The Outcome of Emergency Surgery among Patients with Large Bowel Volvulus (LBV)

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Abstract:

Introduction: volvulus is a twisting or axial rotation of a portion of bowel about its mesentery. Large Bowel Volvulus (LBV) accounts for (5%) of all organic large bowel obstructions and are most common between 50 and 60 years of ages .The reported incidence of the various forms of LBV, (59%) for sigmoid volvulus (SV), (39%) for caecal volvulus (CV) and (2%) for transverse colon volvulus.

The diagnosis of acute LBV can be challenging because its clinical presentation has low specificity compared with other non-traumatic abdominal pain. Emergency surgery is the appropriate treatment for those who present with diffuse peritonitis, intestinal perforation or ischemic necrosis.

Aim of the study: To review the comparison and benefits of emergency operative procedures in the treatment of patients with acute large bowel volvulus in the emergency setting.

Place and Duration: Department of General Surgery at Azadi-teaching hospital in Kirkuk city from December 2008 to December 2013.

Patients and Methods: Total 48 patients; 31 male (64.6%) and 17 female (35.4%) (95.8%) patients were over 55 years of age. were included in the study of which 41 (85.4%) diagnosed preoperatively with acute sigmoid volvulus on emergency laparotomy. The remaining 7 patients (14.6%) with caecal volvulus. The choice of surgical procedure depended on the; large bowel viability, time of presentation following onset of obstructive features, extent of proximal colonic dilatation, co morbid diseases and surgeon's preference. For acute sigmoid volvulus; 11 patient (27.2%) patients underwent sigmoid resection with primary anastomosis (RPA), 18 patient (43.9%) underwent Hartmann's procedure and 12 patients (29.3%) operated by sigmoid resection with Paul-Mikulicz. For caecal volvulus; Right hemicolectomy performed for three patients (42.9%), caecopexy in two (28.6%) and caecostomy in other two patients (28.6%).

Results: Abdominal distension and constipation occurs in all patients (100%), while (95.8%) presented with abdominal pain and peritonitis in (79.2%) (41.5%) has a previous history of bowel decompression either by endoscopic instruments or deflation by rectal tube with a recurrence rate of (76.0%). Chronic medical illnesses are found in most of the patients. LBV is presented in two forms sigmoid (85.4%) of cases, the rest (14.6%) with caecal volvulus. (33.4%) of cases presented with gangrenous colon while bowel perforation (fecal peritonitis) in (4.2%). The operative procedures ;- one stage Resection with Primary Anastomosis in (26.8%) of patients , two stage operative procedures resection of the volvulus sigmoid with (Hartmann and Paul-Mikulicz done in (73.2%), in caecal volvulus right hemicolectomy (with ileo-transverse Anastomosis done for (42.9%), caecopexy (28.6%) and Caecostomy for 2 patients(28.6%) patients. Postoperative complications; Wound infection in (31.3%) of cases. Anastomotic leak (12.5%). Total mortality occurs in 10 cases (20.8%).

Conclusion: In acute LBV emergency surgery is indicated, Hartmann's procedure is the procedure of choice. The presence of cardiac, renal, or respiratory diseases has a significant impact on the complications, morbidity and mortality of patients undergoing surgery for large bowel volvulus.

Key words: Acute large bowel volvulus, Emergency laparotomy, Complications.

Introduction:

A volvulus is a twisting or axial rotation of a portion of bowel about its mesentery. When complete it forms a closed loop obstruction with resultant ischemia secondary to vascular occlusion. The disease is frequently reported in the "volvulus belt" which includes countries in the Middle East, Africa, the Indian subcontinent, Turkey and South America where it accounts for almost half of all large bowel obstructions. LBV accounts for (5%) of all organic large bowel obstructions and are most common among patients aged between 50 and 60 years [(1)]. The reported incidence of the various forms of LBV in the urban Australian population is (59%) for sigmoid volvulus (SV), (39%) for caecal volvulus (CV) and (2%) for transverse colon volvulus [(2)]. Predisposing factors include congenital or acquired anatomical variations, such as a mobile caecum, a long redundant sigmoid with an elongated mesentery, a history of abdominal surgery, late-pregnancy and patient history factors, such as mental retardation, a high-fiber diet, chronic constipation and coincidental disease [(3)]. Acute large intestine obstruction, which, if left untreated, often results in life-threatening complications, such as bowel ischemia, gangrene, and perforation [(4, 5)]. Despite significant progress in the treatment of this disease, no consensus has been reached [(6,7,8,9)]. Emergency surgery is the appropriate treatment for those who present with diffuse peritonitis, intestinal perforation or ischemic necrosis [(10, 11)].

Methodology:

This study was done at department of General Surgery of Azadi-teaching hospital in Kirkuk city. All patients presenting to the emergency department as acute abdominal emergencies and diagnosed intraoperatively as acute large bowel volvulus and necessitate emergency operative intervention from December 2008 to December 2013 were included in this study.

Exclusion done for:-

1- Pediatric age group (below 15 years).

2- Patients with elective operations for large bowel volvulus.

Total 48 patients; 31 male (64.6%) and 17 female (35.4%) were included in the study of which 41(85.4%) diagnosed on emergency laparotomy peroperatively with acute volvulus of sigmoid colon and remaining seven patients (14.6 %) patients with caecal volvulus. Surgical decision making regarding the choice of surgical procedure depended upon the operative findings regarding the presence of bowel viability, time of presentation following onset of obstructive features, extent of proximal colonic dilatation, presence of co morbid diseases and surgeon's preference. Out of 41 patients with acute volvulus of sigmoid colon, 18 patient (43.9%) underwent Hartmann's procedure (sigmoidectomy with the distal bowel closed and returned to the abdomen), 12 patients (29.3%) operated by Paul Mickulicz procedure (the gangrenous part is resected and both ends are brought out as separate stomas) and 11 patient (26.8%) patients underwent sigmoidectomy (RPA; Resection with primary end to end anastomosis with or without proximal colostomy).

For those with caecal volvulus; Right hemicolectomy done forischemic or gangrenous caecum in three patients (42.9%), caecostomy alone in two patients (28.6%) and caecopexy; (fixation of the caecum to the right iliac

fossa done for the other two patients (28.6%). Initially on hospital admission all patients undergo rapid fluid resuscitation with appropriate monitoring. Broad spectrum antibiotics were instituted as early as possible.

All patients underwent proximal gut de-compression by nasogastric suction and by an on-table colonic lavage to decrease abdominal distension and enable better abdominal closure. Comparison was done with respect to early morbidity (complications) and mortality over one month postoperative period among these operative procedures.

Results:

Out of total 48 patients, 31(64.6%) were males and 17(35.4%) were females; 36 patients (95.8%) were over 55 years of age.

Table (1) 46 patients (95.8%) were presented with abdominal pain, while distension and constipation occur in all patients, while vomiting is late and occur in 40 patients (83.3%), peritonitis (abdominal tenderness, fever and absent bowel sound with leucocytosis found in 38 patients (79.2%).

Table (2) Average duration of presentation following onset of obstructive symptoms was four days. Three patients (6.3%) are present early (within 24 hours), while most of them 34 patients (70.9%) are presented after 72 hours from the onset of clinical features of bowel obstruction. Table (3) history of chronic medical illnesses are found in most of the patients mostly hypertension and heart disease 21 patients (43.7%), diabetes in 12 patients (25%), respiratory diseases in 10 patients (20.9%) and eight patients (16.7%) were suffering from strokes. Table (4) after emergency laparotomy for 48 patients with acute abdomen (intestinal obstruction). Acute sigmoid volvulus was diagnosed peroperatively in 41 patients (85.4%) and 7 patients (14.6%) with caecal volvulus. Per operative finding regarding viability of colon showed that; 16 patients (33.4%) presented as gangrenous colon while the remaining 30 patients (62.4%) were found to be a viable sigmoid colon. Perforated colon with fecal peritonitis found only in two patients (4.2%).

Table (5) operative procedures which are used in emergency laparotomies; in sigmoid volvulus one stage procedure (RPA- Resection with Primary Anastomosis- done in 11 patients (26.8%) with or without proximal colostomies, two stage operative procedures resection of the volvulus sigmoid with (Hartmann's procedure in 18 patients (43.9%) and Paul-Mickulicz done for 12 patients (29.3%), while in caecal volvulus right hemicolectomy (with ileo-transverse anastomosis) done for 3 patients (42.9%), caecopexy (derotation and fixing the caecum to abdominal wall) done for 2 patients (28.6%) and Caecostomy for 2 patients (28.6%) patients. Regarding the postoperative complications; Wound infection was more common following all forms of stoma procedure occur in 15 patients (31.3%). Anastomotic leak was seen in 3 patients (6.3%). Overall mortality was 10 (20.8%), the highest mortality rate (60.0%) observed among patients with sigmoid volvulus in those who had (RPA; primary resection and anastomosis without proximal colostomy) one of the patients who had operated by caecostomy alone developed cardiac arrest and died in the second post-operative day as shown in table (6).

Table (1): Age and Sex distribution.

Age /years	Male		Female		Total	
	No.	%	No.	%	No.	%
15-30	0	0.0	0	0.0	0	0.0
31-45	2	4.2	0	0.0	2	4.2
46-60	5	10.4	2	4.2	7	14.6
61-75	11	22.9	6	12.5	17	35.4
More than 75	13	27.0	9	18.8	22	45.8
Total	31	(64.6)	17	(35.4)	48	100.0)

Table (2): Clinical presentation.

Sign & symptoms	No.	%
Abdominal pain	46	95.8
Abdominal distention	48	100.0
Vomiting	40	83.3
Constipation	48	100.0
Abdominal tenderness (peritonitis)	38	79.2

Table (3): Time of presentation.

Time of presentation /hours	Sigmoid volvulus		Caecal volvulus		Total	
	No.	%	No.	%	No.	%
0-24	2	4.2	1	2.1	3	6.3
24-72	9	18.8	2	4.2	11	23.0
72 +	30	62.5	4	8.4	34	70.7
Total	41	85.4	7	14.6	48	100.0

Table (4): Co-morbid disease.

Co-morbid disease	Male		Female		Total	
	No.	%	No.	%	No.	%
Diabetes mellitus	7	14.6	5	10.4	12	25.0
Heart Disease/ Hypertension	13	27.0	8	16.7	21	43.7
Respiratory Disease (COLD, asthma...	7	14.6	3	6.3	10	20.9
Others (strokes……	5	10.4	3	6.3	8	16.7

Table (5): Operative finding.

Operative findings	Sigmoid volvulus		Caecal volvulus		Total	
	No.	%	No.	%	No.	%
Gangrenous (non-viable bowel)	14	29.2	2	4.2	16	33.4
Non gangrenous (viable bowel)	25	52.0	5	10.4	30	62.4
Perforation (fecal peritonitis)	2	4.2	0	0.0	2	4.2
Total	41	85.4	7	14.6	48	100.0

Table (6): Post operative Complications in relation to the Operative procedures.

Volvulus	Operative surgical procedure	Wound infection	Anastomotic leak	Cardio-pulmonary	Mortality (30-days)
Sigmoid 41 (85.4%)	RPA (with proximal colostomy)6 (14.6 %)	1 (16.7%)	0 (0.0%)	1 (16.7%)	1 (16.7%)
	RPA (without proximal colostomy)5 (12.2 %)	2 (40.0%)	2 (40.0%)	2 (40.0%)	3 (60.0%)
	Resection+ Hartmann 18 (43.9 %)	6 (33.3	0 (0.0%)	2 (11.1%)	2 (11.1%)
	Paul Mickulicz (Resection+ mucus fistula) 12 (29.3 %)	4 (33.3%)	0 (0.0%)	1 (8.3%)	2 (16.7%)
Caecal 7 (14.6%)	Rt hemicolectomy 3 (42.9 %)	1 (33.3%)	1 (66.7%)	1 (33.3%)	1 (33.3%)
	Caecopexy 2 (28.6 %)	1 (50.0%)	0 (0.0%)	1 (50.0%)	0 (0.0%)
	Caecostomy alone 2 (28.6 %)	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)
Total	48 (100.0%)	15(31.3%)	3(6.3%)	9(18.8%)	10 (20.8%)

Discussion:

Acute sigmoid volvulus is the third most common cause of large bowel obstruction [12].

It has a wide geographic variation and it differs significantly between high-incidence countries and low-incidence countries [13]. This variation may be associated with differences in anatomy. [14] This study show that 31 patients (64.6%) were males and 17(35.4%) were females with age distribution between 44 and 89 years, most of them (95.8%) were over 55 years of age. In some studies the acute sigmoid volvulus usually occurs in adult men. The mean age was found to be between 56 and 77 years and nearly one-third of all colonic emergencies in elderly patients are due to sigmoid volvulus [15]. Typical symptoms include sudden abdominal pain and distension followed by constipation. The most common signs are abdominal tenderness and asymmetrical abdominal distention. [16] In this study abdominal distension and constipation occur in all patients, while 46(95.8%) of the patients are presented with abdominal pain, vomiting is late and occur in 40 of patients (83.3%), and peritonitis ;abdominal tenderness, fever and absent bowel sound with leukocytosis found in 38 patients (79.2%). This study shows that; Average duration of presentation following onset of obstructive symptoms was four days. Three patients (6.3%) are present early (within 24 hours), while most of them 34 patients (70.9%) are presented after 72 hours from the onset of clinical features of bowel obstruction. Thus, the chances of patients having advanced disease and increased incidence of ischemic and gangrenous bowel is more. Also, most patients were elderly and with co-morbid diseases thus increasing the risk of complications and morbidity/

mortality following surgical intervention. Since the chances of recurrence following detorsion alone are very high, all patients should undergo a definitive procedure in the index admission unless they have severe co-morbid diseases precluding surgical intervention. [17,18]. If circumstances permits, an attempt at detorsion is highly desirable since the outcome following elective surgical intervention is superior to that in emergency settings [19]. Recurrence, after conservative detorsion without surgery, is noted to be associated with a high mortality rate, in the range of (20-30%). [20] Other predisposing factors, such as a high-fiber diet, constipation, previous abdominal surgery, pregnancy, diabetes, or neurological and psychiatric diseases such as dementia or schizophrenia have been described in some literature.[21] This study show that history of chronic medical illnesses are found in most of the patients mostly hypertension and heart disease 21 patients (43.7%), diabetes in 12 patients (25%), respiratory problems in 10 patients (20.9%) and about eight of them suffering from strokes (16.7%).There are suggestions of a link between motility disorders of diabetes mellitus and sigmoid volvulus. Furuya *et al*. from Teikyo University school of Medicine, Japan found no relation between a functional disorder of bowel movement and elongation of the bowel in sigmoid volvulus and number of ganglion cells in Meissner‟s plexus. Diabetes and chronic constipation is a well-recognized predisposing factor for colonic volvulus. Autonomic dysfunction can manifest from diabetic neuropathy. Raveenthiran from India noticed fivefold more diabetics in his patients presenting with volvulus than in the general population. He reported (100%) prevalence of constipation among diabetics in his series. He further concluded that the high rate of constipation in the diabetic will probably trigger the pathology and called for a large size prospective trial. [22,23,24].

The treatment of acute colonic volvulus remains controversial, and depends on the elected procedure and the most appropriate therapeutic approach in terms of the clinical status of the patient, the location of the problem, the suspicion or presence of peritonitis, bowel viability and the experience of the surgical team [25]. This study shows that after emergency laparotomy for 48 patients with acute intestinal obstruction, the operative procedures which are used in sigmoid volvulus one stage procedures RPA- Resection with Primary Anastomosis- done in 11 patients (26.8%), six (14.6%) with and five (12.2%) without proximal colostomies, while two stage operative procedures; resection of the volvulus sigmoid with (Hartmann's procedure) in 18 patients (43.9%) and Paul-Mikulicz done for 12 patients (29.3 %). Various surgical procedures have been adopted for the management of non-gangrenous sigmoid volvulus; most authors agree that the definitive treatment of sigmoid volvulus is sigmoidectomy with or without anastomosis [26-27]. However resection with primary anastomosis in emergency situations, when the general condition of the patient is suboptimal and bowel not prepared, carries an unacceptably high complication rate [28]. Emergency Resection and primary anastomosis (RPA) vs. Hartmann's Procedure first reported by Dean and Murray in 1952, RPA is currently considered to be the gold standard for

management of sigmoid volvulus. However its use alone in emergency surgery in the presence of a gangrenous bowel is contentious. Sigmoidectomy with or without anastomosis has gained agreement as definitive treatment of sigmoid volvulus by most of the authors [29, 30]. De and Ghosh from India supported RPA without colonic lavage in their series based on 197 patients with gangrenous or non-gangrenous bowel who underwent operation for sigmoid volvulus [31]. Many authors have stressed the impact of the experience of the operating surgeon in the outcome of resection and primary anastomosis [32]. Difficulty in finding a clear line of demarcation or the presence of skip lesions, severe fecal soiling, inability to achieve a tension free anastomosis, haemodynamic instability, lack of experience on the part of the operating surgeon to perform a meticulous anastomosis, should all prompt the surgeon to proceed with a Hartmann's procedure rather than a primary anastomosis. To conclude, Hartmann's procedure despite its share of complications is still to be considered as a valuable procedure which should be exercised in appropriate scenarios. The idea of intraoperative lavage is to clean the bowel of any solid fecal matter, in emergency cases precluding preoperative bowel preparation, thereby decreasing chances of contamination and also allowing a better environment for healing of anastomosis. On table lavage definitely increases operating time. Slim *et al.* drew the conclusion that pre-operative mechanical bowel preparation can be detrimental to the anastomosis [33]. Zorcolo *et al.* in their series of 323 patients who underwent procedures for left sided bowel pathology notices no outcome benefit in the small percentage that had colonic lavage [34]. Sule *et al.* from Nigeria report a very low rate of anastomotic leak in the absence of colonic lavage where primary anastomosis was undertaken in emergency settings [35]. Irabor from Nigeria reports a series of 17 patients all of whom underwent emergency RPA without preoperative detorsion or colonic lavage. None of the patients had gangrenous segments. He reported no deaths in his series [36]. Colostomy has been considered to be a relatively simple technical procedure and is often performed in elective and emergency surgery. Raveenthiran found a higher incidence of wound infection in patients with gangrenous segment undergoing RPA in his series. Postoperatively wound infections were more common following all forms of stoma procedure occur in 15 patients (31.3%). Anastomotic leak occur in 3 patients (6.3%). Bhavnagar*et al.* in their series of 76 patients with gangrenous sigmoid volvulus noticed that the addition of a diversion colostomy in primary anastomosis did not improve survival [37].

In caecal volvulus right hemicolectomy (with ileo-transverse anastomosis done for three patients (42.9%), caecopexy (fixing the caecum to abdominal wall done for two patients (28.6%) and caecostomy alone for the other two patients (28.6%). Surgical treatment of cecal volvulus paralleled that of sigmoid volvulus. Before the early 19th century, expectant management was widely practiced; as experience accrued, surgical treatment became accepted. Detorsion and cecopexy were commonly performed, as was placement of cecostomy tubes. The high recurrence and complication rates led to the adoption of right hemicolectomy for the

treatment of cecal volvulus, which remains the accepted approach. Cecostomy is reserved for patients who are too debilitated to withstand resection. [38,39]. Overall mortality occurs in 10 patients (20.8%), the highest mortality rate (60.0%) observed among patients with sigmoid volvulus in those who had (RPA; primary resection and anastomosis without proximal colostomy and also one of the important cause of the high mortality is the age with the presence of co morbid diseases. Bhavnagar *et al* reported that the risk factors for mortality were: age over 60 years; presence of shock on admission; and positive history of a previous episode of volvulus. Kassi*et al* [40]. Reported that the mortality rate was (12%) for Hartmann's procedure. Oren reported the highest complication rate in the stoma group and further noticed an incidence of (2.6%) of colostomy perforation. Oren *et al*. also recommend resection and primary anastomosis for gangrenous volvulus in stable patients [41]. Akcan *et al.* in their retrospective analysis of 136 patients compared the outcome between RPA and Hartmann's in patients with gangrenous and perforated colon and reported anastomotic dehiscence rates of (30%) in 10 patients with gangrene and perforation who underwent RPA[42]. Comparing mortality rate of different procedures in our study, mortality was highest (60%) in those undergoing resection and primary anastomosis without proximal colostomy and least in patients undergoing Hartmann's procedure with viable gut (11.1%). Also, the increased mortality in the group undergoing resection and anastomosis with proximal colostomy may be explained by the increased operating time and blood requirement intraoperatively and postoperatively in compromised patients with poor general condition. One of the most important factors involved in success of resection and primary anastomosis is the surgeon's experience [43].

Conclusions and Recommendation:

1- Volvulus of the large bowel is a major cause of intestinal obstruction in both developing and developed countries and is more common in the male sex.

2- The presence of bowel gangrene strongly predicts mortality, suggesting that prompt diagnosis and management are essential**;** Patients in whom gangrene or perforation is suspected should initially undergo rapid fluid resuscitation with appropriate monitoring. Broad spectrum antibiotics should be instituted as early as possible.

3- Resection with primary anastomosis is the gold standard and the experience of the surgeon is crucial to its success in the patient undergoing emergency surgery. Most advisable surgical treatment of the disease is resection of the redundant sigmoid colon. The continuity of the bowel can be restored safely by primary colonic anastomosis without increasing the rate of postoperative complications. This surgical procedure should be attempted in selected patients without generalized peritonitis from gangrenous or perforation of the sigmoid colon volvulus.

4- If emergency surgery is indicated, Hartmann's procedure should be the procedure of choice. Thus, Hartmann's procedure goes a long way in decreasing mortality due to sigmoid volvulus in the emergency setting. Hartmann's procedure, while certainly useful, should be reserved for special situations -

hemodynamically unstable patient, absence of a clear line of demarcation for the distal part, severe peritoneal contamination, and inability to perform a tension free anastomosis.

5- Emergency surgery is associated with significant mortality and morbidity.

6- The presence of cardiac, renal, or respiratory co-morbidities has a significant impact on the morbidity and mortality of patients undergoing surgery for large bowel volvulus.

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