

ACUTE MECHANICAL INTESTINAL OBSTRUCTION CAUSES & MANAGEMENT

IN AL-YARMOUK TEACHING HOSPITAL

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Abstract

Background: Acute mechanical bowel obstruction is a common surgical emergency and a frequently encountered problem in abdominal surgery. It constitutes a major cause of morbidity and financial expenditure in hospitals around the world.

Aims of the Study: To find out the causes of intestinal obstructions and to assess the methods used for the diagnosis and treatment and the morbidity and mortality rates.

Patients and Methods: a prospective study performed at Al-Yarmouk teaching hospital, during the period between December 2009 and December 2011. The study included information regarding history, physical examination, result of radiological and laboratory tests and the method of management (conservative group 1 and operative group 2).

Results: One hundred sixty patients were included in the study, males 55% and females 45%, The commonest cause was adhesions (68.1%), obstructed hernia (21.3%), tumors (5.6%), volvulus (3.1%), intussusception (1.3%) and gall stone ileus 1 patient 0.6%. Small bowel obstruction constitutes 91.3% and large bowel obstruction constitutes 8.8%. Eighty six patients out of 160 patients (53.75%) were treated by conservative management, 62 patients (72%), successfully treated. And 24 patients (28%) were managed surgically after failure of conservative therapy or the development of signs and symptoms of strangulation. Total (46.25%) of the cases were treated surgically.

Conclusion: Adhesions were the commonest cause of small bowel obstruction. The incidence of strangulation was higher in obstructed hernia. Successful results by conservative treatment can be achieved in high percentage of cases. Morbidity rates, mortality rates, and hospital stay were higher in the operative group in comparison to conservative group.

Key Words: Acute mechanical Intestinal obstruction, small bowel obstruction, adhesive obstruction, hernia.

Introduction

Acute mechanical bowel obstruction is frequently seen among surgical emergencies.¹ Adhesions are responsible for 32- 74% of bowel obstructions and are the leading cause of small intestinal obstruction, representing 45%-80% of cases.^{2, 3} Small bowel obstruction accounts for about 80% of all intestinal obstruction cases.^{4,5}

In strangulation obstruction, blood flow to the obstructed segment is compromised and tissue necrosis and gangrene are imminent^{6,7}, Obstruction may be classified clinically into two types:^{8,9} Small bowel obstruction (high or low) and Large bowel obstruction.

In most cases, supine and upright films of the abdomen can distinguish the type of obstruction present.^{10,11}

Computerized tomography (CT) has become an increasingly common noninvasive diagnostic modality of acute intestinal obstruction, and may also suggest the presence of bowel ischaemia^{12, 13}.

Plain films are as sensitive as CT for the detection of a high grade (complete) bowel obstruction (86% vs. 82%).^{14,15}

Ultrasound is comparable to plain film for the diagnosis, etiology and strangulation in small bowel obstruction and can better identify free fluid which may signal the need for operative intervention.^{16,17}

Decades ago, the hernia was reported as the first cause of acute intestinal obstruction, but recent reports demonstrated that intraperitoneal adhesion became the most possible cause of this disease.^{18,19} there are no specific factors to help in the decision-

making for surgery or conservative therapy.²⁰ Postoperative adhesions, particularly in patients with numerous previous abdominal procedures, often benefit from a trial of non-operative management.^{21,22} In strangulation obstruction, both venous and arterial circulation of the intestine could be disturbed. Such a situation can lead to sepsis and multiple organ failure.²³ The overall mortality and morbidity of bowel obstruction is substantial. Mortality rates range from 3% for simple obstructions to as much as 30% when there is vascular compromise or perforation of the obstructed bowel⁹.

Patients & Methods

This is a prospective study performed at Al-Yarmouk teaching hospital, where one hundred sixty patients were included in the study during the period between December 2009 and December 2011. all patients with a diagnosis of acute mechanical intestinal obstruction admitted to surgical wards, were included, diagnosis was based on the history and physical examination, and supported by radiological evidence of intestinal obstruction by erect and supine abdominal x-ray, chest x-ray, ultrasound and CT scan when available. Data included informations about history, physical finding, laboratory results, radiological findings, treatment modalities and operative findings and procedures which were used in our study. All included patients underwent correction of dehydration and electrolyte disturbances, insertion of stomach tube and administration of I.V

prophylactic antibiotics were begun in the emergency room. Necessary investigations were done including; PCV, blood urea and blood sugar, ECG, and CXR as required. Leukocytes count, blood group and Rh types were also requested.

Patients were divided into:

Group 1: Those who had conservative treatment which subdivided into:

Group 1a : Those who had successful conservative treatment.

Group 1b: Those who had delayed surgery due to failure of conservative treatment.

Group 2: Those who had emergency surgery after initial period of resuscitation .

Data were collected; tables and figures done, P value calculated, morbidity and mortality were calculated. Conclusions were listed and finally recommendations were mentioned.

RESULTS

One hundred sixty patients with a diagnosis of acute mechanical intestinal obstruction were admitted to the surgical wards of AL-Yarmouk teaching hospital eighty eight patients (55%) were males, and 72 patients (45%) were females with a ratio 1.2:1, age range was 15- 90 years, with highest incidence among patients in the fifth and sixth decades, 33 patients (20.6%) and 31 patients (19.4%) respectively, as seen in Figure No.1.

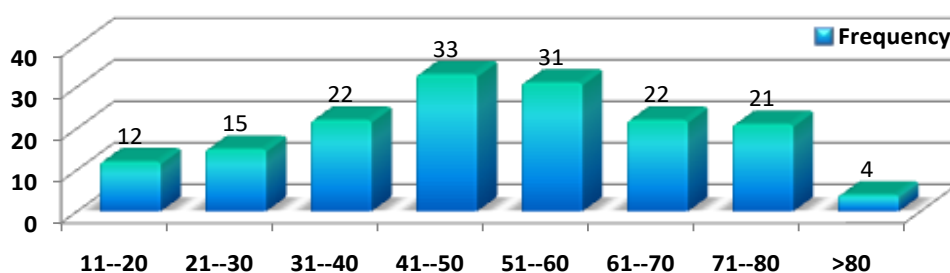


Figure1: The age distribution of patients with intestinal obstruction

Regarding etiology; adhesions were the most frequent cause of intestinal obstruction 109 patients (68.1%). Obstructed hernia constituted the second commonest cause 34 patients (21.3%). Tumors were the third commonest cause 9 patients (5.6%) and the major cause of large bowel obstruction (64.3%). Volvulus is found in 5 patients (3.1%) and represent the second cause of large bowel obstruction (35.7%), intussusception in 2 patients (1.3%) and one patient with intestinal obstruction due to gall stone ileus (0.6%). Regarding the site of obstruction, small bowel was the commonest site of

obstruction , found in 146 patients (91.3%), while large bowel found in 14 patients (8.8%) .

According to obstruction type , patients were divided into two major sub divisions, **simple obstruction**; involved 120 patients (75%), the incidence of simple obstruction was higher in Adhesions, 100 patients (83.3%). and **strangulated obstruction** involved 40 patients (25%) as seen in, which further subdivided into reversible ; involved 22 patients and irreversible; involved 18 patients. The incidence of strangulation obstruction was higher in obstructed hernia 24 patients out of 40 patients (60%).

Etiology	Simple obstruction		Strangulated			
	No	%	No	%	Reversible	Irreversible
Adhesions	100	83.3	9	22.5	4	5
Hernias	10	8.3	24	60.0	16	8
Tumors	9	7.5	-	-	-	-
Volvulus	-	-	5	12.5	2	3
Intussusception	-	-	2	5.0	-	2
Gall stone ileus	1	0.8	-	-	-	-

Table 1: Etiology of intestinal obstruction relative to the type of obstruction.

inguinal hernia was the commonest type of hernia causing intestinal obstruction (53%), followed by paraumbilical hernia (23.5%), and incisional hernia

(17.7%). Strangulated hernia was found in (70.5%) and simple obstructed hernia was found in (29.5%), as seen in table No.2.

Table 2: The type of hernia in relation to pathology and type of obstruction.

Hernia type	Simple obstruction	Strangulated obstruction			Total %
		Reversible	Irreversible	Total	
Inguinal	3(8.9%)	10	5	15(44.1%)	18(53%)
Paraumbilical	2(5.8%)	4	2	6(17.7%)	8(23.5%)
Incisional	5(14.8%)	1	-	1(2.9%)	6(17.7%)
Internal	-	1	-	1(2.9%)	1(2.9%)
Spigelian	-	-	1	1(2.9%)	1(2.9%)
Total	10(29.5%)	16(66.7%)	8(33.3%)	24(70.5%)	34(100%)

Tumors causing intestinal obstruction are found in 9 patients, sigmoid colon 3 cases, caecum 2 cases, rectal tumors 2 cases, recto sigmoid tumor 1 case, and descending colon 1 case.

Regarding symptomatology, abdominal pain was the most common presenting symptoms. In simple obstruction, colicky abdominal pain (70%) while constant abdominal pain (75%) and feculent

vomiting (56.2) were encountered in strangulated obstruction.

Regarding the physical signs which revealed the presence of correlation between strangulated intestinal obstruction with temperature $>38^{\circ}\text{C}$, generalized tenderness, rebound tenderness and rigidity, as seen in table No. 3.

Table 3 : showing physical signs in simple and strangulated intestinal obstruction.

Physical signs of A.M.I.O	Obstruction type						P value
	Simple I.O Pt(n=120)		Strangulated I.O Pt(n=40)		Total		
	No	%	No	%	No	%	
Temprature >38°C	18	15.0	15	37.5	33	20.6	0.002*
Tachycardia	54	45.0	20	50.0	74	46.25	0.583
Peritoneal signs							
Tenderness	78	65.0	40	100	118	73.8	-
Localized	58	74.4	12	30.0	70	59.3	0.0001*
Generalized	20	25.6	28	70.0	48	40.7	
Rebound tenderness	42	35.0	32	80.0	74	46.25	0.0001*
Rigidity	2	1.7	12	30.0	14	8.75	0.0001*
Abdominal distention	70	58.3	25	62.5	95	59.4	0.642
Bowel sound							
Normal	28	23.3	10	25.0	38	23.75	0.614
Hyperactive	38	31.7	10	25.0	48	30	
Absent	54	45.0	20	50.0	74	46.25	
Digital rectal exam.	120	100	18	45	138	86.3	
Empty rectum	85	70.8	12	66.7	97	70.3	0.570

Regarding available investigations, W.B.C count results in simple and strangulated bowel obstructions patients seen in table No.4.

Table4: showing WBC count in simple and strangulated intestinal obstruction.

Investigations WBC count	Obstruction type				P value
	Simple (n=120)		Strangulated (n=40)		
	No	%	No	%	
<12x10 ³ /mm ³	82	68.3	8	20	
12-18x10 ³ /mm ³	36	30.0	24	60	0.0001*
>18x10 ³ /mm ³	2	1.7	8	20	0.0001*

Signs of intestinal obstruction diagnosed by X-ray 77%. By ultrasound 25%. And by CT scan 80%.

Regarding management; patients were divided into two groups: **Group 1** eighty six patients out of 160 patients 53.75%, had conservative treatment which were subdivided into: **Group 1a** Those who had

successful conservative treatment 62 patients (72%), and **Group 1b** Those who had delayed surgery due to failure of conservative treatment 24 patients (28%). **Group 2** Those who had emergency surgery after initial short period of resuscitation (74) patients (46.25%). The total number of patients underwent

surgery was 98 patients out of 160 patients (61.25%) and 62 patients (38.75%) had successful conservative treatment. Regarding conservative time 18 patients (29%) successfully treated with in one day and 30 patients (48.4%) were successfully treated within two days and 14 patients (22.6%) successfully treated with in three.

Regarding operative findings, simple obstruction found in 58 patients (59.2%) and strangulated intestinal obstruction found in 40 patients (40.8%).

Regarding the operative procedures, adhesiolysis was the most common operation performed in 39 patients (39.8%), as seen in table No.5, in addition to other operative procedures which were done to 98 patients who were treated surgically.

Table 5: showing the type of operative procedure and the number of patients.

Operative procedure	No	%
Adhesiolysis	39	39.8
Bowel resection	24	24.5
Hernia repair	22	22.4
Formation of cutaneous stoma	10	10.2
Volvulus detortion and fixation	2	2.0
Removal of gall stone	1	1.1
Total	98	100

Regarding hospital stay, most of patients discharged within **the first week** of admission after improvement 62 patients (100%) successful conservative treatment, while patients discharged in **the second week** 39 patient (24.4%), and 19 patients (11.8%) in **the third week** and only 2 patients (1.3%) in **the fourth week**.

The morbidity rate encountered during the period of study was higher in operative group seen in 31 patients (31.6%), and wound related complications were more common 15 patients, while in conservative group seen in 5 patients (8%).

The mortality rate in this study was 6 patients (3.8%) and all mortalities seen in the operative group only, so the mortality rate in this group was 6.1%.

Discussion

Acute intestinal obstruction is a frequently encountered problem in general surgery and a common surgical emergency²⁴. In this study the largest number of patients was in the fifth decade, and this is similar to results obtained by a local study done at 2010 by Al-Hamdany²⁵ and a regional study done at 2010 by Qureshi A. et al²⁶. the male to female ratio was 1.2:1, which is similar to the results obtained by Al-Hamdany²⁵ and Küçük HF. et al²⁷ in 2010, and it is different from a study done by Maria Silva²⁸ at 2007 in Romania which showed that the females were more commonly affected, and a study done in Korea by Byun YH. et al²⁹ at 2005 were males and females equally affected. These differences may depend on the different etiologies in different countries.

The most common underlying cause of obstruction in our study is found to be adhesions of previous surgery while previous studies in our country showed obstructed hernia as the commonest cause as in Al-marsoomi study³⁰ in 2001. The change in etiology in our country is that after 2003

the incidence of laparotomies for trauma increased which led to the increase of incidence of adhesions, and this is contrary to the earlier results in our regional studies, where obstructed inguinal hernia was the commonest cause of acute intestinal obstruction Perea Garcia et al³¹. nowadays there is a growing knowledge about hernia and rising fear of possible complications which are probably the reasons for an increasing number of hernial repair electively.

Lower abdominal and pelvic adhesions are more likely to cause acute small bowel obstruction than upper abdominal adhesions. These results of anatomical site of previous surgery are well in accordance with results reported by J.Kössi J. et al³² while adhesions due to gynecological operations were more reported by Niyaf³³.

Obstructed hernia was the second commonest cause of intestinal obstruction. Inguinal hernia constituted the largest number of cases followed by paraumbilical hernia and incisional hernia which is similar to other local studies Al-Marsoomi³⁰ and Al-Jabiry³⁴.

Adhesions were a major cause of small bowel obstruction, while neoplasms constitute the third most common cause of intestinal obstruction and it was a major cause of large bowel obstruction (64.3%), Left sided colonic tumors in (77.8%) of cases and right sided involve (22.2%), while results by Al-Hamdany²⁵ were right sided 40% and left sided 60%. Volvulus of the sigmoid colon affect 5 patients (3.1%) and was the second cause of large bowel obstruction (35.7%).

This is similar to results found by Al-Hamdany²⁵ local study and by Markogiannakis H. et al³⁵ in 2007. But in a study conducted at Al-Yarmouk teaching hospital by Al-Marsoomi³⁰ at 2001, hernia was the most common (35%) followed by adhesions (28%) and tumors (17%) and M. Ohene-Yeboah³⁶ at 2003 shown strangulated external hernias

(63.2%), and post-operative adhesions (27.2%) accounted for nearly (90.4%). All other causes of obstruction including volvulus, neoplasia, strictures and intussusception accounted for less than 10% of patients.

While Abdulkareem H. Omari³⁷ at 2012 results were postoperative adhesions in 52.5%, gastrointestinal tumors in 21.0%, and obstructed abdominal wall hernias in 9.5% which were the three major causes of mechanical intestinal obstruction.

abdominal pain found in 100%, and constipation in 83.1% and vomiting in 76.6% were the most frequent presenting symptoms and abdominal tenderness in 73.8%, empty rectum by digital rectal examination in 70.3% and abdominal distension in 59.4% were the most common physical finding on clinical examination. Our results, in comparison to other studies are in accordance with other studies, particularly Cheadle et al³⁸, whereas abdominal distension, bilious vomiting, absolute constipation and abdominal pain were the main signs and symptoms in another series in 2006 by Kuremu RT²². Perea et al³¹ in 2004 prospectively studied 100 patients with adhesive small bowel obstruction and found that the presenting symptoms were vomiting, colicky abdominal pain, absence of passage of flatus and/or feces in and constant pain, whereas abdominal distension constituted the most frequent clinical sign. Markogiannakis H. et al³⁵ reported that absence of passage of flatus and/or feces were the most common presenting symptom and abdominal distension was the most frequent physical finding on clinical examination.

A significant statistical correlation (P value significant) between strangulation obstruction and the presence of preoperative constant abdominal pain, feculent vomiting, temperature > 38 °C, generalized tenderness, rebound tenderness rigidity and WBC count > 12000 /mm³. Our results are approximately similar to Al-Hamdany²⁵, while Tim Jancelewicz³⁹ found that elevated WBC count and peritoneal signs are significantly different.

Plain abdominal films were capable of diagnosing intestinal obstruction in (77%) of cases, compared to (60-70%) reported by Nolan et al⁴⁰ and Nelson et al⁴¹.

Ultrasound examination has been described in the diagnosis of small bowel obstruction⁴². In our study US success found in (25%) of the examined cases. CT scan examination as reported by Akira Furukawa et al⁴³ had a sensitivity of 78%–100%. In our study CT scan success was found in (80%) of the examined cases diagnosed as intestinal obstruction, absence of 24 hours services for ultrasound and CT scan was the reason why not all patients had these investigations in our study.

In conservatively treated patients, looking for increasing abdominal pain, rising temperature, and increasing WBC count as These warning signs were

considered as indications for operative exploration which is found to be statistically significant in our study, (72%) of them were successfully treated conservatively. The period of conservative treatment ranged from 1 to 3 days. Most of them (48.4%) responded within the second day, and within 72 hours.

Küçük HF. et al²⁷ advocate surgical intervention in any patient who fails to show improvement within 24 hours of initiating conservative therapy. While Fleshner et al⁴⁴ advocate more liberal use of non-operative therapy, citing a mean time to successful resolution of up to 4.6 days. In Moayad K. Al-Nakeeb⁴⁵ study up to 3 days which was similar to our study.

Operative intervention was required for (61.25%) of the cases, while in Küçük HF et al²⁷ (56%) of patients needed surgical procedures, and in Niyaf³³ at 2010, (26.6%) of the cases underwent surgery.

The operative findings showed that (59.2%) had simple obstruction, and the remaining (40.8%) had strangulated obstruction. Similar results were found by A`adil S.Mshari⁴⁶, and J. Kössi et al³² 2004, while Moayad K. Al-Nakeeb⁴⁵ result were 79.16% simple obstruction and 20.83% strangulated obstruction, from this finding, we should concentrate on early timing of exploration to decrease the percent of strangulation.

Regarding hospital stay, most of patients discharged within the first week of admission. These findings were in correlation with A`adil S.Mshari⁴⁶ study, the Majority of his patients were discharged from the hospital before 7 days from admission.

The period of hospital stay was longer in the operative group especially those with strangulation which necessitated resection and anastomosis and development of complications like wound infection or development of fistula which need more time for conservative treatment which is supported by Mohamed AY. al-Ghaithi⁴⁷ a regional study.

We found that complications occur in operative group were higher than conservative group, and that goes with local studies done by A`adil S.Mshari⁴⁶ and Shaye A. Khraibet⁴⁸.

The overall mortality in our study was 6 cases (3.8%) and all of them were seen in operative group with rate of (6.1%) out of the operative group 98 patients. These results were approximately similar to a local studies, Al-Hamdany²⁵ (4.9%) and A`adil S. Mshari⁴⁶ (6.8%), while less than the mortality rate in shaye A. Khraibet⁴⁸ (19.5%), and M.OheneYeboaha³⁶ a regional study found overall mortality was (12%), while international study by Chen XZ. et al⁴⁹, reported (1.6%). Major factors influencing mortality rate are old age, comorbidity, non-viable strangulation and delayed treatment,⁵⁰ the lack of intensive care units and expert doctors in this subspecialty was one of the reasons of difference in mortality rate in our study.

In our study we depend mainly on clinical findings to predict strangulation and the appearance of these findings indicate an established bowel ischemia or peritonitis and this was because of the lack of 24 hours services of angio CT scan and other diagnostic facilities.

Conclusions

- 1- Adhesions were the commonest cause of acute mechanical intestinal obstruction and hernias came second.
- 2- The incidence of strangulation obstruction was higher in obstructed hernia as compared to adhesive obstruction.
- 3- Clinical criteria that can be of help in predicting strangulation obstruction were constant abdominal pain, feculent vomiting, temperature $> 38^{\circ}\text{C}$, generalized tenderness, rebound tenderness, rigidity, and WBC count $> 12000 \text{ cell/mm}^3$

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