3
Non-operated	2	9.1

Table(4): Mode of management and intervention

Type of intervention	No. of patients	%
Surgery	14	63.6
Endoscopy reduction	6	27.3
Rectal tube reduction	2	9.1

Table (5) :Postoperative complications and mortality

Complication	No. of patient	%
Atelectasis	2	9.0
Wound infection	1	4.5
Wound dehiscence	1	4.5
Total	4	18.0



Figure 3. Surgery and endoscopic management



Figure 4. Distribution of volvulus according to strangulation status

Discussion

In this study, the ratio of male to female was about (2.1:1), which indicates the male predominance in large bowel volvulus a fact that has been reported by Boulvin who attributed the low incidence in females to their capacious pelvis and lax abdominal wall $^{(3,4)}$. Also Bhatnagar and Sharma in a study of 84 patients with colonic volvulus showed an incidence of 2.2:1 male predominance $^{(3)}$.

In our study, the age of patients ranged from 28-95 years and the mean age was 60.7 years which coincides with other studies carried in the Eastern society, in which the mean age was 60.9 years ⁽⁵⁾, while in Western studies, the mean age was 72 years ⁽⁶⁾ which was higher than in our patients which could be due to higher life expectancy in the western world.

In the majority of patients in our study, main risk factor was chronic the constipation (68%), while history of pregnancy and tumor were encountered frequencies with less (5%,9%), respectively. These results were comparable to the Eastern studies in which colonic hypertrophy associated with high fiber diet is a major risk factor for developing sigmoid colon volvulus ⁽⁷⁾ but they differ from most Western studies in which colonic volvulus occur often in institutionalized and debilitated elderly individuals with neurologic and psychiatric conditions such as Parkinson's disease and schizophrenia⁽⁶⁾. And in one report, 40% live in nursing homes and institutes⁽⁶⁾. This difference could be attributed to the lower percentage of institutionalized individuals and the more frequent ingestion of the high fiber diet in the Eastern society as compared to the western one.

The main presenting symptoms and signs were absolute constipation abdominal distension, pain, tenderness, nausea and vomiting, with less observed tachycardia and fever. These results were comparable with other studies performed in the Eastern countries ⁽⁴⁾ but are somewhat different from the Western studies in which there is less incidence of abdominal tenderness but fever and tachycardia were nearly the same which means less frequency of strangulation in our study⁽²⁾. Previous studies showed that plain abdominal X-ray will confirm the diagnosis in the majority of the patients (80%)⁽⁸⁾ and this coincide with our study in which 16 patients (80%) showed the characteristic Omega sign in cases of sigmoid volvulus and 2 out of the remaining cases had distended colon and absent gases in the rectum in one patient tumor and in the other with colonic

patient air under diaphragm indicative of perforation. In patients who had caecal volvulus the radiological findings were dilated cecum and absent gas in distal colon which is a similar finding to other studies ⁽⁹⁾.

Leukocytosis is usually suggestive of the presence of gangrenous bowel ^(10,11), and this agrees with the finding of leukocytosis in 3 patients in our series, who were found later to have an underlying strangulation and gangrene. As sigmoid volvulus is associated with high morbidity and mortality and high recurrence following non operative decompression, therefore definitive surgery is required for its management ⁽¹²⁾.

The majority of our patients (63.6%) presented with symptoms and signs of acute large bowel volvulus, for that reason they were subjected to emergency laparotomy rather than non-operative decompression.

Mokoena and Madiba (1995) in a study of 90 cases of sigmoid volvulus, advocate resection in all patients⁽¹⁵⁾ and again we prefer in dealing with our patients to do resection of sigmoid colon with colostomy rather than primary anastamosis, that goes with Bagarani et al. study in (1993) who concluded that, the treatment of choice in sigmoid volvulus seems to be resection and primary anastomosis⁽¹³⁾.

In our study; we found most of cases who are treated as emergency laparotomy have viable colon, so; we can treated conservatively by decompression of sigmoid volvulus with rectal tube or endoscopy **figure 3** followed by good preparation of patient and then elective definitive surgery by resection and end to end anastomosis which can decrease the morbidity but these are only if the patient is stable clinically (i.e. no symptoms and signs of toxicity). Madiba and Thomson concluded that resection and anastomosis is the favored option for both gangrenous and viable bowel in the management of caecal volvulus, because non-operative decompression is not usually possible ⁽¹⁴⁾ which supported our work as we performed surgery in only two patients with caecal volvulus although we did resection in one patient only. Concerning the morbidity rate and mortality rate in our study, they were highest when intraoperative strangulation was encountered, the morbidity was (18%) and the mortality was (4.5%). These results are nearly similar to other studies as Mokoena and Madiba (1995) who in their study of 90 cases, reported (18%) morbidity rate and (4.5%) mortality rate, (80%) of which was in the emergency operating group ⁽¹⁵⁾. Although the choice of the therapeutic procedure is important in mortality, but other factors like septic shock and the presence of bowel gangrene increases the mortality rate.

Conclusion

Volvulus of the colon is predominant in males and especially old age males. The Majority of patients with sigmoid colon volvulus have history of chronic constipation, laxative dependency and high fiber diet. Most cases with volvulus presented with viable bowel, so can be reduced by endoscopy or rectal tube then subjected to elective surgery with decreased the postoperative complications. emergency cases. resection In and colostomy should be done in case of sigmoid volvulus with toxic patients and non viable bowel, primary anastomosis if the patient stable during surgery and have viable bowel while resection with primary anastomosis in case of caecum.

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