Causes of Intestinal Obstruction in Erbil Teaching Hospital Province –North of Iraq

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ABSTRACT:

BACKGROUND:

Bowel obstructions are not uncommon should be suspected in any patient with persistent vomiting, distention, and abdominal pain because delayed diagnosis and treatment can have devastating consequences. Undiagnosed or improperly managed obstructions can lead to vascular compromise, which causes bowel ischemia, necrosis, perforation, sepsis, and death.

OBJECTIVE:

The object of this study is to focus attention on the causes of intestinal obstruction and the role of abdominal radiographs and imaging in the diagnosis and operative procedures undertaken.

Setting: The study was conducted at the Department of Surgery, Erbil Teaching Hospital Erbil province (2.5 million populations) –Iraq, between years 1996 and 2005 inclusive.

METHODS:

A prospective study was carried out spread over 10-years, and involving 591 patients with intestinal obstruction, among them only 570 patients underwent operations included in this study and 21 patients with conservative management had been excluded.

Of the 570 patients with intestinal obstruction, 411were male patients (72.1%) their mean ages were 51.25% and 159 were female patients (27.9%) their mean ages was 39.8%.

RESULTS:

The most common cause was the entrapment of bowel in an external hernia (30.7%). Postoperative adhesions accounted for obstruction in a third of our patients (28.7%), and (59%) of them followed appendectomy. The operative findings of all patients who presented obstructed hernias still account for the highest percentage of cases. Other minor causes constitute the rest of cases.

All 570 patients with the diagnosis of IO underwent surgical procedures in 68 patients (11.9%)who developed serious complications in the form of Sepsis, Intra-abdominal abscess, Wound dehiscence, Aspiration, Short-bowel syndrome (as a result of multiple surgeries)

Forty patients died (7%) mostly because of irreversible shock, pulmonary embolism, and multiorgan failure .

CONCLUSION:

entrapment of bowel in an external hernia and adhesions remain the leading causes of acute intestinal obstruction in our environment. Sustained efforts at elective repair of hernias and research aimed at reducing adhesions are likely ways to reduce the high mortality from intestinal obstruction.

KEYWORDS: intestinal obstruction causes and types, surgical treatment of bowel obstruction.

INTRODUCTION:

Intestinal obstruction (I O) is an emergency condition that requires early identification and intervention[1]. The etiology of Intestinal obstruction is age dependent[2]. Distinguishing between a true mechanical obstruction and a pseudo-obstruction is important, as the treatment differs[3]. Mechanical obstruction of the bowel causes bowel dilation above the obstruction. This causes mucosal edema and impaired venous and arterial blood flow to the bowel. Bowel edema and ischemia increase the mucosal permeability of the bowel, which can lead to bacterial translocation, systemic toxicity, dehydration, and electrolyte abnormalities. Bowel ischemia can lead to perforation and fecal spoilage of the peritoneal cavity[4, 5].

A small-bowel obstruction (SBO) is caused by a variety of pathologic processes[6]. The leading cause of SBO is postoperative adhesions (60%) followed by malignancy, and hernias, Surgeries most closely associated with SBO are appendectomy, colorectal surgery, and gynecologic and upper gastrointestinal (GI) procedures[7]. One study from Canada reported a higher frequency of SBO after colorectal surgery, followed by gynecologic surgery, hernia repair, and

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appendectomy. Lower abdominal and pelvic surgeries lead to obstruction more often than upper GI surgeries[7, 8].

Approximately 60% of mechanical LBOs are caused by malignancies, 20% are caused by colonic volvulus, and 5% are the result of diverticular disease.[9, 10, 11]

With recent technologic developments, the role of computed tomography (CT) in the diagnosis of bowel obstruction has expanded CT is recommended when clinical and initial radiographic findings remain indeterminate or strangulation is suspected, this modality clearly demonstrates pathologic processes involving the bowel wall as the mesentery, mesenteric vessels, and peritoneal cavity[12].

The aim of this study is designed to reveal the most important causes of intestinal obstruction , the facilities available, and the outcome of treatment compared with similar studies done in different countries.

PATIENTS AND METHODS:

From January years 1996 and 2005 inclusive - a period of 10 years - all patients (591) admitted to the emergency ward of the Erbil Teaching Hospital with a clinical diagnosis of intestinal obstruction, who had been operated upon (570) were included in the study. Twenty one Patients diagnosed as incarcerated or irreducible hernia with features of intestinal obstruction not operated upon were excluded.

The name, age and sex of each patient were recorded on a special prepared chart. The onset, duration, and main symptoms of obstruction, as well as the past medical history, x-ray and operative findings were also recorded. Findings on plain abdominal radiographs and later at operation confirmed the diagnosis.

Clinical examination showed that when the obstruction of the small bowel abdominal cramps centered around the umbilicus or in the epigastrium, vomiting, and—in patients with complete obstruction—obstipation. In the absence of strangulation, the abdomen was not tender in many cases. Hyperactive, high-pitched peristalsis with rushes coinciding with cramps was typical. Sometimes, dilated loops of bowel were palpated. With infarction, the abdomen became tender and auscultation revealed a silent abdomen or minimal peristalsis. Shock and oliguria were serious signs that indicated either late simple obstruction or strangulation.

Obstruction of the large bowel usually caused milder symptoms that developed more gradually than those caused by small-bowel obstruction. Abdominal distention was the cardinal sign. Physical examination typically showed a distended abdomen with loud borborygmi. There was no tenderness, and the rectum was usually empty. A mass corresponding to the site of an obstructing tumor was palpable in some cases. Systemic symptoms were relatively mild and fluid and electrolyte deficits were uncommon.

Once the clinical diagnosis of obstruction was confirmed with plain abdominal x-rays the initial treatment comprising naso-gastric decompression, intravenous crytalloids, bladder catheterization, antibiotics and adequate analgesics was started.

Surgery was defined as emergency (within 24 to 72 hours) or postponed for several days. Recorded operative findings included the site of obstruction, and the operative procedure to relieve it. All deaths were recorded and mortality referred to deaths occurring during the same hospital admission.

Of the total patients (570), 411were males (72.1%) their mean ages were 51.25% and 159 were females (27.9%) their mean ages was 39.8%. male to female ratio was 2.6/1.

RESULTS:

Age and sex distribution of patients with intestinal obstruction are shown in table 1.

The age and sex distribution of patients with intestinal obstruction showed in Table 1. Male predominance is apparent throughout the series but is more pronounced in the' aged and the very young,

Abdominal pain was characteristic with most patients, Pain, often described as crampy and intermittent, and was more prevalent in simple obstruction. Usually, pain that occurred for a shorter duration of time and colicky and accompanied by bilious vomiting it was more proximal. Pain lasting as many as several days, which are progressive in nature and with abdominal distention, found typical with a more distal obstruction. Nausea Vomiting was associated more with proximal obstructions Constipation as evidenced by the absence of flatus or bowel movements Fever and tachycardia - Occurred late and was associated with strangulation.

Abdominal distention, Duodenal or proximal small bowel had less distention when obstructed than the distal bowel has when obstructed. Hyperactive bowel sounds occurred early as GI contents attempt to overcome the obstruction. Hypoactive bowel sounds occurred late.

Table 1 :Age and sex distribution of patients with intestinal obstruction. (411 male and 159 females)

Age in years	0-10	11-20	21-30	31-40	41-50	51-60	6`-70	>71
Male	44	76	45	66	49	60	26	45
Females	10	33	27	25	35	14	6	9

Total =570

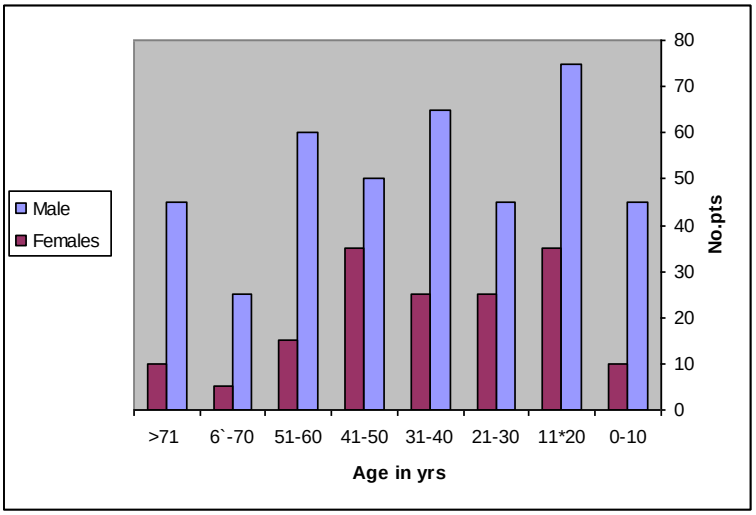

Figure 1- age and sex distribution of patients with intestinal obstruction.

Table 2:Cause of intestinal obstruction:-

1. **External hernias (n=175) 30.7%**

Inguinal	90
Femoral	40
Para –umbilical	35
Others	10

2.**Postoperativecauses(n=208) 36.4%**

Adhesions	160
Paralytic ileus	29
Anastomotic stricture	4
Incisional hernia	15

3. Neoplasms *(n*= 45) 7.9%

4. **Paralytic ileus (inflammatory | (n=50) 8.7%**

5. Mesenteric vascular occlusion (n=9)| 1.57%

6. Intussusception, secondary (n=33) 5.7%

Secondary growth	**28**
Meckel's diverticulum's	**2**
Peutz- Jcghers syndrome	**1**
Cause not found	2

7. **Miscellaneous [n=50] 8.77%**

Adhesions (? cause)	10
Internal hernias	10
Intestinal tuberculosis	14
Sigmoid volvulus	13
Pseudo membranous enteritis	1
Peutz Jeghers syndrome [intussusceptions	1
Faecal impact ion	1

Table 3: Previous surgery leading to intestinal obstruction by adhesions

Type of surgical procedure	No. of patients	%
Appendecectomy	93	58.0
Cholecystectomy	17	10.6
Surgery for penetrating abdominal trauma	16	10.0
Surgery for blunt abdominal trauma	10	6.2
Peptic ulcer surgery	9	5.6
Surgery for miscellaneous conditions	8	5.0
Surgery for malignancy	7	4.3
Total	160	100

Procedures undertaken

Of the 570 operations for intestine obstructions in 455 patients (79.8%) the obstruction was relieved by simple procedures non-resectable operative techniques including such as opening the neck of an inguinal hernia, separation of adhesions or division of bands. reduction of obstructed hernias, reduction of non-strangulated intussusceptions, Bypass procedures, colostomy and ileostomy,and in some patients only biopsy taken from the lesion for advanced malignant conditions and for diagnostic conditions , other simple procedures miscellaneous procedures. However, in 115 patients (20.2%) bowel resection was mandatory (table 4).

Table 4: Procedures undertaken techniques in 570 patients

No. of patients	Percent.	operative techniques
397	69.6	Non-resectable techniques
115	20.1	Resectable techniques
46	8.0	Only biopsy taken
12	2.1	More than one procedures*
Total 570		

* e.g. resection in some area and anastomosis in other areas.

Table 5: Indications for bowel resection (n=115)

No. of patients	Percent.	Indications for resection
55	47.8	had strangulated non-viable bowels
24	20,8	patients had easily resectable neoplasm's
26	22.6	secondary growths causing intussusceptions underwent resection and anastomosis
4	0.70	anastomotic stricture, the stenotic segment had to be resected and a fresh anastomosis made
5	0.87	Injury during surgery was responsible for resection
1	0.17	a patient with the Peutz Jeghers syndrome
Total 115	100	

Mortality/Morbidity

Acute abdominal emergencies cause many deaths. Acute intestinal obstruction is one of the wide varieties of abdominal conditions responsible for these deaths. The exact cause of obstruction and the facilities available for treatment influence the outcome Mortality and morbidity were dependent on the early recognition and correct diagnosis of obstruction. Forty-six patients died during admission from intestinal obstruction, 6 before and 40 after surgery - an over-all mortality of 7%. Of these 46 deaths, 32 (69.5%) were referred from centers outside the Erbil-city and 14 (30.4%) were admitted 5 days or more after onset of illness. Lack of transport, financial difficulties, and double referrals - health center to district hospital and them to Erbil city were some of the causes of delayed presentation. The 6 deaths before operation were due to a combination of hypovoleamic shock,

uremia, sepsis and aspiration.

Of the 40 post-operative deaths 28(70%) occurred in the first 48 hours after operation, 9(22.5%) within 3 days and 3 (7.5%) after one week. Severe hypotension, oliguria and pulmonary edema were some of the findings in the 28 early postoperative deaths. The other 12 deaths were due mainly to post-operative peritonitis. The postoperative mortality was 7%.

Table 6 :Operative procedures undertaken in 40 dead patients

No. of patients	%	procedures undertaken
9	22.5	More than one procedures* undertaken in the same patient
11	27.5	resection for malignancy patients
12	30	surgery for postoperative adhesions with uncontrolled sepsis
5	12.5	surgery for delayed strangulation
3	7.5	surgery for anastomotic leak
Total 40	100%	

The primary causes of death were mismanaged hypovolemic shock in14, uncontrolled sepsis in 9 pulmonary embolism in 4, hepatic failure in 5, and renal failure in 8. This high mortality could be explained because of late presentation, delayed diagnosis and limited facilities with presences of inhumanity UN sanctions on Iraq after the second Gulf War (table 7).

Table 7: The primary causes of death of death in 40 patients

No. of patients	Percent.	primary Cause of death
14	35	Intra-abdominal abscess and mismanaged hypovolemic shock
9	22.5	uncontrolled sepsis
4	10	pulmonary embolism& Aspiration
5	12.5	Hepato-renal shad down
8	20	Mesenteric vascular occlusion
Total 40 patients		

Table 8:Showing the site of obstruction in 570 patients

No. of patients	%	Site of obstruction
214	37.5	Left colon
95	16.6	Right colon
47	8.2	Transverse colon
48	8.4	Lower small bowel
47	8.2	Upper small bowel
19	3.3	More than one site involved
Total 570		

In 45 patients with tumors presented as intestinal obstruction, 4 patients with secondary deposits from malignant melanoma of the skin, and 2 from lung cancer while 41 patients the primary tumors were intestinal (table 8).

Table 9:Sites of primary intraabdominal tumors in 41 patients.

No. of patients	%	Primary site
23	56	Large bowel
4	9.7	Genitor-urinary system
5	12.1	Primary non-Hodgkin's intestinal lymphoma
2	4.8	Intestinal atypical Kaposi's sarcoma
2	4.8	Intestinal Ewings sarcoma
5	12.1	Rectal carcinoma
Total 41	100	

Table 10: The advantage of diagnostic tools in patients with intestinal obstruction

Diagnostic tools	CTscanning	Plain abdominal x-ray	Ultrasonography
No. of patients	٢٤٥	٥٦٦	٤٩٥
Sensitivity	91%	79%	78%
Specifity	97%	71%	96%
Accuracy	92%	46%	87%

DISCUSSION:

The most common single cause of intestinal obstruction in this study was entrapment of bowel in an external hernia in 175 patients (30.7 %).

postoperative adhesions was the second most common mechanical cause of intestinal obstruction in 28.7 per cent of the patients which is nearly similar to a series reported by Bevan (37.9 percent) [12,13].

Sigmoid volvulus accounted for obstruction in 13 patients (2.3 %.) of patients which is higher in comparing with 6% and 8% in similar studies done in South Africa and North America respectively , Sigmoid volvulus observed in Ramadan fasting Muslim month which is a frequent cause of intestinal obstruction because probably of high residual diet intake[14,15]

Secondary Intussusception occurred in 33 of our patients (5.8%) compaired with other similar studies which estimated that Intussusception ranged between 5% and 16% of all intussusceptions in the western world occur in adults. Approximately two thirds of adult intussusceptions cases were caused by tumors[16,17, 18].

Although intestinal tuberculosis is relatively common problem in our country we encountered 163 patients with gastrointestinal tuberculosis during the period of this study only (15%) with tuberculas stricture comparing with 6% and10% in similar studies in Libya and India and this difference can be explained on the bases that most of the gastrointestinal tuberculosis in this country is that of dry and fibrotic type (45%) local study done in the department of pathology not published yet[19,20,21].

In this locality the intestine is the most common extramedullary site of non-Hodgkin's lymphoma, we encountered 159 patients with Mediterranean gastrointestinal Lymphoma during the period of this study only 35 % developed acute intestinal obstruction comparing with a in similar studies done in South Africa and Japan which was 9 %and 7 % respectively because of later presentation and diagnosis in this locality [22, 23].

Although Gallstone disease is common in the North of Iraq and cholecystectomy is among frequent operations yet the complications is very rare only one instance (0.2%) of gallstone ileus occurred, comparing with 0.7% and 0.5 per cent in similar studies in South Africa and India respectively[24, 25].

Postoperative adhesions speciously operations for emergency conditions (85%) occurred in 160 patients (28%), 58% after appcndicectomy and 10% after elective and emergency hepatobiliary surgery this difference in postoperative adhesions probably because the peritoneal cavity in appendicitis is infected and that surgery is performed by a surgeon in training, whose handling of tissue may not be delicate. On the other hand biliary surgery is more often undertaken as an elective procedure and performed, by a more senior surgeon[26, 27].

In 10 patients with IO the primary cause was adhesive fibrosis that cause was not identified probably they had some sort of idiopathic peritonitis which was not diagnosed during early presentation and managed accordingly

There were 160 instances of intestinal obstruction in patients who had previously undergone abdominal surgery (table 2). Among them 70.7 % occurred within three years of surgery, 85.4 per cent had surgery for obstruction within five years, while the longest interval noted in the series was 13 years.

In this study CTscanning had a high sensitivity (91%), specificity (97%) and accuracy (92%) in diagnosing the presence of obstruction comparing with one small series reported in United States which showed a sensitivity of 93%, specificity of 100%, and accuracy of 96 % in diagnosing obstruction and another report done in India showed a sensitivity of 92% and specificity of 71% in correct identification of partial or complete small bowel obstruction (SBO) [28, 29, 30].

For Ultrasound and plain radiography the comparable sensitivity, specificity and accuracy were, 78%, 96%,87% and 79% 71%, 46% respectively, comparing with other studies reported in United States which showed a sensitivity of 96%, specificity of 95%, and accuracy of sensitivity, specificity and accuracy were, 92%, 98%,97% and 86% 94%, 88 % respectively [31].

The level of obstruction was correctly predicted in 91% on CT, in 68 % on US and in 65% on plain films. CT was superior (94%) to both US (26%) and plain radiography (9%) in determining the etiology of obstruction. CT is a highly accurate method in the evaluation of intestinal obstruction especially for determining the level and cause of obstruction and should be the technique of choice when clinical or plain radiographic findings are equivocal[29, 30].

The incidence of male to female mean age groups for intestinal obstruction was 51.25 years and 39.8 years respectively compaired with a similar study done in north Austria which was 63 years and 46 years respectively [30], this difference in earlier mean age presentation in females probably it is related to some gynecological problems leading to intestinal obstruction such as intra-abdominal infections secondary to female genital organ complications like infections ,ruptured ectopic gestation and complications of ovarian diseases which occur early in their life as well as young females seeking management later probably because of some social barriers[29] .

CONCLUSION:

Acute intestinal obstruction remains a major cause of mortality in our environment. External hernias are still a major cause. The pattern is however changing with increasing adhesions and decreasing hernias. The mortality has remained unacceptably high. It is apparent from this report that increased efforts to repair external hernias before strangulation occurs are likely to reduce the incidence and mortality from intestinal obstruction. In addition research aimed at finding ways to reduce adhesion formation may reduce the incidence of adhesive obstructions. For affected patients, high quality surgical expertise coupled with sound clinical judgment and early surgery when needed will greatly improve survival.

Furthermore a general improvement in health care infrastructure especially in the rural communities could further reduce mortality as patients may then present early.

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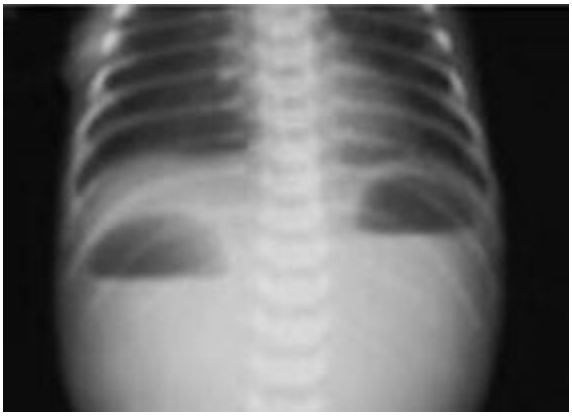

Figure 2: Plain x-ray showed sign of (double- bubble) Duodenal Artesia in 48-hours newly born infant with clinical features of small bowel obstruction,

Figure 3: Radiograph from a patient with massive sigmoid volvulus shows a distended ahaustral sigmoid loop (white arrow), inferior convergence of the walls of the sigmoid loop to the left of the midline, and approximation of the medial walls of the sigmoid loop as a summation line.

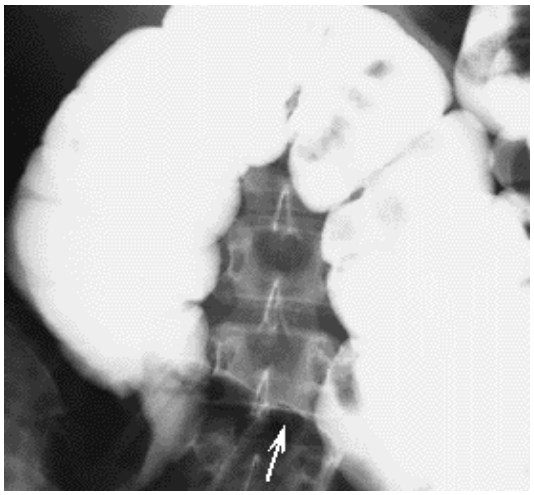

Figure 4: Barium examination demonstrates a bird's-beak deformity tapering at the point of volvulus (wide white arrow). Note walls of dilated cecum (narrow white arrows).of the same patient above.

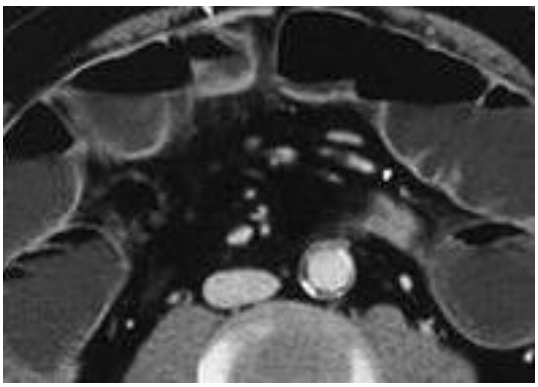

Figure 5: CT scan from a patient with adhesive partial small bowel obstruction shows massively dilated small intestine (black arrow) proximal to a thick adhesive band and decompressed small bowel distal to the adhesion. The patient was operated on because of the low probability that this obstruction would resolve with conservative management.

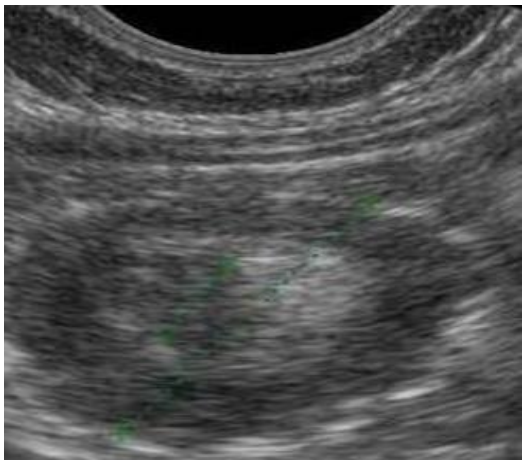

Figure 6:US of the abdomen showing classical appearance ileocolic intussusception with target sign is clearly shown in this patient: The sensitivity of sonography in the diagnosis of intussusception is almost 100%. The ultrasound appearances of bowel within bowel are characteristic and the classic sonographic appearance of intussusception includes the "doughnut" or target, sign and the "pseudokidney" or "sandwich" sign. A doughnut sign, a hypoechoic rim of homogenous thickness and contour with a central hyperechoic core, is seen in a transverse view of intussusception. A hyperechoic tubular center is seen longitudinally covered by a hypoechoic ring, resembling a pseudokidney. Longitudinal sonography reveals a sandwichlike appearance of the alternating loops of bowel with a loop-within-loop appearance.

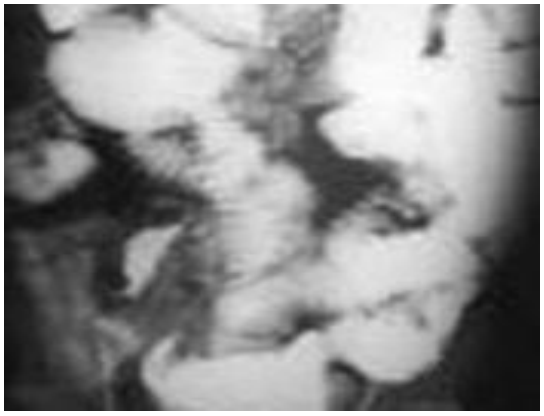

Figure 7: Small-bowel obstruction. Upper GI barium series in a patient with features of intermittent small-bowel obstruction. Multiple strictures and polypoid filling defects are noted in the proximal small bowel due to deposits of non-Hodgkin lymphoma.

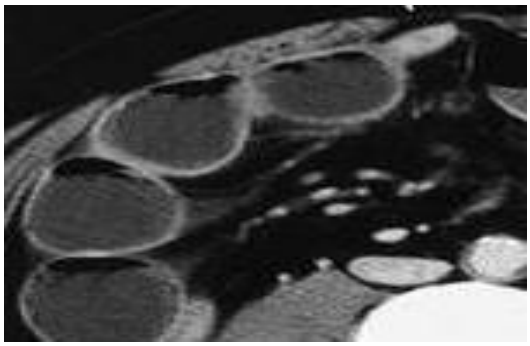

Figure 8: Mechanical small bowel obstruction in a patient with a history of abdominal surgery (partial gastrectomy). CT scans through the midabdomen demonstrate a transition zone at the undersurface of the abdominal scar . Adhesive bowel obstruction at the distal jejunum was confirmed at surgery.

Figure 9: Small-bowel obstruction. Plain abdominal radiograph of the abdomen in a 65-year-old man presenting with features of intestinal obstruction shows dilated loops of the small bowel associated with thickened edematous valvulae conniventes and a strangulated left inguinal hernia (arrow).

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