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Original Article (Clinical Research)

Mechanical Small Bowel Obstruction Incidence, Causes, Signs, and Symptoms in Al – Yarmouk Teaching Hospital

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ABSTRACT

Objectives: To assess causes, signs & symptoms of mechanical obstruction of the small bowel. Background: Mechanical obstruction of the small bowel is a common clinical and surgical condition, often presenting with signs and symptoms like those seen in other acute abdominal disorders controversy remains as to which patients with small bowel obstruction need immediate surgical intervention and which may be managed conservatively. Patients and Methods: A prospective study to assess incidence, causes, signs, and symptoms among ninety-two patients undergoing surgeries due to mechanical small bowel obstruction in Al-Yarmouk Teaching Hospital. In a period between October 2016 and October 2017 patients have divided into two groups 1 patients had surgery during the first 24hr from the start of signs & symptoms and a group of 2 patients had surgery after 24hr since the beginning of signs & symptoms. Results: Among ninety-two patients included in this study the result was 54 male (58.7%) and 38 female (41.3%). Patients with the previous scar were 62 cases (67.4%). The most common causes of MOSB were adhesions (63%), obstructed hernia (29.3%) most common type was inguinal hernia (16.3%), tumors (4.34%) and other causes were Crohn's, bezoar, and intussuscept. Conclusion: Mechanical obstruction. The small bowel is a severe condition and moderately common in cases of acute abdomen adhesions were the commonest cause of MOSB also a high incidence of strangulation was seen in obstructed hernia, and patients generally present with abdominal pain, nausea and emesis, abdominal distension, and progressive obstipation, the clinical finding of high fever. Localized or generalized severe abdominal tenderness, rebound tenderness, severe leukocytosis, or metabolic changes suggest possible complications of bowel necrosis, perforation, or generalized peritonitis. MSBO is usually suggested by plain abdominal radiographs and confirmed by a CT scan.

Keywords Mechanical obstruction, small bowel, Adhesions, Obstructed hernia.

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Patient Consent Declaration: Institutional Review Board (IRB) permission obtained for the study.

INTRODUCTION

Mechanical obstruction of small bowel is one of the commonest surgical emergencies faced by surgeons today. Though a lot of work has been done on it still it is challenging for surgeons from diagnostic and therapeutic point of view (1). Mechanical intestinal obstruction is mechanical blockage arising from a structural abnormality that presents a physical barrier to the progression of gut content (2). Mechanical intestinal obstruction can be classified as partial or complete, simple, or complicated, partial obstruction allows the passage of some liquid contents and gas whereas complete obstruction does not allow any bowel content to pass through point of obstruction. Unlike simple obstruction in complicated obstruction blood circulation to a segment of bowel is compromised that results in ischemia, infarction, and perforation (3).Mechanical small bowel obstruction requires quick and correct diagnosis as well as immediate, rational, and effective therapy (30) .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 (27,28).Peritoneal adhesions and obstruction hernia were the most common causes of mechanical small bowel obstruction (8,9). Adhesions are fibrous bands of scar tissue that form between internal organs and tissues, joining them together abnormally. Intra-abdominal adhesions between pervious abdominal scar and underlying organs occur commonly because of laparotomy (1,17) . Pain is the most common frequent symptom of mechanical small bowel obstruction.

The onset of the obstructive symptoms is usually sudden with high small bowel obstruction but more gradual with low small bowel obstruction. The colicky pain comes with greater frequency in high small bowel obstruction, about every 5 minutes in jejunal obstruction but every 30minutes in ideal obstruction (12). Consequences of bowel obstruction are progressive dehydration, electrolyte imbalance and systemic toxicity due to migration of toxins and bacteria translocation either through the intact but ischemic bowel or through perforation (12,18). All patients of mechanical bowel obstruction are potential candidates for major abdominal surgery with long term morbidity and possible mortality. Hence, the decision of surgery and its timing is vital – various factors are considered for taking the decision on operative or non – operative management. The factors considered are age of the patients, duration of obstruction, volume of nasogastric Aspirate, physical finding, finding of the radiological imaging, previous abdominal surgeries, and malignancy (8) . Patients and Methods: This is a prospective study of adult (over 14-year-old) patients admitted to surgical ward at Al – Yarmouk Teaching Hospital with a diagnosis of acute mechanical small bowel obstruction during a period of one year extended between October 2017.Written informed consent was obtained from all patients a with paralytic ileus or patient treated successfully conservatively were excluded from our study. While, since our hospital does not have a pediatric surgery department, patients less than 14 years of age are not referred to our hospital. Consequently, all adult patients with clinical, laboratory and radiological evidence of acute mechanical small bowel obstruction were included in the study.

Date collection (including prehospital, emergency department and in – hospital information) was started immediately after patients' arrival at the surgical Emergency department continued daily. Recorded variable were Age, Gender, Time between the onset of symptoms and arrival at the emergency department, vital signs (systolic and diastolic arterial Bp, heart rate, breathing rate, and body temp), symptoms and physical examination findings white blood cell (WBC) counts. Imaging features, time between the onset of symptoms and operation, operative finding, etiology of mechanical obstruction, incidence and causes of small bowel ischemia, necrosis and perforation, hospital stay and find outcome of the patients. All included patients underwent a period of resuscitation correction dehydration, electrolyte disturbance, antibiotic, I. V Fluid and NG tube in most of cases necessary laboratory and radiological investigations were done. Patients were divided into two groups, Group 1 patients had surgery during the first 24 hours from the start of signs & symptoms and Group 2 patients had operation after 24hrs since the start of onset. The data analyzed using statistical package for social sciences (SPSS) version 23. Categorical data presented by frequencies and percentage, chi square test was used to test qualitative between postoperative complication and duration of presentation. A level of P – value less than 0.05 was considered significant.

Results: A 92 patients with a diagnosis of mechanical small bowel obstruction were a demitted to the surgical words of AL – Yarmouk Teaching Hospital during a period of one year between October 2016 and October 2017. Fifty-four patients (58.7%) were males, and fifty-eight (41.3%) were females as seen in figure No.1 age range was 14 – 85 years with highest incidence among patient in fourth and fifth decades as seen in figure 2.

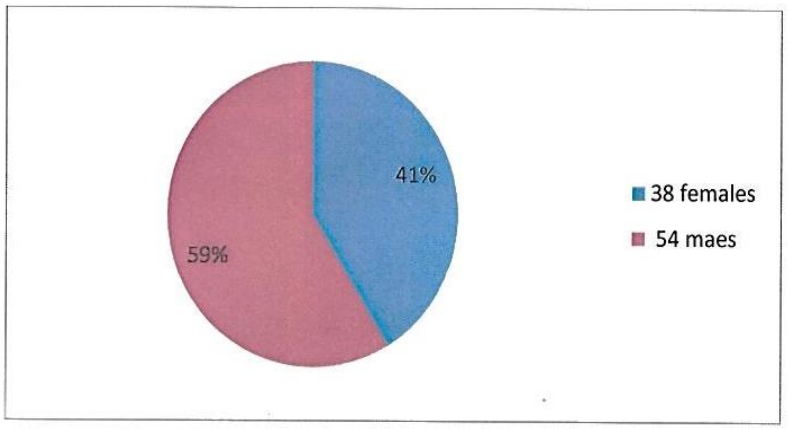

Figure No.1: The sex distribution of patients with mechanical obstruction of small bowel

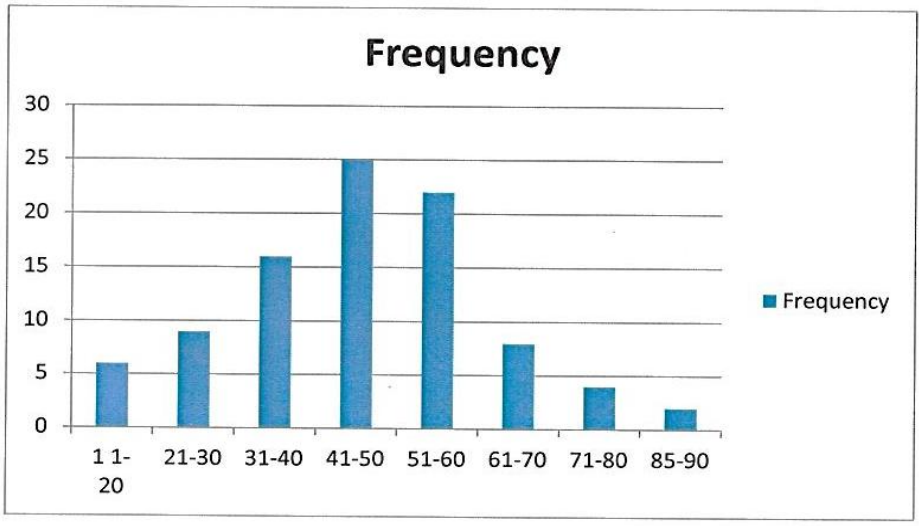

Figure No.2: The age distribution of patients with mechanical small bowel obstruction.

Adhesions were the most common cause of MSBO 58 PATIENTS (63.04%). The second most common cause was obstructed hernia (29.34%) and the most common type of obstructed hernia was inguinal HERNIA 15 case (16.3%) as seen in figure 3. Tumors were the third common cause of MOSB (4.34%) other causes of mechanical obstruction of small bowel represent (3.24%) and they were: Crohn's (1.8%) bezoar (inspissated food) and intussusception as seen in table 1.

Table 1: Distribution of patients according to the causes of mechanical obstruction of small bowel (n=92)

Causes	Frequency N%
Adhesions	58 (63%)
Obstructed hernia	27 (29.34%)
Tumors	4 (3.34%)
Crohns	1 (1.08 %)
Bezoar	1 (1.08 %)
Intussuscepyions	1 (1.08 %)
Total	92 (100 %)

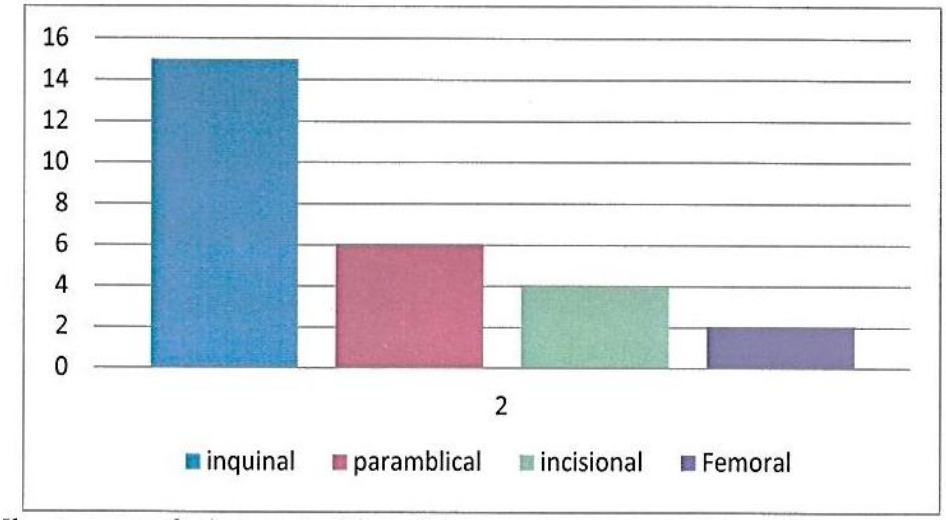

Figure No.3: The types of obstructed hernia

Regarding the clinical presentation our study revealed that abdominal pain was the most common presenting symptoms, also the tenderness was seen in all cases of mechanical small bowel obstruction, the bilious vomiting was seen in 80 cases (87%), distension seen in 74 cases (80.4%) and finally constipation was seen in few cases 7 cases (7.6%) most of them were delayed cases as seen in table2.

Table 2: Distribution of patient according to main signs and symptoms

Signs & symptoms	No	%
Pain	92	100 %
Tenderness localized generalized	92	100 %
Vomiting (bilious)	80	87 %
Distension	74	80.4 %
Constipation	7	7.6 %
Tachycardia	57	61.95 %
Rebound tendemess	35	38 %

Regarding available radiological investigation plain abdominal X – Ray was sent for 75 cases (81.5%) and it gave suggestion of MOSB in 56 cases (74.6%). CT scan was sent for 45 cases (48.9%) and was diagnostic in (88.8%). U/S was sent for 65 cases (70.6%) and it showed only gaseous bowel and suspicion of intestinal obstruction in 15 cases (23%) of them as seen the table 3.

Table 3: Imaging investigation used in MOSB

Imaging Investigation	No. & Patient	Patients with sign of intestinal Obst.	%
Plain abdominal X-Ray	75	56	74.6%
CT scan	45	40	88.8%
Abdominal U/S	65	15	23%

In this study all patient were treated surgically and the patients were divided into two groups according to the time of onset Group 1 patients had operation during the first 24 hrs from the time of onset had Group 2 patients had operation other 24hr since the start of signs & symptoms as seen in figure 4.

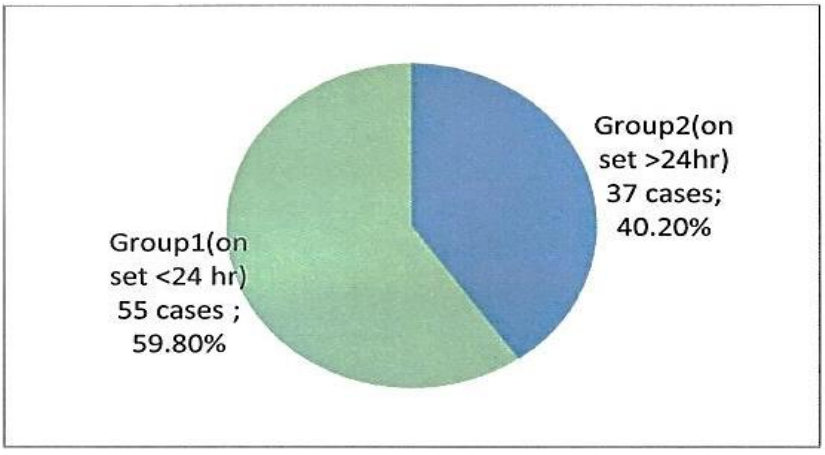

Figure No. 4: Distribution of patients according to the time of operation

Regarding the operative finding and procedures the adhesive bands were the most operative finding and the majority of cases were treated by Adhesionolysis, all cases with obstructed hernia were treated by hernial repair, cases with irreversible ischemia, necrosis, perforation and tumors were treated by surgicalresection, one case was diagnosed as MOSB due to inspissated food (bezoar)was treated by enterotomy with removal of food then primary repair two cases presented with advance metastasis tumor, treated by palliative cutaneous stoma (ileostomy) as seen in table 4.

Table 4: Showing the operative procedures and numbers of patients.

Operative procedure	No	%
Adhesiolysis	54	58.7 %
Bowel resection	12	13 %
Hernia repair	27	29.3 %
Formation of cutaneous stoma	2	2.17 %
Enterotomy	1	1.08 %

Regarding hospital stay most of patients discharged within the first week of admission after improvement, complication rate was high in group 2 (operation was done after the 1st 24 hours) as seen in table 5.

Table 5: Complication rate according to the timing of operation.

Group 1 (operations during 24hr since start of signs & symptoms)
Group 2 (operations was done after 24hr since start of signs & symptoms)

	Group 1 N = 55	Group 2 N = 37	Total N = 92	P. value
1. Post oper. Complication	3 (21.4)	11 (78.6)	14	0.001
Yes	52 (66.7)	26 (33.3)	78	
No				
2. Infection	3 (30)	7 (70)	10	0.041
	52 (63.4)	30 (36.6)	82	
3. Abscess	- (0)	2 (100)	2	0.08
	55 (61.1)	35 (39.6	90	
4. Fistula	- (0)	1 (100)	1	0.22
	55 (60.4)	36 (39.6)	91	
5. Wound dehiscence	- (0)	1 (100)	1	0.22
	55 (60.4)	36 (39.6)	91	

The mortalities in this study were 3 cases (3.26%) one mortality seen in Group 1 and the other two mortalities were seen in Group 2 the causes of mortality were: old age, delayed cases, ischemic heart disease, septicemia,and pulmonary causes.

DISCUSSION

Mechanical bowel obstruction is a common surgical emergency and a frequency encountered problem in abdominal surgery (27,28). It constitutes a major cause of morbidity and financial expenditure in hospital around the world (29) mechanical obstruction of bowel requiring a quick and correct diagnosis as well as immediate rational and effective therapy (30).

In our study the most common cause of mechanical small bowel obstruction was adhesions (63%) as seen in table No. 1and this result similar to result obtained by study done at 2017 by Elroy PW (1). When adhesions were responsible for (60%) of mechanical small bowel obstruction in him also study our study like study done in 2015 by Amit sastry (22) in this study the adhesions were the commonest cause of MOSB. Adhesions are frequentcause of intestinal obstruction, intra-abdominal adhesions between previous abdominal scar and underlying organ occur commonly as result of laboratory (12,17) in our study the cases that have a previous scar were 62 cases (67.339%) and this like study done in 2017 by ceanaH (17). The second most common cause of mechanical small bowel obstruction in our study was obstructed hernia 27 cases (29.34? %) as seen in table 1 and most common type of obstructed hernia in our study was obstructed inguinal hernia (16.3%) as seen in figure No. 3 and this result similar to result obtained by study at 2017 by Elroy PW (1) and another study was done at 2016 by Aswini kumarpujahari(8).In general there are wide variations in the prevalence of 10 throughout the world depending on ethnicity age group, dietary habits and geographic location, among other factors it varies from country to country and area to area in the same country(4,11) and this explain why some studies differ in results from our study for example study was done at 2011 by Naseer Ahmed Baloch(19) in Pakistan when the tuberculosis was the commonest cause of mechanical intestinal obstruction (30.6%) and the

adhesions were the second common cause of mechanical bowel obstruction (22.6%) and the obstructed hernia was the third common cause of mechanical intestinal obstruction (17.5%). In our study the third common cause of MOSP was tumors 4 cases (4.34%) and other causes (3.24%) were Crohn's bezoar (inspissated food) and intussusception (1.08%) for each one.

In our study the percentage of male cases was higher (58.7%) than percentage of females (41.3%) males / females' ratio (1.4 :1) as seen as in figure No. 1 and this result similar to study was done by Hasan Fehmi Kueuk 31 (54.4% / 45.6%)at 2010 and different from study was done at 2015 by Amit sastry, maria Grigoreva when the result was slightly higher of females. The visceral pain of intestinal colic is from increased peristalsis against the obstructive lesion is usually referred towards the midline rather than being localized as the midline origin of development (12,18). Origin of development (12,18). The onset of the obtrusive symptoms is usually sudden with high small bowel obstruction but more gradual with low small bowel obstruction (12).

The colicky pain comes with greater frequency in high small bowel obstruction about every 5 minutes in jejunal obstruction but every 30 minutes in ileal obstruction(12), the pain is typically central in small bowel obstruction but where strangulation of the bowel has occurred the pain may become constant and localized(12) in our study the pain was the commonest symptom (100%) and tenderness was the commonest sign, in the mechanical obstruction of the small bowel the vomiting was the second common symptom 80 cases (87%) and finally the obvious distension seen in 74 cases (80.4%) as seen in table 2 and this result is similar to the study was done at 2016 by Aswini Kumar Pujahar(8). The plain abdominal radiograph considered the first line of radiological investigation that used in MOSB diagnosis in our study the plain abdominal X-Ray sent for 75 cases and was diagnostic in 74? %Of cases as seen in table 3. Sometimes plain abdominal X-Ray was the only radiological in investigation used in diagnosis. CT scan, besides confirming the diagnosis of bowel obstruction, it gives information on partial or complete obstruction, its location, and help in deciding early surgery. Contrast Enhanced Computed Tomography (CECT) give enough information on ischemic bowel and bowel oedema which requires emergency surgery (10,3). In our study the CT scan sent for only 45 cases and was diagnostic in (88.8%) as seen table 3 and this result similar to study was done at 2007 by QalbaniA(10) and study was done at 2008 by Desser TS, Gross M. multidetector row computed tomography small bowel obstruction(3). Clinical presentation of pain, vomiting and distension, laboratory and radiographic factors should all be considered when deciding about treatment of bowel obstructions. In our stud the operative procedure was done according to operative findings, cases with adhesive bands treated with adhesionolysis, cases with obstructed hernia treated by releasing obstruction and hernia repair, cases with complication like, irreversible ischemia, necrosis and perforation treated by bowel resection and anastomosis some time two operative procedures were done in same case as seen in table No. 4.

Post operative complications were seen more common in group 2(delayed cases) and this complication were wound site infection, abscess, fistula and wound dehiscence as seen in table 5 and this result similar to study was done at 2010 by Hasan Fehmi Kucuk(31).

Mechanical obstruction of small bowel is commonly encountered surgical condition and is associated with increased morality (14). The morbidity and mortality by intestinal obstruction can be reduced by early diagnosis and prompt treatment (12). In our study the mortality was seen in three cases (3.26%), one case belongs to Group 1 and two cases belongs to Group 2 the causes of mortality were, old age, delayed presentation, ischemic heart disease, septicemia, and pulmonary causes.

CONCLUSION

Mechanicalobstruction of small bowel remains a comm0n and difficult problem encountered by the severalsurgeons. Following resuscitation, a precise history may indicate the pathology and physical examination supported by basic imaging may indicate where the pathology is. These have considerable bearing on the indications, timing of intervention and necessary preparation should be considered. Appreciation of Fluid balance. Acid – base – electrolyte disturbance and the importance of preoperative resuscitation decrease the morbidity and mortality from MOSB. Patients with previous abdominal scars due to laparotomies are candidate for developing MOSB due to adhesions that are the commonest cause of mechanical obstruction of small bowel. Despite the whole investigations (radiological, laboratory) the clinical judgment is the comer stone for making decision for surgical treatment or non-surgical management.

RECOMMENDATIONS

1. We recommend all patients with intestinal obstruction to be admitted to hospital.

2. We recommend that surgeon to avoid unnecessary use of gauze, towel and mopping and should be careful to avoidintra-abdominal tissue or bowel injury to decrease adhesions.
3. We recommend the surgeon to remove any foreign body, clot and to drain abscess from operative field and should stop any bleeding source to decrease adhesions in future.
4. We recommend the radiological department to provide CT & CECT for 24 hours in the teaching hospital to help the surgeon in diagnosis and exclusion.
5. We recommend increasing the educational level of patients with hernia to do elective surgery to avoid hernia obstruction and strangulation.
6. We recommend minimal invasive surgery in elective and emergency cases.

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