
**PATTERN OF INTESTINAL OBSTRUCTION IN
BASRAH; A PROSPECTIVE STUDY****Adel Salih Mushari[@] & Zaki Al-Faddagh[#]**[@]MB,ChB, FICMS, AlQurna Hospital. [#] MB,ChB, CABS, Professor, Department of Surgery, Basrah College of Medicine, Basrah University.**Abstract**

Intestinal obstruction remains one of the commonest surgical emergencies, with hernias being electively repaired; adhesive obstruction has emerged as the leading cause of intestinal obstruction in the west, while the obstructed hernia remaining the main cause in developing countries.

This is a prospective study involving 464 patients admitted with intestinal obstruction to the surgical unit in AL-Mawane general hospital, Al-Sadir teaching hospital, Al-Basrah maternity and child hospital and Al-Basrah general hospital during the period between (January 2004-December 2007).

All patients were admitted and thorough careful history, particularly history of previous surgery and examination were done involved the hernial orifice. Type of treatment, time surgical intervention, operative finding and period of hospital stay were noted.

Most of our patients were attended for postoperative followed up for complications and recording the mortality in the hospital.

The study included 464 patients, their age ranged from 2 days to 75 years. (Mean 33.8years), and they are more frequent in female 258 patients (55.7%) than male 206 patients (44.3%). Acute onset of presentation was found in 296 patients (63.7%). Constipation in 419 patients (90%) and abdominal pain in 380 patients (82%) were the main presenting symptoms. Previous admissions for same complain were reported by 64 patients (13.7%). History of previous surgery were reported by 71 patients (15.4%), and time interval from previous surgery, varies from one month to (5) years. Simple obstruction was the most common form of intestinal obstruction (67.7%). Of all patients included in the study, 288 patients (62%) present with small bowel obstruction and 176 patients (38%) with large bowel obstruction. The commonest cause of intestinal obstruction was strangulated external hernia in 99 patients (21.3%), intestinal adhesions in 73 patients (15.7%). The hernia (29.2%) together with adhesions from previous surgery (25.4%) constitute the bulk of causes of small bowel obstruction, while volvulus of sigmoid colon (23.6%) and tumours (22.7%) form the main cause of large bowel obstruction. Intussusception was the most prevalent variety of intestinal obstruction in child age group (27.2%), followed by hirschsprungs disease (22.2%). Of strangulated hernia, inguinal hernia was the most frequent type of hernia seen (71.7%). Surgical intervention was necessary in 409 patients (88.2%). The period of conservative treatment ranges from 3-14 days, with average (6.3) days. Post operative complication occurred in 167 patients (40.8%). The mortality was 6.8% and it was related to extreme of life, delay in presentation and mismanagements.

The study concluded that simple intestinal obstruction is the commonest type of obstruction, higher rate of strangulated hernia than the rate of obstruction due to adhesions, which is opposite to a typical pattern of developed countries. Intussusception is the most frequent cause of intestinal obstruction in children, early presentation and diagnosis is the key to reducing morbidity and mortality.

Introduction

Intestinal obstruction is a common surgical problem and account for large percentage of surgical admission for acute abdominal pain¹. The intestinal

obstruction may be classified into two types: dynamic (mechanical) obstruction, adynamic (non mechanical) obstruction, this may occur in two forms. Peristalsis

may be absent (such as paralytic ileus) or it may present in a non propulsive form (such as mesenteric vascular occlusion or pseudo-obstruction), in both types mechanical element is absent².

The differential diagnosis of intestinal obstruction mostly depends on its location in the bowel, age of the patients, history of previous abdominal or pelvic operation, previous episode of intestinal obstruction, history of intra abdominal inflammation and the presence of associated disease problem²⁻⁴. Careful history and thorough physical examination can make correct provisional diagnosis of intestinal obstruction^{1,4}. Clinical signs like the presence of scar of previous operation, abdominal distension, swelling of hernial orifice and abdominal mass still remain important as ever^{2,3}. Adhesive intestinal obstructions especially when admitted frequently to the hospital deserve special attention, however most of these obstructions related adhesions resolve with conservative treatment⁵. Common causes of intestinal obstruction in their studies are adhesions from previous laparotomy, strangulated external hernia, volvulus of colon, tumour, paralytic ileus, pseudo-obstruction, fecal impaction, hirschsprungs disease, crohn's disease, radiation enteritis, gall stone ileus and intussusception^{1,2,4,6}.

Intestinal obstruction can be classified as Small bowel obstruction & Large bowel obstruction^{2,7}:

The nature of presentation will also be influenced by whether the obstruction is: acute, subacute, acute on chronic & Chronic.

Chronic intestinal obstruction usually involves the lower gastro intestinal tract⁴. Presentation will be further influenced by whether the obstruction is: Simple obstruction where the blood supply is intact & Strangulated where there is direct interference to blood flow.

The important of these classification, is that, the natural history of the condition, its response to treatment and the asso-

ciated morbidity and mortality all vary according to which type of obstruction is present¹. Adhesions are the commonest causes of intestinal obstruction in the western world and account for 40% of causes of intestinal obstruction followed by inflammatory and carcinoma 15% for each, while obstructed hernia form 12% of causes².

The frequency with which obstruction related to these condition is encountered varies according to the patients population and practice setting⁸.

Postoperative adhesions giving rise to intestinal obstruction usually involve the lower small bowel². Most of the adhesions related events are encountered during the first year after surgery, but the incidence of adhesion related morbidity and readmission did not decline during the 10 years period⁵.

Although all abdominal surgeries cause adhesions, these result in obstruction most frequently occurred after appendectomy and pelvic procedure such as abdominal hysterectomies^{2,7}. In developing countries, intestinal obstruction due to strangulated hernia, head the list of causes of intestinal obstruction⁴ and hernia of all types are encountered⁷.

Acute bowel obstruction is an ever increasing clinical problem. Successful management depends on comprehensive knowledge of the etiology and pathophysiology of the obstruction, familiarity with imaging methods, good clinical judgment, and meticulous surgical technique⁷. The mortality of intestinal obstruction depends on the presence of associated comorbid disease and presence of strangulation which increase it by five folds⁴.

The aim of this study is to identify and analyze the clinical presentation, management of intestinal obstruction in our city along with the etiology of obstruction and to evaluate patients clinical condition regarding the causes of obstruction, post operative complication, period of conservative treatment and hospital stay.

Patients and methods

This is a prospective study involved 464 patients with intestinal obstruction admitted to Al-Mawane hospital, Al-Sadir teaching hospital, Al-Basrah maternity and child hospital and Al-Basrah general hospital between (January 2004–December 2007).

A questionnaire form filled for all patients which include all features. All patients were admitted and thorough careful history, particularly history of previous surgery and examination were done involved the hernial orifice.

In addition to blood urea, blood sugar, Hb and WBC count, pre operative investigations includes plain abdominal X-ray (erect and supine), abdominal ultrasound, CT scan and barium enema were only done whenever indicated.

Immediate surgical intervention was carried out in some patients, while others patients were put on conservative treatment for variable period, according to the severity of clinical condition and

presence or absence of sign of strangulation. The surgical operations were carried out by different surgeon (senior and resident). Broad-spectrum antibiotic were given to the patients and continue for few days, correction of fluid, electrolyte and acid base imbalance were done.

Nasogastric tube inserted in all cases to decompress the upper gastrointestinal tract and foley catheter to monitor the urine out put. In cases were treated by surgical intervention, operation was done under general anesthesia with endotracheal tube at the right time and causes of the obstruction recorded. While those cases were treated conservatively; followed by close observation to every patient with serial abdominal examination to exclude any sign and symptom of strangulation and abdominal X–ray.

Most of our patients were attended for postoperative followed up for complications and recording the mortality in the hospital.

Results

The age of our patients ranged between 2 days–75 years. The majority of our patients are in the first and sixth decade of life, (35.7%) and (12.9%) respectively. While sex distribution more common in female 258 patients (55.7%) than male 206 patients (44.3%).

Table I: Age and sex distribution of patients with Intestinal obstruction.

Age(years)	male	%	Female	%	total	%
<10	72	34.4 %	94	36.6%	166	35.7%
11-20	29	14%	7	2.7%	36	7.8%
21-30	11	5.3%	9	3.4%	20	4.3%
31-40	21	11.1%	22	8.6%	43	9.3%
41-50	16	7.7%	38	14.7%	54	11.6%
51-60	25	12.1%	33	12.7%	58	12.6%
61-70	25	12.1%	35	13.6%	60	12.9%
>71	7	3.3%	20	7.7%	27	5.8%
total	206	44.3%	258	55.7%	464	100%

Socioeco-

nomics

state: 257 patients (55.3%) were from rural area, while 207 patients (44.7%) were from urban area.

Table II: Socioeconomic status

Status	No.	%
Rural	257	55.3%
Urban	207	44.7%
Total	464	100%

The onset of presentation: Acute onset of presentation was found in 296 patients (63.7%) followed by sub acute in 89patients (19.2%).

Table III: Onset of presentation of patients with Intestinal obstruction

presentation	No.	%
acute	296	63.7%
sub acute	89	19.2%
Acute on chronic	45	9.7%
chronic	34	7.4%
total	464	100%

The main clinical presentation: The constipation in 419 patients (90%) and abdominal pain in 380 patients (82%) are the main presenting symptom, followed by abdominal distention in 316 patients (68%) and vomiting in 302 patients (65%), while dehydration in 256 patients (55%), irreducible swelling in hernial orifice in 127 patients (27.3%) and abdominal scar in 71 patients (15.4%) are commonest signs.

Table IV: Main clinical presentation.

Presenting feature	No.	%
constipation	419	90%
Abdominal pain	380	82%
Abdominal distention	316	68%
vomiting	302	65%
dehydration	256	55%
Irreducible Swelling in hernial orifice	99	21.3%
Abdominal scar	71	15.4%
Abdominal mass	26	5.6%

Time of previous surgery: History of previous surgery was found in 71 patients (15.4%) and most of these cases 34 (47.8%) present within one years of index laparotomy, 10 patients (14.3%) between 1-2years , 8 patients (11.2%) between 2-3 years, 13 patients (18.3%) between 3-4 years and 6 patients (8.4%) between 4-5 years.

Table V: Time of previous surgery.

Duration / years	No.	%
Less than one	34	47.8%
1-2 years	10	14.3%
2-3 years	8	11.2%
3-4 years	13	18.3%
4-5 years	6	8.4%
Total	71	100%

Type of previous surgery: The most common previous surgery were appendectomy in 31 patients (43.6%) followed by cesarean section in 10 patients (14.3%) and ectopic pregnancy in 8 patients (11.3%).

Table VI: Type of previous laparotomy.

operation	No.	%
appendectomy	31	43.6%
Cesarean section	10	14.3%
Ectopic pregnancy	8	11.3%
Bullet injury	7	9.8%
Perforated D.U.	6	8.4%
Not known	9	12.6%
total	71	100%

Type of treatment: Immediate surgical interventions were carried out in 213 patients (45.9%), While 196 patients (42.3%) didn't respond to conservative management and treated operatively within 72 hours, and 55 patients (11.8%) respond to conservative treatment.

Table VII: Type of treatment.

Type of treatment	No.	%
Immediate surgical intervention.	213	45.9%
Not respond to conservative and convert to surgical.	196	42.3%
Respond to conservative treatment.	55	11.8%
Total	464	100%

Period of conservative treatment: The period of observation in 55 patients who were managed conservatively ranged from 3-14 days, with an average (6.3) days.

Table VIII: Period of conservative treatment.

Duration /days	No.	%
3-6 days	26	47.2%
7-10 days	18	32.7%
11-14 days	11	20.1%
total	55	100%

Cause of intestinal obstruction: Strangulated hernia in 99 patients (21.3%) with band and adhesion in 73 patients (15.7%) are the commonest causes of intestinal obstruction, followed by tumour in 46 patients (9.9%), intussusception in 45 patients (9.7%), volvulus of sigmoid colon in 41 patients (8.8%) and hirschsprungs disease in 37 patients (7.9%).

Table IX: Causes of intestinal obstruction.

Causes	No.	%
Hernia	99	21.3%
Band and adhesion	73	15.7%
tumour	46	9.9%
Intussusceptions	45	9.7%
Volvulus of sigmoid colon	41	8.8%
Hirschsprungs disease	37	7.9%
Paralytic ileus	28	6.1%
Malrotation with mid gut volvulus	17	3.6%
Tuberculosis	16	3.4%
Imperforated anus	16	3.4%
Pseudo-obstruction	14	3.2%
Fecal impaction	13	2.9%
Intestinal atresia	12	2.5%
Meconium ileus	4	0.9%
Gall stone ileus	3	0.7%
Total	464	100%

Causes of small bowel obstruction: Small bowel obstructions were found in 288 patients (62%). Strangulated external hernias in 84 patients (29.2%) and adhesion in 73 patients (25.4%) were the most frequent causes of small bowel obstruction

Table X: Causes of small bowel obstruction .

cause	No.	%
hernia	84	29.2%
band and adhesion	73	25.4%
intussusception	45	15.6%
Paralytic ileus	28	9.8%
Malrotation with midgut volvulus	17	5.9%
tuberculosis	16	5.6%
Intestinal atresia	12	4.1%
tumour	6	2.1%
Meconium ileus	4	1.3 %
Gall stone ileus	3	1 %
total	288	100%

Causes of large bowel obstruction: Large bowel obstructions were found in 176 patients (38%). Volvulus of the sigmoid colon in 41 patients (23.6%) and tumour in 40 patients (22.7 %) were the most common causes, followed by hirschsprungs disease in 37 patients (21%).

Table XI: Causes of large bowel obstruction.

Cause	No.	%
Volvulus	41	23.6%
Tumour	40	22.7 %
Hirschsprungs disease	37	21%
Imperforated anus	16	9%
Hernia	15	8.5%
Pseudo-obstruction	14	7.9 %
Fecal impaction	13	7.3%
total	176	100%

Causes of intestinal obstruction in children. Intussusception was found in 45 patients (27.2%) followed by Hirschsprungs disease in 37 patients (22.2%), while external hernia in 20 patients (12%).

Table XII: Causes of intestinal obstruction in children.

causes	No.	%
intussusception	45	27.2%
Hirschsprungs disease	37	22.2%
External hernia	20	12%
Malrotation	17	10.2%
Imperforated anus	16	9.6%
adhesion	15	9.1%
Intestinal atresia	12	7.3%
Meconium ileus	4	2.4%
total	166	100%

Type of intestinal obstruction: Simple obstruction was the most common type of intestinal obstruction 314 patients (67.7%) followed by strangulated obstruction in 150 patients (32.3%).

Table XIII: Types of intestinal obstruction.

Type	NO.	%
Simple obstruction	314	67.7%
Strangulated obstruction	150	32.3%
total	464	100%

Type of strangulated hernia: Of 99 patients have strangulated hernia, the inguinal hernia was the commonest type in 71 patients (71.7%), followed by para-umbilical hernia in 19 patients (19.2%) and incisional hernia in 8 patients (8.1%).

Table XIV: Type of strangulated hernia.

types	number	%
inguinal	71	71.7%
Paraumbilical	19	19.2%
Incisional	8	8.1%
femoral	1	1%
total	99	100%

Postoperative complications: Post operative complications were occurred in 167 patients (40.8%), Wound infection in 69 patients (41.4%) and pulmonary complication in 58 patients (34.8%) were the main complications, other complications include wound dehiscence in 21 patients (12.6%), prolonged ileus in 12 patients (7.1%) and anastomosis leakage and fistula in 7 patients (4.1%).

Table XV: Type of post operative complications.

complication	NO.	%
Wound infection	69	41.4%
pulmonary complications	58	34.8%
wound dehiescence	21	12.6%
prolonged ileus	12	7.1%
anastomosis leakage and fistula	7	4.1%
total	167	100%

Period of hospital stay: The majority of our patients 266 (57.3%) was discharged before 7 days from admission, and 173 patients (37.4%) of them were discharged between 8-11 days.

Table XVI: Period of hospital stay.

Duration/days	No.	%
Less than 7	266	57.3%
8-11	173	37.4%
More than 12	25	5.3%
total	464	100%

Table XVII: Comparison between the present study and other studies. (Site and causes of obstruction)

Result	Present study Basrah.	Sourkati ¹⁷ khartoum	P.value	Mohamed ¹⁶ SaudiArabia	P.value
Small bowel obstruction	62%	76%	<0.01	81%	<0.01
Large bowel obstruction	38%	24%	<0.01	19%	<0.01
Hernia	21.3%	22%	< 0.05	17%	<0.01
Adhesion	15.7%	16%	<0.05	45%	<0.01
Volvulus	8.8%	9.1%	< 0.05	3.6%	<0.01
tumor	9.9%	Not reported	—	4.8%	<0.05
Intussusception	9.7%	14.1%	<0.01	8%	<0.01
Inflammatory obstruction	Not reported	Not reported	—	3.6%	—
Pseudo-obstruction	3.2%	Not reported	—	9.5%	<0.01
others	21.7%	38.8%	<0.01	8.5%	<0.01

Table XVIII: Comparison between the present study and other study regarding the intestinal obstruction in children.

Result	Present study basrah	Archibong ¹⁸ Nigerian	P.value
Intussusception	27.2%	22%	<0.01
External hernia	12%	9%	<0.01
Hirschsprungs disease	22.2%	8%	<0.01
Malrotation & midgut volvulus	10.2%	10%	< 0.05
Adhesion and band	9.1%	7%	< 0.01
Imperforated anus	9.6%	11%	<0.05
meconium ileus	2.4%	3%	<0.05
Ascaris worm	Not reported	25%	----

The causes of mortality: Overall mortality was 32 patients (6.8%).it's related to neonatal age group and associated congenital anomalies, elderly patients, bowel resectio,coexisted comorbid disease ,infection and pulmonary complications. and in 11patients (34.7%) caused by septicaemia.

Table XIX: Causes of death.

Cause of Death.	No.	%
Septicaemia.	11	34.7%
Associated disease.	9	28.3%
Intestinal gangerine.	7	21.8 %
Fluid and electrolyte imbalance	3	9.3%
Pulmonary complications	2	6.3%
total	32	100%

Discussion

Of primary concern to both patients and surgeon is the possibility of intestinal obstruction may be of strangulated type. The major goal is to distinguish between strangulated obstructions from other type². One of the most difficult tasks in general surgery is deciding when to operate on patients with intestinal obstruction¹. (Timed surgical intervention).Whether it is of the strangulated or the non strangulated variety; the mortality from acute intestinal obstruction arises

with each passing hour from the onset of symptom³.

The age of our patients ranged between 2days-75 years with mean age of (33.8) year table I. More than half of patients were aged between 30-75years; there was a second peak age incidence among patients below 10 years, with majority of them below age of 5 years, it is similar to study of Wysocki¹³. Other studies⁹ reported over half of patients were aged between 2-30 years, this is due to the

nature of patients whom we dealt with in our hospital they were adult and most of these cases of intestinal obstruction were hernia and delay in treatment resulted in intestinal obstruction.

Regarding to sex distribution, it occurred more frequently in female (258) patients (55.7%) than male (206) patients (44.3%) table I, with ratio (1.2:1), it is similar to study of wysocki¹³ (58% in female and 42% in male), this is may be due to that female were more prone to surgical intervention than male for obstetrics reason and incidence of incisional hernia in female were more common than male due to pregnancy which cause lax abdomen and obesity. while other study⁹ reported more number in male than female, with ratio(1.7:1).

Most of our patients were from rural area 257 patients (55.3%), while 207 patients (44.7%) were from urban area table II and it is similar to which reported by Hasnain¹¹. Socioeconomic status was significant determinant of the causes of obstruction¹¹. The frequency of causes of intestinal obstruction is encountered varies according to the patients population and practice setting⁸, as some causes of intestinal obstruction like tuberculosis, ascaris lumbricoides worm and delayed in hernia repair are encountered in special situation.

Acute onset of presentation was found in 296 patients (63.7%) table III, while sub acute, acute on chronic and chronic presentation present in 89 patients (19.2%), 45 patients (9.7%) and 34 patients (7.4%) respectively which was comparable to other reports^{7,20}, that show no significant difference.

Constipation and obstipation in 419 patients (90%) and abdominal pain in 380 patients (82%) were the main presenting symptoms followed by abdominal distention in 316 patients (68%) and vomiting in 302 patients (65%) table IV). This was comparable to the other reports¹⁰ which showed no significant difference.

Dehydration present in 256 patients (55%), irreducible swelling in hernia orifice in 99 patients (21.3%), scar of previous laparotomy in 71 patients (15.4%) and abdominal mass in 26 patients (5.6%) were the commonest physical signs table IV and it is similar to that reported by Archampong²¹ and Shittu²², this may be attributed to high percentage of strangulated hernia as a cause of swelling in hernial orifice.

Previous admission for same complain were reported by 64 patients (13.71%), this is lower than that reported by cuscheri⁵ (34.6%) and Greenfeild⁷ (30%), this may be attributed to low number of adhesive obstruction in the present study.

History of previous surgery in the present study was 71 patients (15.4%), the interval between surgery and intestinal obstruction varies from one month to 5 years with mean 11 months and majority of the patients (47.8%) present within one year of index laparotomy table V. It is shorter than that reported by Tamijmarane¹² (less than 10 years), longer than the study of Jastanah¹⁴ (one month–3 years) and no significant difference from cuscheri⁵ (most of adhesion related events are encountered during the 1st year after surgery).

Previously performed appendicectomy was the commonest cause of adhesive intestinal obstruction in 31 patients (43.6%) table VI, which was comparable to other reports, that show no significant difference¹⁷(45%).

Surgical intervention (immediate or timed interval surgical intervention) was performed in 409 patients (88.2%) table VII and it is higher than that reported by Makogiamakis¹⁰(41.3%), while 55 patients (11.8%) respond to conservative treatment; this is lower than that reported by above study¹⁰(58.7 %), this may be attributed to low incidence of adhesions obstruction in this study, which has capacity to resolve spontaneously without surgical intervention. In recent surveys,

up to (80%) episode of small bowel obstruction due to adhesions may resolve nonoperatively^{7,20}.

The period of observation to patient managed medically (conservative treatment) ranged from 3-14 days, with average (6.3) days, it is for 3-6 days in 26 patients (47.2%), for 7-10 days in 18 patients (32.7%) and for 11-14 days in 11 patients (20.1%) table VIII, it is of no significant difference from Shih¹⁵ and Greenfield⁷, the long period of conservative treatment may be due to the proportion of patients have early post operative adhesion and paralytic ileus which respond to non operative approach in over (75%) of cases for 10-14 days and it is most frequently implicated cause of delayed discharge following abdominal operation⁷.

In present study 288 patients (62%), the obstruction involves the small bowel table X, XVII and it is lower than which reported by Mohamed¹⁶(81%) and sourkati¹(76%) table XVII, this may be attributed to lower incidence of adhesive obstruction in the present study, as the commonest cause of small bowel obstruction².

In other 176 patients (38 %) have large bowel obstruction table XI, XVII and it is higher than which reported by Mohamed¹⁶(19%) and sourkati¹⁷(24%) table XVII, this may be attributed to high incidence of sigmoid volvulus in the present study, which may be related to the constipation and lack of mobility in Ramadan fasting.

The cause of intestinal obstruction showed that strangulated external hernia due to various types represented the commonest cause of intestinal obstruction in this study 99 patients (21.3%) table IX this is similar to the study of Sourkati¹⁷ table XVII and Wysocki¹³, which is opposite to a typical pattern of developed countries as the adhesions (40%), inflammatory (15%) and carcinoma (15%), are the most common causes of

intestinal obstruction in western countries, while obstructed hernia account for (12%) of cases^{1,2,5,7&8}. While it is higher than the study of Mohamed¹⁶ (17%) table XVII, this can be explained on the basis of the fact that even though Saudia Arabia is a developing country, the health care delivery system is similar to those in developed countries¹⁴.

The second cause is band and adhesion (congenital band or from previous laparotomy) constitute 73 patients (15.7%) table IX, this show no significant difference from above study¹⁷, table XVII, and it is lower than the study of Mohamed¹⁶ (45%) table¹⁷, this may be due to same above cited reason¹⁴.

Obstruction secondary to the tumour presented in 46 patients (9.9%) table IX, it is higher than the study of Mohamed¹⁶ (4.8%) table¹⁷, this may be attributed to a large number of elderly patients included in our study and may be due to expose to radiation in our place due to different wars like desert storm. Of these 46 patients with malignant intestinal obstruction, large bowel tumour presented in 40 patients, (22.7%) of cases of large bowel obstruction table XI and small bowel tumour presented in 6 patients, (2.1%) of causes of small bowel obstruction table X. Of all patients included in this study 45 patients (9.7%), intussusception is the leading cause of obstruction in children table IX, it is similar to that reported by Mohamed¹⁶ and it is lower than which reported by Sourkati¹⁷(14.1%) table XVII and Adesunkanmi⁹(14.5%), this is because of the age of patients we dealt with in our hospital, table I, as over half of their patients were aged below 30 years^{9,17}, which opposed to the age group of our patients.

Volvulus of the sigmoid colon is the 5th most frequent cause in our study 41 patients (8.8%) table IX and it is of no significant difference from other study¹⁷ table XVII and it is higher than the study of Mohamed¹⁶.

Hirschsprungs disease in the present study occurred in 37 patients (7.9%), table IX, it is not reported by above studies^{16,17}.

Paralytic ileus in the present study occurred in 28 patients (6.1%) table IX, it is lower than that reported by Kammen²⁵(14%) and it is not reported by other studies^{16,17}, it is adynamic obstruction and have following varieties: postoperative, infection, reflex ileus and metabolic causes².

In 17 patients (3.6%) table IX, the intestinal obstruction was caused by malrotation with midgut volvulus, it commonly occurred in the neonatal age group and it is not reported by above studies^{16,17}. Tuberculous intestinal obstruction presented in 16 patients (3.4%) Table IX, it is lower than the study of Hasain¹¹(10%) and it is not reported by other studies^{16,17}, this may be attributed to poor nutrition, economic sanction, bad hygiene and family crowding in the low social class of people; socioeconomic status was a significant determinant of the causes of obstruction⁵.

Imperforated anus presented in 16 patients (3.4%) table IX, and it is not reported by above studies^{16,17}.

Colonic pseudo-obstruction in the study of Mohamed¹⁶(9.5%) table XVII, is higher than present study 14 patients (3.2%)table IX this is may be attributed large number of patients with severe illness and metabolic disease that their study included and it is not reported by sourkati¹⁷.

Hernia in 84 patients (29.2%) and band and adhesion from previous surgery in 73 patients (25.4%) form leading cause of small bowel obstruction table X.

Volvulus of sigmoid colon in 41 patients (23.6%) and tumor in 40 patients (22.7%) form leading cause of large bowel obstruction. Table XI, while study of Wysocki¹³ reported that (96.4%) of large bowel obstruction was caused by primary tumour. Intussusception in 45 patients (27.2%) together with hirschsprungs

disease in 37 patients (22.2%), constitute the bulk of causes of intestinal obstruction in children table XII, this is higher than the study of Archibong¹⁸ table XVIII, show ascaris lumbricoides worm is a leading cause of intestinal obstruction in their study, this may be due to high incidence of ascaris worm infestation in their countries.

Simple obstruction were the most common type of intestinal obstruction in the present study 314 patients (67.7%) table XIII followed by strangulated obstruction in 150 patients (32.3%), while strangulated obstruction in studies of Markogiannakis¹⁰ and Bizer²⁶(28%), (10%) respectively; this may be due to large number of obstruction due to strangulated hernia were encountered in our study . A significantly higher risk of strangulation was noticed in incarcerated hernia than all the other obstructive causes¹².

Of the strangulated hernias, inguinal hernia in 71 patients (71.7%) was the most frequent type of hernia seen followed by paraumbilical hernia in 19 patients (19.2%) table XIV, it was comparable to the other reports^{17,19} while in study of Wysocki¹³ majority of patients suffered from femoral hernia, femoral hernia account for (20%)of hernia in women and strangulation is the initial presentation of (40%) of femoral hernia.

The post operative complication occurs in 167 patients (40.8%). Table XV, and it is higher than the study of Mohamed¹⁶ in 14 patients(17%) , this is may be due to high incidence of strangulated obstruction which needs bowel resection, defect in sterilization measure, large number of elderly patients in the present study and repairing of big incisional hernia may increase the pulmonary complication. In advertent enterotomy during adhesiolysis increase the morbidity and relaparotomy rate⁵. Of these complications, wound infection was the main complication in 69 patients (41.4%), which is treated by

removal of suture and repeated dressing plus antibiotic.

Other complications include pulmonary complications in 58 patients (34.8%) and wound dehiscence in 21 patients (12.6%). The majority of our patients 266 (57.3%) were discharged from the hospital before 7 days from admission, in good general condition Table XVI.

The other patients who constitute 173 (37.4%) were discharged between 8-11 days from admission and 25 patients (5.3%) were discharged after 12 days from admission, this may be due to the development of complications like wound infection or development of fistula which need more time for conservative treatment.

The mortality rate in present study 32 case (6.8%) table XIX and in 11 patients (34.3%) caused by septicemia, the all over mortality is lower than that reported by sourkati¹⁷(19.7%) and Shittu²²(8.2%), this may be attributed to delayed presentation, fluid and electrolyte imbalance, high percentage of strangulated obstruction in their studies, number of patients in the neonatal period and patients with sigmoid volvulus. The morbidity and mortality associated with strangulation are dependent on age of the patients and extent of bowel involvement². When volvulus necessitates emergency surgery, it carries a substantial mortality even in relatively young patients²³.

This study concluded that simple intestinal obstruction is the commonest type of obstruction, obstructed external hernia together with adhesive band and volvulus are the most common causes of bowel obstruction, as well as of bowel strangulation. The intussusception was the most

frequent cause of intestinal obstruction in children. Inguinal hernia was the commonest type of hernia causing intestinal obstruction. Non-operative management is successful in significant percentage of patients. Adhesive obstruction deserves a conservative approach with judicious application of surgical intervention. The pattern of bowel obstruction in our society is similar to that in developing Countries. Early presentation and early diagnosis and prompt treatment are the key to reducing morbidity and mortality.

Recommendations; Careful history and thorough examination are important in order not to miss serious case such as strangulated hernia. Detailed knowledge of the pathophysiology, etiology and proper management of cases of intestinal obstruction are mandatory. Since strangulated hernia was found to be the commonest cause of intestinal obstruction, we must increase the patient's and surgeon awareness not to delay operation will help to decrease the incidence of obstructed hernia significantly. Adhesive obstruction form a considerable number of patients with intestinal obstruction, meticulous surgical technique, washing of the peritoneal cavity with saline to remove clots etc., covering anastomosis and raw peritoneal cavity, minimizing contact with gauze and good hemostasis are of great importance operative measure to decrease post operative adhesions and recently there is a numerous substances have been instilled in the peritoneal cavity to prevent adhesions formation including oxidized cellulose, sodium hyaluronate and carboy methyl cellulose (seprafilm), icodextrin, 0.5% ferric hyaluronate gel.

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