

Mechanical Intestinal Obstruction Causes and Management

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Abstract

Aim:- Is to find out the possible cause or causes leading to intestinal obstruction and to encourage doctors to make use of their clinical abilities with few laboratory and radiological facilities available to diagnose and manage intestinal obstruction.

Patients and Methods: The study consists of 73 patients admitted to AL-Hilla teaching hospital with intestinal obstruction from October 2006 to December 2007. Full medical assessment was done for them with full investigations. Thirty three patients needed surgical intervention.

Results: The commonest etiology of intestinal obstruction was adhesions and bands 44 patients (60%), 5 patients (6.8%) incarcerated abdominal hernia, 3 patients (4.1%) Volvulus of sigmoid, 2 patients (2.7%) mesenteric thrombosis, 2 patients (2.7%) intussusception and 2 patients (2.7%) with pseudo obstruction. Small intestinal obstruction constitutes 61 cases (83.56%) and large bowel obstruction 12 patients (16.4%).

Discussion: The results of this study indicates that postoperative adhesions and bands are the 'main cause of intestinal obstruction and appendectomy was the main operation leads to adhesional intestinal obstruction followed by gynecological operation .It also indicates that generalized abdominal tenderness and rebound tenderness are significant indicator of bowel strangulation.

Conclusion: Intestinal obstruction is a serious surgical condition and needs careful clinical history and examination which remains the corner stone by which we can differentiate between simple and ischemic obstruction, usually early intervention needed to prevent gangrene and decrease morbidity and mortality.

الخلاصة

الهدف من الدراسة : إيجاد الأسباب الممكنة المؤدية إلى انسداد الأمعاء ولتشجيع الأطباء بواسطة إمكاناتهم السريرية مع القليل من الفحوصات المختبرية والفحوص الشعاعية المتوفرة لتشخيص ومعالجة انسداد الأمعاء.
الطريقة :- تضمنت الدراسة 73 مريضاً دخلوا المستشفى الحلة التعليمي العام نتيجة لانسداد الأمعاء من تشرين أول 2006 إلى كانون أول 2007 وقد تم تقييم حالاتهم المرضية بصورة كاملة مع إجراء كافة الفحوصات .
33 مريض فقط كانوا بحاجة إلى تدخل جراحي.

النتائج : كان السبب الرئيسي لانسداد الأمعاء لمعظم الحالات هو الالتصاقات الناتجة عن عمليات جراحية سابقة في 60% من المرضى (44 مريض)

و الفتوق المختنقة في 6.8% من المرضى (5 مريض) والنواء المعوي السيني في 4.1% (3 مريض) وتداخل الأمعاء في 2.7% من المرضى (مريضين) و الانسداد الكاذب للأمعاء في 2.7% (مريضين). شكل انسداد الأمعاء الدقيقة 83.56% من الحالات (61 مريض) والغليظة 12 مريض (16.4%).

المناقشة : أكدت الدراسة أن الالتصاقات الناتجة عن عمليات سابقة هي السبب الرئيسي المؤدي لانسداد الأمعاء وان عمليات استئصال الزائدة الدودية هي العملية الجراحية الرئيسية المؤدية لحصول الالتصاقات تليها عمليات الجراحة النسائية .

الاستنتاجات :- انسداد الأمعاء هي حالة جراحية خطيرة وتحتاج إلى أخذ تاريخ مرضي وفحوصات دقيقة والتي تبقى الحجر الأساس والذي عليه نستطيع من خلاله التفريق بين انسداد الأمعاء البسيط والوعائي والذي عادة يحتاج إلى تدخل جراحي مبكر لمنع حصول الغانغرينا ولتقليل حالات الموت والإعاقة .

Introduction

Intestinal obstruction is a common and dangerous surgical emergency. It is second to abdominal trauma as a cause of surgical emergency^(1, 2). The diagnosis is usually straight forward based on clinical and radiological findings. Clinically there were cardinal features of obstruction include abdominal pain, distention, vomiting and absolute constipation^(3,4)

1-Pain: - is the first symptom which occurs suddenly, usually severe in nature and colicky. A continuous severe pain indicates strangulation^(3,4).

2-Vomiting: - the more distal the obstruction the longer the interval between the onset of symptoms and appearance of nausea and vomiting^(3,4).

3-Distention: the more distal obstruction the more will be distension and it is due to gas and fluid collection inside the bowel^(3,4)

4-Constipation is classified as absolute where neither faeces nor flatus are passed^(3,4)

5-Other manifestations of intestinal obstruction include: -dehydration, fever, hypokalaemia and abdominal tenderness^(3, 4). Clinical features of strangulation include constant pain, rebound tenderness, rigidity and shock.

Radiologically:-

1- Supine plain X-rays preferred since gas distention appears the anatomical character of each part of intestine^(3,4)

- Jejunum:- characterized by its valvulae conniventes giving concertina effect.

- Ileum: - described as featureless,

-Cecum as rounded gas shadow in the right iliac fossa and

-Large bowel shows haustral folds spaced irregularly^(3,4).

2- Erect position x-rays shows air-fluid levels which occur later and fluid levels reflect the severity of obstruction and also the distance of obstruction^(3,4)

3- Other radiological investigations are: - U/S, CT and MRI for more information in suspicious cases.

The etiology and pattern of obstruction vary in different countries, in western countries the obstructed hernia used to be the commonest cause of intestinal obstruction in the first half to of last century. Now postoperative intraperitoneal adhesion is the commonest cause (40%), followed by carcinoma (15%), obstructed hernia (12%), inflammatory causes (15%), fecal impaction (8%), pseudobstruction (5%) and rare causes (5%). In developing countries the obstructed hernias still the most common cause of obstruction followed by adhesion and Volvulus of sigmoid^(5,6). The problem facing the surgeon in this condition include first he should decide that the diagnosis is intestinal obstruction secondly the timing of surgical intervention and putting in mind the possibility of intestinal strangulation. Silen reemphasized the need for early surgical interference because of the difficulty in recognizing the strangulation clinically and higher morbidity and mortality in patients who had prolonged conservative therapy⁽⁷⁾. At the same time works continued to appear in using different types of clinical aids to find out the possibility of strangulation.

The aim of study

Is to define the major causes of intestinal obstruction in our locality and shed light on the reliability of the

various predictive criteria in differentiation between simple and strangulated intestinal obstruction.

Patients and Methods

Seventy three patients with intestinal obstruction admitted to surgical department of Hilla teaching hospital for about more than one year period, between the 1st of October 2006 to the 30th of December 2007. Our patients admitted first to surgical casualty unit. Careful history and clinical examination with the necessary laboratory and radiological investigations to confirm the clinical suspicion usually done in the same unit, during this period the necessary resuscitation given to the patient at the same time. Our provisional diagnosis depends mainly on clinical examination.

Keeping in mind certain physical finding which usually present in cases of strangulation among these are:-

- (1) Abdominal tenderness, rebound tenderness and muscle guarding.
- (2) Tachycardia (above 100/min).
- (3) Leucocytosis (above 10000/mm³).
- (4) Fever (above 38 °C).
- (5) Constant pain suggestive of strangulation.
- (6) Palpable abdominal mass or irreducible hernia.
- (7) Shock (hypotension).
- (8) Vomiting.
- (9) Bloody diarrhea.

A vein with good caliber cannula is selected. Patient received daily requirement of fluid plus loss as normal saline or ringer lactate, with nasogastric tube suction, monitoring chart of vital signs and a combination of antibiotics are given (ceftriaxone and metronidazole iv). Laboratory investigations had been done which include Hb and PCV, blood group and cross match, blood urea, and random blood sugar. White cell count in suspicious cases of strangulation, this

is done in most cases as preoperative investigations. In our study abdominal U/S and radiological examination were done to all patients.

Results

Seventy three (73) patients with intestinal obstruction admitted to surgical department of Al-Hilla teaching hospital (met the criteria for inclusion in this study for diagnosis and treatment). Male to female ratio was 2/1, this ratio relatively constant in all age groups. The age range from 10 years to 80 years, the highest rate found among patient where in the fourth, fifth and sixth decades of life. In fact 78% of patient above 40 years, the maximum 18 patients (25%) number of patients in the seventh decade of life. **Table 1** show the etiology of all types of obstruction and give absolute incidence and percentage of each cause.

61 patients (83.56%) presented with small bowel obstruction and 12 patients (16.43%) presented with large bowel obstruction. Adhesions were the most frequent cause of obstruction and form 44 patients (60%). Most bands and adhesion were due to previous operations and appendicectomy is the commonest cause in 20 patients (45%), followed by gynecological operations 12 patients (27%), followed by previous laparatomies 10 patient (22%), followed by 2 patients diagnosed as tuberculosis of abdominal cavity (4.5%) **Table 2**. Bands and adhesions are the major cause of small bowel obstruction. The second common cause is the obstructed external hernia 15 patients (20%) (**Table1**). The inguinal hernia constitute the largest number of cases 9 patients (60%), followed by paraumbilical hernia 3 patient (20%), incisional hernia in 2 patients (13.3%) and femoral hernia 1 patient (6.6%)

(Table 3). There is no internal herniation reported in this study. As a cause of intestinal obstruction nearly most cases of external hernia causes small bowel obstruction (Table 1). Neoplasm constitute the third most common cause of intestinal obstruction 5 patients (6.8%). There is 2 patients with small bowel tumor and 3 patients with large bowel tumor, so it is a major cause of large bowel obstruction in elderly. Volvulus of sigmoid colon

constitutes 4.1 % (3 patients). Intussusception constitutes 2.7% (2 patients) both of them occur in adult age group in the small bowel and found due to small bowel tumor which are lipoma and stromal tumor. Mesenteric vascular occlusion 2 patients (2.7%) presented as paralytic ileus, both of them are old age with ischemic heart disease and lastly 2 patients (2.7%) presented as pseudoobstruction.

Table 1. Causes of Intestinal Obstruction in Al-Hilla Teaching Hospital

Causes	No. Of patients	%
Bands and adhesions	44	60
External hernia	15	20
Neoplasms	5	6.8
Volvulus	3	4.1
Mesenteric occlusion	2	2.73
Intussusception	2	2.73
Pseudoobstruction	2	2.73
Sum	73	~100
Small bowel obstruction	61	83.56
Large bowel obstruction	12	16.43

Table 2. Primary causes of bands and adhesions.

Type of HERNIA	Number of Patients	%
Inguinal	9	60
Paraumbilical	3	20
Incisional	2	13.3
Femoral	1	6.6

Table 3. Types of hernia as a cause of intestinal obstruction.

Primary causes of adhesions	Number. Of Patients	%
Appendicectomy	20	45
Gynecological	12	27
Laparotomy	10	22
Tuberculosis	2	4.5

Mortality:

There are 4 deaths in 73 patients (mortality rate 5.47%).The cause of death in 2 patients was due to late septic shock which is due to gangrene

and the others were due to terminal malignancy(advanced carcinoma of colon).

Differentiation between simple and strangulated intestinal obstruction:

After careful assessment of the patients by clinical examination, abdominal x-rays supine and erect positions usually done for almost all patients to elucidate the level of obstruction and possible etiology and the possibility of perforation. Laboratory investigations include Hb, .PCV, WBC count, blood sugar and. Urea, blood group and cross match, these done for most patients as preoperative investigations. Most of the patients received at least one liter of Ringer or normal saline in the emergency unit, nasogastric suction and antibiotic was given if there is suspicion of strangulation. There were 54 patients (73.9%) with small bowel obstruction and 19 patients (26.1%) with large bowel obstruction. About 50 patients 68.5 % diagnosed as simple intestinal obstruction were put on conservative therapy(nothing by mouth ,iv fluid, nasogastric tube suction and antibiotic) and by this conservative treatment the obstruction was relieved in 40 patients, and in 10 patients the obstruction was not relieved, the surgery done for them and 2 patients were found to be strangulated due to external hernia (**Table 4**).There were 23 patients diagnosed as having strangulated intestinal obstruction preoperatively according to the criteria used diagnosis of strangulation (**Table 5**).Generally the most critically ill patient had the greatest number of symptoms.

(1) Abdominal tenderness, rebound tenderness and muscle guarding (38 patients) (52%).

(2) Tachycardia above 100/min 54 patients (74%),

(3) Leucocytosis more than 10000 /mm³ was noted in 48 patients (65%),

(4) Fever above 38°C was seen in 41 patients (56%).

(5) Pain suggestive of strangulation in contrast to pain of simple mechanical obstruction tends to be more severe and constant in 38 patients (52%),

(6) Thirty one patients (43%) have palpable abdominal mass or irreducible hernia.

(7) Hypotension seen in about 15 patients. (21%) and preoperative shock seen in 6 patients (8%) and it was an ominous sign.

(8) Bloody diarrhea or blood and mucous by rectal examination commonly found in patient with mesenteric vascular occlusion and intussusception, it constitute 8 % (2 patients).

All patients have at least one sign of strangulation and the majority of patients have 4 or more. Plain abdominal x-rays were not helpful in differentiating simple from strangulated obstruction. Of the 23 patients (**Table 5**) who were diagnosed preoperatively as strangulated intestinal obstruction only 10 patients (43%) were found to have strangulated intestinal obstruction and actually 3 of them required resection because of gangrenous bowel and in 13 patients no strangulation was found. On the other hand 50 patients (**Table 4**) who were diagnosed preoperatively as simple intestinal obstruction appear to have strangulation. Two patients (4%) were found to have strangulated intestinal obstruction after exploration.

Surgical technique and operative procedures:

The total number of patients operated on was 33 patients. Twenty eight patients (85%) showed viable bowel and only 5 patients (15%) were found to have gangrenous bowel which necessitate resection with end to end anastomosis.

The procedures done in our study are: -

(1) Exploratory laparotomy to discover the nature and site of obstruction.

(2) Lysis of bands and adhesions.

(3) Release of strangulated external hernia followed by simple repair of the canal.

(4) Emergency colostomy or colost-

omy as life saving measures.
 (5) Resection of the gut and primary anastamosis or colostomy.

(6) Short circuiting around the obstruction.

Table 4. Relation between preoperative and postoperative diagnosis of simple and ischemic intestinal obstruction.

Preoperative provisional diagnosis of simple intestinal obstruction	Intraoperative Diagnosis
50 patients 40 patients relieved by conservative management	10 patients 2 patients ischemic obstruction 8 patients simple obstruction

Table 5. Preoperative vs. Intraoperative diagnosis of bowel ischemia.

Preoperative suspicion of ischemia	Intraoperative diagnosis
23 patients	10 patients with strangulated obstruction 13 patients with simple obstruction

Discussion

Recent reports are all documenting an increasing prevalence of adhesions as a major cause of intestinal obstruction, the results reported by McAdam (8), Bizer (9), Play forth (10), Stewartson (11) and Banerjee (12); showed that adhesions were the main cause of intestinal obstruction forming 63%, 74%, 54%, 64% and 69% respectively.

In our study adhesions were also the major cause and it accounts for 60% of the cases which is very similar to the previous studies, this can be explained by the high rate of abdominal surgery and early hernia repair that have been done in our locality in the last decades which led to decrease in the incidence of hernia as a cause of intestinal obstruction with progressive increase in adhesive intestinal obstruction. Different results have been reported by Kuruvilla (13) who did his study in Libya, he found that adhesions accounted for 28% of cases while Chakrabarty (1) from India showed that adhesions were the cause of obstruction in only 9.9 % of causes (Table 6). In our study appendices-

tomy was the commonest operation complicated by adhesive bowel obstruction (54%). This result has been documented by Alexander (14) who reported an incidence of 59% while in the study of Kuruvilla (13) appendicectomy accounted for 34.2 % of cases. Asbun (15) found that appendicectomy was the prior operation in only 4% of cases which is very low figure as compared with that of our study. The probable explanation for this high incidence of appendicectomy that found in our study as the main prior operation for adhesive bowel obstruction is that appendicectomy is the commonest operation performed in all hospitals. Also a significant number of patients with acute appendicitis presented late with perforation which explained the increasing incidence of adhesions. In our study gynecological (35%) operations occupy the second cause of adhesive bowel obstruction especially caesarean sections due to increase percentage of these operations nowadays. Also increase number of laparotomies was due to trauma or acute abdomen associated with increase bowel obstruction.

Table 6. Shows the commonest cause of mechanical intestinal obstruction and its percentage in different countries.

Country	Commonest causes of bstructin	%
England	Adhesion	73
Usa	Adhesion	75
India	Hernia	50
Saudia arabia	Adhesion	57
Nigeria	Hernia	65
Ughanda	Hernia	75
Ghana	Hernia	78

Table 7. Signs and symptoms of intestinal obstruction and their percentages.

Signs and symptoms	No. Of patients	%
Abdominal tenderness and Rebound tenderness	38	52
Tachycardia >100/min	54	74
Leucocytosis>1000/mm	48	65
Fever>38°c	41	56
Pain suggestive of strangulation	38	52
Palpable abdominal mass and Irreducible hernia	31	43
Shock(hypotension)	15	21
Bloody diarrhoea	6	8

Table 1 shows the commonest cause of mechanical intestinal obstruction and its percentage in different countries. The table shows that Saudi Arabia is a developing country and the commonest cause is adhesion which reflects the development of health services in this country. In many parts of the world particularly in developing countries hernia and hernia repair is the commonest cause of intestinal obstruction. Kuruvilla ⁽¹³⁾ found in his study in 1987 that hernia was the major cause of intestinal obstruction in Libya, it accounted for (30.6%) of cases and even a higher incidence (50%).'While in our study hernia was the second common cause it accounted for (20%) of cases which is less than above figures, this is probably the result of early hernia repair used to be done in our locality. Neoplasm accounted for five patients (6.8%)

mostly colonic tumors (3 patients) and accounted for the commonest cause of large bowel obstruction. Volvulus of sigmoid accounted for 4.1% (3 patients) is the second cause of large bowel obstruction. Intussusceptions account for 2.8% (2 patients) none of them was found to be gangrenous. Mesenteric vascular occlusion in 2 patients (2.8%) in both of them the bowel was found to be gangrenous and resection was done and 2 - patients (2.8%) diagnosed as pseudo-obstruction by exclusion and responded to conservative management. Twenty three patients (**Table 5**) were suspected preoperatively to be strangulated intestinal obstruction according to the following clinical findings:-

- Abdominal tenderness, rebound tenderness and abdominal guarding 52%.
- Leucocytosis above 10,000 65%.

- Tachycardia 74%.
- Fever above 38°C 56%.
- Pain suggestive of strangulation in 52%.
- Palpable abdominal mass or irreducible hernia in 43%. Shock or hypotension 21 %.
- Bloody diarrhea in 8%.

Peroperatively only 8 patients 34% (**Table 5**) were having strangulated intestinal obstruction and in two of them a gangrenous bowel was found. In 15 patients (66%) viable bowel is found, so 34% of patient with strangulation were correctly diagnosed preoperatively. In 50 patients (**Table 2**) who were diagnosed preoperatively as simple intestinal obstruction 40 of them relieved by conservative therapy and 10 patients failed to respond to conservative treatment, on exploration two of them (13.3%) were found to be with strangulated bowel.

Cross KSH⁽¹⁶⁾ found that 14 patients need bowel resection but in only 3 of them the preoperative diagnosis was correct. Silen et al⁽⁷⁾ found that in only 15 of patients with strangulation were correctly diagnosed preoperatively. Villamizar E⁽¹⁷⁾ And Chrungoo RK⁽¹⁸⁾ have shown that differentiation between simple obstruction and that of strangulation was difficult and have recommended early operation to avoid catastrophic results. In study by Stewardson, Bombeck and Nyhus⁽¹¹⁾ the correlation of a combination of the so called classic findings and the presence of gangrenous bowel they found in nearly 90% of patients they exhibit 2 or more of the following finding as fever, Leucocytosis, tachycardia and localized abdominal tenderness should be present. No patient has gangrenous bowel without at least one of the classic finding. In general, the more of these finding that are present the greater the incidence of strangulation. In our study patients who were diagnosed as simple

intestinal obstruction their management started conservatively with close clinical observation including the passing of flatus or motion, repeated abdominal examination and chart for vital signs which usually continued for 12 - 24 hours. Looking for any change in the clinical status of the patient and vital signs including increasing abdominal pain, rising temperature, increase in pulse rate and increase in WBC count. These warning signs were considered as an indication for operative exploration. Leffal MD⁽⁴⁾ set that early operation for patients with strangulated obstruction is necessary to reduce morbidity and mortality. With prompt surgical intervention the strangulating element may be removed before gangrene of the bowel ensues. Careful search for signs and symptoms of strangulated intestinal obstruction should allow earlier diagnosis and therapy. Ellis⁽²⁾ said once clinical diagnosis of obstruction is made even when radiological appearances are normal and there is nothing to suggest strangulation the best treatment is still urgent surgery. F.Charles Brunicardi⁽¹⁹⁾ said once there is clinical suspicion of obstruction the best treatment is immediate surgery; delay will only increase morbidity and mortality.

Conclusion

From this study we concluded that postoperative adhesions are the major cause of intestinal obstruction and appendectomy being the commonest cause of adhesive intestinal obstruction. There is no single physical sign that can be regarded as a definite indicator for the presence of bowel strangulation, however generalized abdominal tenderness and rebound tenderness are amongst the physical signs that have a significant association with the presence of bowel strangulation, their presence in patients with

acute intestinal obstruction should call for early exploration.

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