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Management and Outcome of Acute Mechanical Bowel Obstruction in a Teaching Hospital

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Abstract **Original Research Article**

Objective: To identify and analyze the clinical presentation, management and outcome of patients with acute mechanical bowel obstruction along with the etiology of obstruction and causes of bowel ischemia, necrosis, and perforation. ***Methods:*** This is a prospective observational study of adult patients admitted with acute mechanical bowel obstruction between September 2010 and August 2011. ***Results:*** Of the 100 patients included in the study, 73 (73%) presented with small bowel and 27 (27%) with large bowel obstruction. Absence of passage of flatus and/or feces (96%) and abdominal distension (92%) were the most common symptoms and physical finding, respectively. Adhesions (51%), incarcerated hernias (14%), Volvulus (14%) and large bowel cancer (12%) were the most frequent causes of obstruction. Sixty-seven patients (67%) were treated operatively and 33 (33%) were treated conservatively. Bowel ischemia was found in 20 cases (20%), necrosis in 13 (13%), and perforation in 3 (3%). Bands and adhesions, hernias, and volvulus, were the most frequent causes of bowel ischemia (65%, 20%, 10%), necrosis (38.46%, 23.08%, 38.46%), and perforation (33.33%, 33.33%, 33.33%). A comparatively higher risk of strangulation was noticed in incarcerated hernias and volvulus than bands and adhesions. ***Conclusion:*** Absence of passage of flatus and/or feces and abdominal distension are the most common symptoms and physical finding of patient'> with acute mechanical bowel obstruction, respectively. Adhesions, hernias, volvulus and large bowel cancer are the most common causes of obstruction, as well as of bowel ischemia, necrosis, and perforation. Although an important proportion of these patients can be non-operatively treated, a major portion requires immediate operation. Great caution should be taken for the treatment of these patients since the incidence of bowel ischemia, necrosis, and perforation is significantly high.

Keywords: Management, Outcome, Acute Mechanical Bowel, Etiology.

INTRODUCTION

Acute mechanical bowel obstruction is a common surgical emergency and a frequently encountered problem in abdominal surgery [1, 2]. It constitutes a major cause of morbidity and financial expenditure in hospitals around the world [3] and a significant cause of admissions to emergency surgical departments [2, 4]. Intestinal obstruction belongs to highly severe conditions, requiring a quick and correct diagnosis as well as immediate, rational and effective therapy [5, 6]. Surgeons are concerned about bowel obstruction cases because strangulation, causing bowel ischemia, necrosis and perforation might be involved, and it is often difficult to distinguish simple obstruction from strangulation. Accurate early recognition of intestinal strangulation in patients with mechanical bowel obstruction is important to decide on emergency surgery or to allow safe nonoperative management of carefully selected patients [1, 2, 7, 8]. Although close and careful clinical evaluation, in conjunction with laboratory and radiologic studies, is essential for the decision of proper management of patients with acute mechanical bowel obstruction [1], a preoperative diagnosis of bowel strangulation cannot be made or excluded reliably by any known parameter, combinations of parameters, or by experienced clinical judgment [7-9].

Mechanical bowel obstruction is an old and common surgical emergency [1 .2]. Immediate and correct diagnosis of this condition and its etiology is essential [5, 6, 9-11], and appropriate treatment is of utmost importance [5, 6, 9-11]. The clinical picture, however, of these patients [6, 12, 13] along with the etiology of obstruction [1-3, 11, 14-16] and strangulation prevalence are variable [8, 17, 18), while appropriate management remains controversial [1-3, 10, 17, 19]. We, therefore, conducted this prospective study to identify and analyze the clinical presentation of patients with acute mechanical bowel obstruction in our department, the etiology of obstruction as well as management and outcome of these patients. Moreover, we evaluated the causes of bowel ischemia, necrosis, and perforation.

AIMS & OBJECTIVES

Acute mechanical bowel obstruction is one of the commonly met emergencies. Most of the patients have similar presentation but management differs. Decision to operate is not always straight forward in every case.

General aims and objectives:

i) To analyze the management and outcome of acute mechanical bowel obstruction.
ii) Follow up the clinical course of the disease.

Specific aims and objectives: To identify and analyze the clinical presentation, management and outcome of patients with acute mechanical bowel obstruction along with the etiology of obstruction and causes of bowel ischemia, necrosis, and perforation.

MATERIALS AND METHODS

This is a prospective observational study of adult (over 14 years old) patients admitted in the Department of Surgery, Rajshahi Medical College Hospital, University of Rajshahi with a diagnosis of acute mechanical bowel obstruction between September 2010 and December 2011. Patients with paralytic ileus were excluded from our study while, since our hospital have a Pediatric Surgery Department, patients under 14 years of age are referred to our Pediatric Surgery Department. The adult patients with clinical and radiological evidence of acute mechanical bowel obstruction were included in the study. Data collection (including pre-hospital, emergency department and in-hospital information) was started immediately after patients' arrival at the Surgical Department and continued on a daily basis. Recorded variables were: age, gender, time between the onset of symptoms and arrival at the emergency department, vital signs (systolic and diastolic arterial blood pressures, heart rate, breathing rate, and body temperature), symptoms and physical examination findings, white blood cell (WBC) counts, imaging features, types of management, time between arrival and operation, operative findings, etiology of obstruction, causes of bowel ischemia, necrosis, and perforation, complications, admission in the Intensive Care Unit (ICU) , length of ICU and hospital stay, and the final outcome of the patients. Vital signs were non-iuvasively measured every 3 h apart from the patients who were admitted to the ICU and had continuous invasive monitoring. Serial clinical examinations every 6 h by the same attending surgical team were performed in all patients to evaluate the patients' symptoms and signs. All patients underwent WBC count testing as well as plain abdominal X-ray every 24 h. Abdominal ultrasound (US) was performed in all patients on arrival at the Surgical Emergency Department while an abdominal computed tomography (C1) scan and colonoscopy were performed in a portion of the patients based on the clinical judgment of the attending surgical team. Criteria for operative management of the patients were hemodynamic instability despite fluid resuscitation with crystalloid solution or recurrence of instability after initial stabilization, peritoneal signs on physical examination and identification by imaging studies (X- ray, US, or CT scan) of bowel ischemia, necrosis, and/or perforation, and failure of non-operative management on the 4th post-adrnission day. Intraoperative findings were also recorded with great emphasis on the etiology of obstruction as well as the incidence and causes of bowel ischemia, necrosis, and perforation.

RESULTS

Over one year of study period, 100 adult patients with acute mechanical bowel obstruction were selected and composed our study group. Mean age of the patients was 36.72 years while men comprised 59%, women comprised 41 % of the group. The majority of the patients (73%) presented with small bowel obstruction. Demographic, clinical, and laboratory data of the study group on arrival at the Emergency Department are presented in Table I.

Table-l: Demographic, clinical, and laboratory data of the total study group on arrival at the Emergency Department (n =100)

Value	Variable
Age	36.72, (range 14-76)
Sex (Male/Female)[2]	M: 59 (59%)/F: 41(41%)
Time between onset of symptoms and arrival (h)	78.96, (range: 0-240)
Systolic arterial blood pressure (mmHg)	110.2, (range: 60-150)
Diastolic arterial blood pressure (mmHg)	50.4 (range: 30-90)
Heart rate (/min)	84.3 (range: 60-140)

Value	Variable
Breathing rate (/min)	17.1, (range: 13-32)
Body temperature (°C)	36.4, (range: 35.5-37.4)
Constipation	96 (96%)
Vomiting	73(73%)
Abdominal distension	92(92%)
Colicky abdominal pain	71 (71 %)
Continuous abdominal pain	16 (16%)
Abdominal muscle guarding	31 (31 %)
Rebound tenderness	11 (11 %)
Small bowel obstruction	73 (73%)
Large bowel obstruction	27 (27%)
White blood cell (WBC) count (10°/L)	9.93 [range: 3.58-24.4]
Leukocytosis? (WBC > 10.8 x 10°/L	61 (61%)

Values are expressed as mean; Values are expressed as number of patients and percentage (parenthesis).

Regarding clinical presentation of the patients, absence of passage of flatus and/or feces (96%) were the most common presenting symptoms and abdominal distension (92%) was the most frequent physical finding on clinical examination.

Table-II: Demonstrate and distribution of the study according to Age distribution

Age (Years)	No. of patients n= 100		
	Total	M	F
14-20	12	7	5
21-30	26	15	11
31-40	27	17	10
41-50	13	8	5
51-60	16	9	7
>60	6	3	3

The table - II shows increased incidence in 2nd, 3rd, 4th and 6th decades of life.

Table III: Demonstrate and distribution of the study according to Sex Distribution

Sex	n=100	%
Male	59	59%
Female	41	41%

The above table shows a higher male incidence with a ratio of 1.44: 1.

Table-IV: Duration of symptoms at the time of admission

Duration	n=100	%
(0-24) hrs	11	11.0
(24-72) hrs	47	47.0
(3-7) days	35	35.0
> days	7	7.0

The highest 47% patients were admitted within period of (24-48) hrs and the lowest 7% patients were admitted after 7 days of the onset of symptoms.

Regarding patients with small bowel obstruction, bands and adhesions, incarcerated hernias, compound volvulus and intestinal tuberculosis were the most frequent causes of obstruction [50 (68.49%), 14 (19.19%),4(5.48%), and 2(2.73%), respectively]. Large bowel cancer, sigmoid volvulus, and fecal impaction were the most common causes in large intestinal obstruction group [12(44.44%), 10 (37.03%), and 4(14.81 %), respectively].

Table-V: Various causes of acute mechanical bowel obstruction

Causes	No. of Patients n=100			%		
	M	F	Total	M	F	Total
Bands and adhesions	26	25	51	26	25	51
Hernia	12	2	14	12	2	14
Volvulus Sigmoid	6	4	10	6	4	10
Compound	2	2	4	2	2	4
Intestinal Neoplasm	7	5	12	7	5	12
Fecal impaction	2	2	4	2	2	4
Intestinal Tuberculosis	1	1	2	1	1	2
Bolus obstruction	1	0	1	1	0	1
Intussusception	1	0	1	1	0	1
Crohn's disease	1	0	1	1	0	1

Finally, in the total study group of patients with small or large bowel obstruction, adhesions, incarcerated hernias, volvulus and large bowel cancer constituted the most frequent causes (51%,14%,14% and *12%*, respectively) (table- V).

Moreover, almost all (except three) patients with adhesive obstruction had previously undergone abdominal operations; the vast majority of these cases had undergone one operation 35 (35%), to (10%) had two, and 3 (3%) had *three* operations. In terms of the types of previous operations, 18 patients (18%) had undergone an appendectomy, 17 (17%) gynecological procedures, 9 patients had undergone repair of perforation of hollow viscus, 8 (8%) had a cholecystectomy, 5 (5%) had adhesiolysis in previous mechanical bowel obstruction episodes, 2 (2%) had large bowel cancer resection, and 5 (5%) had other surgical procedures. It is of note that, except for 2 patients with a laparoscopic cholecystectomy in the group of two previous abdominal operations, all patients had undergone open surgical procedures.

Furthermore, regarding the types of incarcerated hernias (14), 9 patients (64.24%) presented with an inguinal hernia, 1 (7.14%) with an umbilical hernia, 1 (7.14%) with an incisional hernia, and 1 (7.14%) with a femoral hernia, while in 2 patients (14.29%) an internal hernia was intra-operatively identified. Sigmoid cancer was overrepresented accounting for 7 (58.33%) of the 12 patients with obstruction due to a large bowel cancer, whereas two (16.66%) patients had an ascending colon cancer, one (8.33%) had a transverse colon cancer, one (8.33%) had a descending colon cancer, and one (8.33%) had a rectum cancer.

Among 100 patients, 67% was operatively treated and 33% was safely and effectively treated conservatively. In case of non-operative treatment, bands and adhesions composed the highest proportion 22 (66.66%) of the patients with acute mechanical bowel obstruction (table-VI). Out of four obstructed hernia patients, two refused operation after relief of obstruction, and two were obese and advised to reduction their weight.

Table-VI: Choice of Treatment

Type of treatment		**n=100**	**%**
Operative		67	67
Conservative	**Total**	**33**	**33**
	Bands and	22	66.66
	adhesions		
	Fecal impaction	4	12.12
	Obstructed hernia	4	12.12
	Sigmoid vovu1us	3	9.09

The operative procedures that were adapted are given details in table- VII.

Table-VII: Operative procedures adopted

Operative procedures	**n=67**	**%**
(I) Bands and adhesions (29)		
(a) Adhesiolysis	12	17.91
(b) Lysis+Resection and anastomosis	9	13.43
(c) Lysis+Resection with intestinal stoma	8	11.94
(2) Incarcerated hernia (l0)		
(a) Relief of obstruction with herniorrhaphy	4	5.97
(b) Resection and primary anastomosis with herniorrhaphy	6	8.95
Volvulus (11)		
(a) Sigmoid colectomy with primary end to end anastomosis	4	5.97
(b) Resection with intestinal stoma		
(l)Colostomy (Hartmann'S procedure)	3	4.47
(II) Ileostomy	4	5.97
(4) Intestinal neoplasm (l2)		
(a) Proximal colostomy	5	7.46
(b) Right hemicolectomy	5	7.46
(c) Left hemicolectomy	2	2.98
(5) Intestinal Tuberculosis (2)		
Resection and primary anastomosis	1	1.49
Intussusceptions (1)		
Right hemicolectomy with i1eotransverse anastomosis	1	1.49
food bolus obstruction(l)		
Breaking and push upwards into jejunum	1	1.49
Crohn's disease (1)		
Resection and primary anastomosis	1	1.49

In case operatively treated patients 67 (67%) of the total study group, the majority of the causes were bands and adhesions 29 (43.28%), hernia 10 (14.93%), volvulus 11 (16.42%), and intestinal neoplasm 12(17.91%). A substantial portion (36%) required surgical intervention on the first admission day. Details were given in table- VIII.

Table-VIII: Causes of obstruction in operated cases

Cause	N	%
Bands and adhesions	29	43.28
Obstructed hernia	10	14.93
Volvulus	11	16.42
Intussusceptions	1	1.49
Bolus obstruction	1	1.49
Tuberculosis	2	2.99
Intestinal Neoplasm	12	17.91
Crohn's disease	1	1.49

The rate of bowel ischemia, necrosis, and perforation in the total study group were significantly high (20%, 13%, and 3%, respectively). In the small bowel obstruction group, ischemia was intraoperatively reversible in 3 out of 16 patients, whereas the remaining 13 patients had bowel necrosis. In contrast, no reversible ischemia was observed in the large bowel obstruction group. Therefore, although patients with small bowel obstruction and those with large bowel obstruction presented similar ischemia rate, the incidence of necrosis and perforation was much higher in the large intestine group. Etiology of bowel ischemia, necrosis, and perforation in the small bowel obstruction group, the large bowel obstruction group, and the total study group is presented in Tables -IX & X, XI, respectively.

Table-IX: Etiology of bowel ischemia, necrosis and perforation

Cause	Ischemia n=2 (%)	Necrosis n= 13(%)	Perforation n=3 (%)
Bands and adhesions	13(65.0)	5(38.46)	1(33.33)
Hernia	4(20.0)	3(23.08)	1(33.33)
Large bowel cancer	1(5%)	0	0
Volvulus	2(10%)	5(38.46)	1(33.33)

Table-X: Incidence uf bowel ischemia, necrosis and perforation

Value	Small bowel obstruction group (0=73)	Large bowel obstruction group (0=27)	Total Study group (n=100)
Ischemia	16(21.92)	4(14.81)	20(20.0)
Necrosis	7(9.59)	6(22.22)	13(13.0)
Perforation	2(2.74)	1(3.70)	3(3%)

Table -XI: Incidence of bowel ischemia, necrosis and perforation according to cause

Value	Bands and adhesions	Hernia(L4)	Volvulus (14)	Large bowel cancer(12) L
Ischemia	13(25.49)	4(28.57)	2(14.26)	1(8.33)
Necrosis	5(9.80)	3(21.43)	5(35.71)	0
Perforation	1(1.96)	1(7.14)	1(7.14)	0

Bands and adhesions were the cause in the vast majority of the small bowel obstruction group that presented ischemia, necrosis, and perforation, while incarcerated hernias were the second most frequent cause. Regarding the large bowel obstruction group, volvulus constituted the most common cause. Finally, in the total group, bands and adhesions, hernias, and volvulus, were the most frequent causes of bowel ischemia, necrosis, and perforation. It was notable that bowel ischemia was reversible in half of the cases with obstruction due to incarcerated hernias, justifying thus, immediate operative intervention in these patients. With regard to the risk of strangulation, a significantly much higher risk was noticed in incarcerated hernias than all the other obstruction causes. Of the 4 patients with acute mechanical bowel obstruction caused by incarcerated hernias, 4 (28.57%) had bowel ischemia, 3 (21.43%) had necrosis, and 1 (7.14%) had perforation. On the contrary, 13 (25.49%) of the 51 cases with adhesive obstruction presented ischemia and 5 (9.80%) necrosis, and 1 (I .96%) had perforation. Additionally, out of 12 patients with obstruction due to large bowel cancer, 1 (8.33%) had ischemia, and there were no necrosis, or perforation.

Out of 67(67%) operated patients, 25(37.31%) minor to major post-operative complications. Ten (14.93%) of them developed minor wound infection,

3(4.48%) developed Wound dehiscence, 5(7.49"(0) developed Respiratory complication, (1.49%) developed Post-operative anuria with shock, 2(2.99%) developed anastomotic breakdown, two (2.99%) suffered from septic shock along with acute respiratory and renal failure. Out of five Respiratory complications one suffered from pneumonia. Two patients died, resulting in a mortality rate of2.99% due to multiple organ failure attributable to sepsis (table-XII).

Table -XII: Incidence of post-operative complication

Post-operative complication	No. of patient n=67	%
Wound infection	10	14.93
Wound dehiscence	3	4.48
Respiratory complication	5	7.46
Post-operative anuria with	1	1.49
shock		
Anastomotic breakdown	2	2.99
Shock with ARDS with	2	2.99
ARF		
Death	2	2.99
Total	**25**	**37.31**

Postoperative complications were mainly observed in patients who were operated after 72 hrs of onset of symptoms (details in table -XIII).

Post Shock Deat (hours) lnfection Dehiscence Complication operative breakdown

Table-XIII: Incidence of post-operative complication in relation to delay in surgery after the onset of symptoms.

Delay	Wound infection	Wound Dehiscence	Respiratory complication	Post-Operative anuria with shock	Anastomotic breakdown	Shock with ARDS with ARF	Death
<24	1		1				
24-48	2	1	1	1			1
48-72	2		1		1	1	
>72	5	2	2		1	1	1
Total	**10**	**3**	**5**	**1**	**2**	**2**	**2**

In this study out of 100 patients, six (6%) were died. Two of them were died postoperatively due to multisystem organ failure and four were died preoperatively, during resuscitation due to irreversible shock. The cause of obstruction is given in table – XIV.

Table XIV: Mortality in relation to cause and treatment

	Disease	No of death
Pre-operative (Expired during resuscitation)	Small bowel obstruction	2
	Volvulus	2
Post-operative	Intestinal neoplasm	1
	Compound volvulus	1
Total		**6**

DISCUSSION

Acute mechanical bowel obstruction remains a frequently encountered problem in abdominal surgery and a common surgical emergency [1, 2], which is a frequent cause of admissions to hospital emergency surgical departments [2, 4]. The majority of this study group presented with acute mechanical small bowel obstruction. This has also been found in other studies with small bowel obstruction accounting for about 80% of total obstruction cases [9, 20, 21].

Regarding clinical presentation of my patients, absence of passage of flatus and/or feces were the most frequent presenting symptoms and abdominal distension was the most common physical finding on clinical examination. Additionally, vomiting, nausea, colicky abdominal pain, and abdominal discomfort were frequent symptoms on arrival. Our results, even though some differences are noticed, are in accordance with the literature [6, 12, 13, 22, 23]. Particularly, Cheadle *et al.*, reported abdominal pain (92%), vomiting (82%), abdominal tenderness (64%), and distention (59%) as the most frequent symptoms and signs [6], whereas abdominal distension, bilious vomiting, absolute constipation and abdominal pain were the main signs and symptoms in another series [l2].

Perea *et al.*, prospectively studied 100 patients with adhesive small bowel obstruction and found that the presenting symptoms were vomiting (77%), colicky abdominal pain (68%), absence of passage of flatus and/or feces (52%), and constant pain (12%), whereas abdominal distension constituted the most frequent clinical sign with a prevalence of 56% [13].

In a study of patients with bowel obstruction due to large bowel volvulus, the most common sign of sigmoid volvulus was distension (79%) and the most frequent symptoms were pain (58%) and constipation (55%), whereas most patients with cecal volvulus presented with pain (89%) [22].

Furthermore, in a review of cases with obstruction because of small and large bowel intussusceptions, abdominal pain, nausea, vomiting, and abdominal distension were the commonest symptoms and signs, respectively [23]. Adhesions, incarcerated hernias, and large bowel cancer constitute the most frequent causes of obstruction [3, 4, 9, 11, 14, 16, 17, 20, 21, 24-30].

Moreover, adhesions were the most prevalent etiology of obstruction in the small bowel obstruction group and the total study group and the less common etiology in the large bowel group. Several studies postulate that adhesions are responsible for 32%-74% of bowel obstruction and are the leading cause of small intestinal obstruction representing 45%-80% of it [l-4, 7, 9, 14, 17, 20, 24-26, 28-30]. The vast majority (65%-90%) of the patients with adhesive obstruction have undergone previous abdominal operations [6, 13, 14, 18, 19, l6, 28, 29]. In the present study, this finding was higher than that observation. As for the types of previous operations in this study patient, appendectomies, gynecological operations, repair of hollow viscus perforation, cholecystectomies, previous operation duo to adhesion and large bowel cancer resections were more prevalent. This is also in accordance with the literature [2, 18, 19, 28, 29].

Even though the appropriate management of adhesive obstruction is still controversial, a substantial share of these patients, ranging from 35% to 75% in several studies, can safely and effectively be treated with non-operative management as it was also shown in my patients [2, 3, 9, 12, 16-19, 24, 28-30]. The increasing role of adhesions as a cause of acute intestinal obstruction demands greater need for routine preventive measures against adhesion formation [14]. A number of intraoperative measures are now encouraged during elective abdominal surgery to reduce the incidence of adhesions that might subsequently produce intestinal obstruction [1].

As it was also observed in this study, large bowel cancer, particularly sigmoid cancer, is the most common etiology of obstruction in patients with large intestinal obstruction with a prevalence of 40%-90% [9, 10, 14, 21]. A study in African population, 75% cases of intestinal obstruction due to intestinal neoplasm the growth was not respectable [37]. In western study intestinal neoplasm as a cause of intestinal obstruction has a higher incidence as found by Coleman and Moran [33]. All of such patients in my study were operatively treated.

Moreover, incarcerated hernias were the second most common etiology of obstruction as well as an important cause of bowel ischemia, necrosis, and perforation. It should also be emphasized that bowel ischemia was reversible in half of our cases with obstruction due to incarcerated hernias justifying, thus, immediate surgery in these patients. Since abdominal hernias continue to account for 8%-25% of all cases of intestinal obstruction [1, 4, 14, 17, 20, 24, 26, 30], while in a few series represent the most common cause of intestinal obstruction accounting for 30%_55% [11, 16, 21, 27], and, moreover, they still remain the most common cause of strangulation [1, 4, 11, I7, 21, 24, 27] surgeons should continue their aggressive attitude towards elective repair of all abdominal hernias as well as towards immediate operative intervention in patients with acute mechanical bowel obstruction secondary to incarcerated hernias.

In an Indian study, it is shown that volvulus was the most common cause of intestinal obstruction (Mishra and Sahoo) [36]. In my study volvulus is the 3rd most common cause and similar to some other study.

Other less common causes of obstruction reported in the literature are Crohn's disease [3, 17, 20] and gallstones [21], accounting for 3%-7% and 2% of small bowel obstruction cases, respectively, and bowel volvulus [14, 15, 20, 24] and intussusceptions [14, 20, 25], accounting for 4%- 15% and 4%-8% of total obstruction cases, respectively. In my series, the prevalence of Crohn's disease was much lower, whereas no case of obstruction due to gallstone was observed.

An important share of our patients was successfully non-operatively treated. This was more prevalent regarding adhesive small bowel obstruction. This has also been noticed in other studies [2, 3, 9, 12, 16-19, 24, 28-30].

Similar to other studies [12, 24], of those patients that were operated, a substantial proportion required immediate operation. Much attention should be paid to the treatment of these patients since the incidence of bowel ischemia, necrosis, and perforation is significantly high. Strangulation rate in the literature ranges from 7% to 42% [4, 8, 12, 17, 24, 26, 28]. In addition, Kossi *et al.*, reported an incidence of ischemia of 20%, of necrosis of 8%, and of perforation of 2% [18]. In regard to the risk of strangulation in the present study, a significantly much higher risk was noticed in

incarcerated hernias, volvulus and adhesions in comparison to all the other obstruction causes. Moreover, the incidence of bowel ischemia, necrosis, and perforation in adhesive obstruction was much higher ill this study. These results have been also described in other studies [1, 4, 11, 17, 21, 24, 27]. In my study, complication and mortality fate were not so high. In the literature, complication rate ranges from 6% to 47% [6, 20, 25, 27, 31, 32] whereas mortality ranges from 2% to 19% [4, 6, 11, 14, 17-20, 24-27, 31, 32].

In general, appropriate treatment of acute mechanical bowel obstruction as well as timing of surgery for patients selected to undergo operative intervention still remain controversial [l, 3, 10, 17, 19]. Management of this condition requires careful assessment and awareness while the appropriate treatment needs to be tailored to the individual situation [l0, 19].

Furthermore, no specific factors that may predict success of conservative or surgical management have been identified [19]. Although modern surgical management continues to focus appropriately on avoiding operative delay whenever surgery is indicated, not every patient is always best served by immediate operation. As it was also proved in the present study, certain entities, such as bowel obstruction secondary to incarcerated abdominal wall hernia, and patients with clinical signs and symptoms suggestive of strangulation do require prompt operative intervention [1, 3, 16, 17]. Other conditions, however, such as postoperative adhesions, particularly in patients with numerous previous abdominal procedures or concomitant medical problems, often justifiably benefit from a trial of non-operative management [l-3, 9, 16-18, 28-30]. A substantial portion of these patients was successfully conservatively treated in this study.

The risk of strangulation with adhesive bowel obstruction is significantly lower as compared to incarcerated hernia [l, 4, 17, 24], In this study, the strangulation of adhesive bowel Obstruction is much higher due to delay in hospital admission starting from symptoms. Strangulated obstruction requires emergency surgery, and early recognition is often lifesaving since delay in treatment is an independent predictive factor of mortality and, in addition, bowel strangulation is an independent predictor of complication and, even more, of mortality while the mortality rates of patients with strangulated obstruction are two to 10 times higher than those of patients with non-strangulated obstruction [4, 6, 10, 11, 12, 14, 16, 17, 31].

Moreover, accurate early recognition of intestinal strangulation in patients with mechanical bowel obstruction is important to allow safe non-operative management of carefully selected patients [1, 2, 7, 8]. Traditionally, such recognition is based on the presence of one or more of the classical signs: vascular compromise, continuous abdominal pain, fever, and tachycardia, peritoneal signs on physical examination, leukocytosis, and metabolic acidosis [7, 8]. Close and careful clinical evaluation, in conjunction with laboratory and radiologic studies, is essential for the decision of proper management of patients with acute mechanical bowel obstruction; if any uncertainty exists; prompt operative intervention is indicated [1].

It should be emphasized, though, that great caution should be taken for the management of these patients since studies have shown that preoperative diagnosis of bowel strangulation cannot be made or excluded reliably by any known clinical, laboratory, or radiologic parameter, combinations of parameters, or by experienced clinical judgement [7-9].

Limitations of the Study

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

CONCLUSION

Acute mechanical bowel obstruction is one of the commonest surgical emergencies throughout the world. Mortality and morbidity increase markedly with late presentation. So, it demands an increased awareness regarding the danger in delaying the treatment among the health care workers and in general population. A significant number of mortality and morbidity can be reduced by early diagnosis, adequate resuscitation, proper operative procedure and postoperative care. Management of acute mechanical bowel obstruction requires a great deal of exercise of probability clinical assessment and metabolic monitoring and individual case must be judged on its own merit.

Though there is a great advancement of medical science today, acute mechanical bowel obstruction still remains a great challenge for surgeons.

RECOMMENDATION

This study can serve as a pilot to a much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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DECLARATION

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