

## Study of Clinical Features, Etiology and Operative Management of Acute Intestinal Obstruction in Adults

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### Abstract

*Introduction:* Acute bowel obstruction is an emergency. It should be diagnosed early and treated promptly, if not the patient's life may be endangered. Hence it is essential for every surgeon to have complete knowledge of this condition. *Aims & objectives:* To study clinical presentation, various etiologies and management of acute intestinal obstruction in adults. *Material and Methods:* Present study was a hospital based prospective study conducted over period of 2 years. Hundred patients admitted with acute bowel obstruction were evaluated on basis of detailed clinical history and physical examination. *Results:* Presenting symptoms were pain (100%), constipation (99%), vomiting (94%), fever in 54% of the cases. Obstipation was least common symptom (40%), distension was next commonly seen sign (89%) followed by abdominal tenderness (100%). Patients with absent bowel sounds were 68%, 18% patients showed evidence of hypotension. Causes of obstruction were: adhesions (27%), obstructed external hernias (19%) followed by volvulus (15%), pseudo obstruction (3%). For postoperative adhesions appendectomy was most common cause (44.44%) followed by gynecological operations and perforation peritonitis. *Conclusion:* Abdominal pain was most common presenting

symptom of acute intestinal obstruction. Most common sign of acute obstruction was tenderness followed by abdominal distention and absent bowel sounds. Small bowel obstruction was more common than large bowel. Most common cause of acute bowel obstruction in adults was adhesions followed by obstructed external hernias and Volvulus. In large bowel obstruction, malignancy was most common cause. Most common procedure performed for acute bowel obstruction in adults was resection and anastomosis followed by adhesiolysis.

**Keywords:** Intestinal Obstruction; Adhesiolysis; Pseudo Obstruction.

### Introduction

Bowel obstruction has shown continuous changing pattern in different regions all over the world, with variation in incidence, etiology, presentation, sex distribution and mortality. Acute bowel obstruction is an emergency that if not diagnosed early and not treated adequately and promptly, the patient's life may be endangered.

So it is essential for every surgeon to have complete knowledge of this condition. The mortality from acute bowel obstruction rises with each passing hour from the onset of symptoms. Many researchers still advocate surgery for all cases of acute bowel obstruction. Treatment decisions have to be finely balanced between hazards of strangulation and risks of surgery. We undertook the study of acute intestinal obstruction in adults regarding its incidence, etiology, management, complications.

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### Aims & Objectives

To study clinical presentation, various etiologies, management and complications of acute intestinal obstruction in adults.

### Material and Methods

The present study was a hospital based prospective study conducted over 2 years. Hundred patients admitted for acute bowel obstruction were evaluated. All patients who were suspected to have bowel obstruction were admitted through OPD or casualty. They were evaluated on the basis of detailed clinical history and physical examination. They were resuscitated, Ryle's tube was inserted and plain abdominal radiograph was done. Routine intravenous antibiotics were given to all patients. Routine blood investigations were done in all patients. Those patients who had clear cut evidence of acute bowel obstruction on the basis of clinical examination and plain abdominal radiograph were explored surgically after thorough resuscitation. Ultrasonography abdomen was not done in all patients. CT scan of the abdomen was done in those selected cases in which the diagnosis of acute obstruction could not be firmly established on clinical and other radiological investigations.

Intraoperative findings were noted and appropriate surgical procedure was carried out.

### Results

Pain was present in all the patients presenting with acute intestinal obstruction. Constipation was present in 99% of cases. Next most common symptom was vomiting (94%) followed by distension (89%). Fever was seen in 54% of the cases. Obstipation was least common symptom (40%) (Table 1).

Abdominal tenderness was most common sign seen (100%), followed by distension (89%), absent bowel sounds (68%) and hypotension (18%) (Table 2).

For post-operative adhesions, appendectomy was the most common cause (44.44%). Gynecological operations and perforation peritonitis have almost similar incidence (Table 3).

From the table 4 it is seen that adhesions was the single most common cause of intestinal obstruction (27%). The second most common cause being obstructed external hernias (19%) followed by volvulus (15%). In our study there were 3% cases of pseudo obstruction where there was no obvious mechanical cause of obstruction.

**Table 1:** Symptoms in acute bowel obstruction

Symptoms	No. of cases	Percentage
Pain	100	100
Distension	89	89
Constipation	99	99
Vomiting	94	94
Obstipation	40	40
Fever	54	54

**Table 2:** Signs in acute bowel obstruction

Sign	No. of Cases	Percentage
Tachycardia	46	46
Hypotension	18	18
Fever	54	54
Distension	89	89
Exaggerated bowel sounds	27	27
Absent bowel sounds	68	68
Rigidity	32	32
Hernia	19	19
Free fluid	35	35
Tenderness	100	100

**Table 3:** Surgeries responsible for post-operative adhesive obstruction

Previous surgery	No. of cases	Percentage
Appendectomy	12	44.44
Gynecological operations	7	25.92
Perforation peritonitis	8	29.62
Total	27	100

**Table 4:** Etiological distribution of patients with obstruction

Etiology	No. of cases	Percentage
Adhesions	27	27
Obstructed inguinal hernia	19	19
Volvulus	15	15
Colonic malignancy	08	08
Carcinoma rectum	05	05
Internal hernia	01	01
Koch's abdomen	04	04
Appendicular perforation	04	04
Stricture	03	03
Meckel's diverticulum	05	05
SMA thrombosis	02	02
Obstructed umbilical hernia	01	01
Intussusception	03	03
Pseudo-obstruction	03	03
Total	100	100

**Table 5:** Operative procedures performed in acute obstruction

Operative Procedure	No. of cases	Percentage
Adhesiolysis	28	28.86
Reposition and hernia repair	13	13.40
Resection and anastomosis	33	34.02
Exteriorization of loop	2	02.06
Strictureplasty	1	01.03
Proximal diversion	7	07.21
Derotation of volvulus	4	04.12
Excision of Meckel's with resection and anastomosis	5	05.15
Hemicolectomy	2	02.06
Sigmoidectomy	8	08.24
Appendectomy with adhesiolysis	4	04.12
Total	106	100

In the present study, small bowel obstruction was more common in the acute stage than large bowel obstruction. 73% of all the cases were due to small bowel obstruction. 24% of all the cases were due to large bowel obstruction. In the acute cases pseudo obstruction forms only 3% of all cases. 97% patients had evidence of mechanical bowel obstruction and were treated surgically. Only 3% of patients were treated conservatively as they were found to be cases of acute pseudo obstruction (Table 5).

In the various operations performed for acute obstruction resection and anastomosis was the most common operation (30.92%). Adhesiolysis was second most common operation performed (28.86%). In all the cases of acute large bowel obstruction, sigmoidectomy was the most commonly done procedure (8.24%). Proximal diversion in the form of colostomy was also a very commonly done operation for large bowel obstruction (7.21%).

## Discussion

Intestinal obstruction is a very common emergency condition seen by all surgeons across the world. Our

knowledge of intestinal obstruction dates back to antiquity. One of the earliest references to diseases of the gastro-intestinal tract appears in the code of Hammurabi, written in approximately 2200 B.C. (Cantor) [1]. Duverger, in 1747 excised several inches of gangrenous small intestine and its mesentery and reunited the ends with few sutures over piece of trachea, returning the bowel to peritoneal cavity. In early 1800's Dupuytren established enterostomy as an operative procedure for treatment of obstruction. Lembert (1826) described the technique of intestinal suturing which is still in use and still bears his name. Resection of loop of small bowel followed by anastomosis by suture was first introduced by Dieffenbach in 1836.

The high morbidity and mortality attendant with operative enterostomy stimulated Wangensteen (1933) [2] and others to explore nasointestinal intubation as nonoperative means of intestinal decompression. Numerous techniques for intubating small intestine were introduced Smith, 1952 [3]; Dennis, 1969 [4], including the still used Cantor (1947) [5] and Miller-Abbott tubes (1934) [6]. In some cases, intestinal intubation alone proved successful as primary treatment of intestinal obstruction (Wangensteen, 1933) [2]. However, 1940's saw the introduction of antibiotics,

intravenous fluids and a more thorough understanding of pathophysiology of intestinal obstruction. (Gamble and McIver, 1925) [7].

Moreover, with improvements in anaesthetic techniques and adequate preoperative fluid resuscitation, mortality related to definitive operative treatment of uncomplicated, simple small bowel obstruction dropped remarkably. With this dramatic improvement in surgical care, enthusiasm waned for nonoperative management by prolonged intestinal intubation.

We undertook the study of acute intestinal obstruction in adults to study its incidence, etiology and management. In our study most cases occurred in age group 41 - 60 years comprising of 41%. The incidence of bowel obstruction decreased as age advanced further. The mean age of all patients included in our study was 43.92 years. When age and sex were correlated in our study it was found that except in 12 to 20 year age group, in all other age groups males outnumbered females.

The probable explanation could be that adhesions and hernia which were most common causes in our study were seen in the 5<sup>th</sup> decade and large bowel malignant obstructions were common in the elderly in the 6<sup>th</sup> decade. In our study male to female ratio was 2.57: 1 (i.e. 3: 1) Chen X Z and Wei T (2008) [8] found an incidence of 1.23: 1. Arshad Malik (2010) [9] in his study on 229 patients found sex ratio of 2.84: 1 while Adhikari (2010) [10] found sex ratio of 3.03: 1. Osuigwe AN (2002) [11] found the ratio to be 2: 1 while Lawal et al (2005) [12] from Nigeria found the sex ratio to be 1.5: 1 in their study of 99 patients. A similar study conducted at Ghana in 2006 by Ohene- Yeboah [13] found the ratio to be 1.7:1.

From the Table 6 it is seen that in the study by Osuigwe AN [11] the maximum incidence of intestinal obstruction was in the 6th decade i.e. 51-60 years

(24.44%). Similarly the maximum incidence of obstruction in the study by Adhikari et al. [10] was in the age group 41-50 years (24.25%). Both these match with our findings.

In our study it was seen that pain in abdomen was the most common presenting symptom of bowel obstruction found in all 100% patients. The next most common symptom was constipation (99%) followed by vomiting (bilious or non bilious - 94%). Distention was present in 89% patients while fever and obstipation were noted in 54% and 40% respectively. Similar findings were found by other authors.

In the study conducted at Pakistan [14], pain was the common symptoms in 100% patients followed by constipation (97%), distension (97%) and vomiting (92%). Osuigwe [11] also found pain (90%) and distension (85%) to be the most common symptoms. Adhikari [10] observed distention as the most common symptom in 92.92% patients followed by pain in abdomen (71.66%).

From the Table 7 it is seen that pain is the most common symptom in almost all studies. In the study by Adhikari et al., there is a low incidence of vomiting and pain as compared to our study and a higher incidence of obstipation. This may be attributed to the fact that in their study, the most common causes of obstruction were obstructed hernias and large bowel malignancies, and in such cases, vomiting is a late feature and obstipation is more common.

In our study, in all the cases, the most common sign was tenderness, present in 100% cases, followed by absent bowel sounds which were present in 68% patients. Tachycardia was present in 47% patients while hypotension was present only in 18%. At a similar study conducted in Pakistan [14], tenderness was present in 91% patients while absent bowel sounds were present in 81% cases.

**Table 6:** Comparison of age wise distribution between various studies

Age group	Our study (%)	Osuigwe [11] (%)	Adhikari [10](%)
12-20	06	04.44	09.26
21 - 30	20	15.55	11.44
31 - 40	18	17.77	15.25
41 - 50	20	15.55	24.25
51 -60	21	24.44	13.07
61 -70	13	22.22 (>60 yrs)	19.61
71 - 80	02		07 08

**Table 7:** Comparison of symptoms in various studies

Symptoms	Our Study	J. Khan	Adhikari	Osuigwe	Haridimos	Malik
Pain	100	100	71.66	90	74	75
Vomiting	94	92	24.8	71.2	78 6	73
Distension	89	97	92.92	85	65.3	87
Constipation	99	97	—	—	80.6	88
Obstipation	40	—	76.02	—	—	—
Fever	54	—	—	—	—	—

Though the most common sign in the study by J. Khan was tachycardia, no obvious cause for such a finding could be found. Tenderness and absent bowel sounds which were common in our study were also seen to be in high percentage in the study by J. Khan (Table 8).

In our study the most common cause of intestinal obstruction in adult was found to be adhesive obstruction comprising of 27% of cases followed by obstructed external inguinal hernias (19%) and then followed by volvulus (both small and large bowel - 15%). In cases of large bowel obstruction, the most common cause was malignant obstruction (54.16% of the total cases of large bowel obstruction).

In our study all cases of adhesive obstruction were postoperative in nature comprising 27% of all cases. Similar results stating that adhesive obstruction is the most common cause of bowel obstruction were found in other studies. Chen X Z [8] found incidence of 62% while Malik et al. [9] found adhesive obstruction to be 41.04% of the total 229 cases of intestinal obstruction. In study conducted at Ghana by Ohene- Yeboah in 2006 [13] in 652 patients, the incidence of adhesive obstruction was 27.20%.

Haridimos [15] found adhesive obstruction to comprise of 64.8% of the total number of cases. Lawal et al. [12] from Nigeria found the incidence to be 44%. Adhikari et al. [10] and Osuigwe [11] had a comparatively lower incidence of adhesive obstruction comprising of 15.53 and 17.1% respectively of their total number of cases. There is a variable incidence of post-operative adhesive obstruction among various studies as at some centers, especially in developed countries, there is very less incidence of other etiologies like obstructed hernias and volvulus. As stated previously all cases of adhesive intestinal obstruction in our study were post operative in nature. The most common operation responsible for post operative adhesions was found to be appendectomy (44.44%) followed by surgeries for perforation peritonitis (29.62%). Gynecological surgeries like LSCS, hysterectomy and tubal ligations were responsible in 25.92% cases.

Ohene- Yeboah [13] also found appendectomy to be the operation which is most commonly responsible for postoperative adhesions (33.07%). Surgeries for perforation peritonitis were responsible in 30% cases and gynecological operations in 16.15% cases in their study. Lawal et al. (2005)[12] found that surgeries for

perforation peritonitis were maximally responsible for post operative adhesions in 43.33% cases followed by gynecological surgeries (20%) and appendectomy (13.33%) in a study conducted in 99 cases.

In our study the incidence of obstructed external hernias was 20%. Out of all the cases of obstructed hernias, inguinal hernias were most common comprising 19% of the total cases. We had only 1 case (1%) of obstructed umbilical hernia. On comparison with other studies Malik et al. [9] found similar incidence of 19.21% of obstructed external hernia. Osuigwe AN [11] found the incidence to be 18.4% in his study. Haridimos [15] found that the incidence was 14.8%, while Lawal et al. [12] from Nigeria found the incidence to be 11%. In a similar study conducted in Pakistan by Jahangir Khan (2007) [14] obstructed external hernias were found to be the most common cause of acute intestinal obstruction comprising 35% of the total number of cases. Adhikari et al. [10] also found a high incidence of obstructed external hernias (35.96%). Also in the study of Ohene- Yeboah [13] obstructed external hernias were the most common cause of obstruction i.e. in 63.18%.

In our study the total incidence of volvulus, both small and large bowel was 15%. This included small bowel volvulus, ileocaecal volvulus as well as sigmoid volvulus. Lawal et al. [12] also found 15% incidence of volvulus in their study which is perfectly matching with our results. Adhikari et al. [10] found the incidence to be 6.26% while J. Khan [14] found it to be 6%. Ohene [13] found the incidence of volvulus to be 5.83%, Chen XZ [8] found a very low incidence of 1.4% in his study. Malik et al. [9] found the incidence to be 3.93%.

In our study the most common cause of large bowel obstruction was colorectal malignancies in 13% cases followed by sigmoid volvulus. Out of 13% cases, 5% were cases of carcinoma rectum causing complete obstruction, 8% cases were those of colonic malignancy most commonly left sided.

In our study there was no case of malignant small bowel obstruction. Adhikari et al. [10] found the incidence of malignant obstruction to be 16.62% while Osuigwe [11] found it to be 18.2%.

Haridimos [15] found the incidence to be 13.4% which is perfectly matching with our results.

Lawal et al. [12] found the incidence to be 10% and Chen X Z [8] found it to be 23.7%.

**Table 8:** Comparison of various signs with other study

Signs	Our study	J. Khan
Tenderness	100	91
Tachycardia	47	98
Hypotension	18	36
Rigidity	32	21
Exaggerated bowel sounds	27	19
Absent bowel sounds	68	81

In our study there was 3% incidence of intussusception in adult population, mostly ileocolic in nature. Chen XZ [8] had similar incidence of 2.8% while Adhikari et al. [10] had incidence of 2.18%.

In study conducted by J. Khan, the incidence of intussusception in adults was found to be 5%.

Lawal et al. [12] found the incidence to be 8%.

In our study we had 2% incidence of obstruction due to SMA thrombus. Osuigwe [11] also found the incidence to be 1.3%.

There were 3% cases of intestinal pseudo obstruction in our study which were managed without surgical intervention. Study in Pakistan by J. Khan [14] also found the incidence to be 2%.

From the Table 9 it is seen that the incidence of adhesive obstruction is highly variable among different studies. In all the studies, adhesive obstruction and obstructed hernias combined together form the maximum bulk of patients. In almost all the studies, the most common cause of large bowel obstruction is large bowel malignancy.

In our study the site of obstruction was small bowel in 73% cases and large bowel in 24% cases there were 3% cases of intestinal pseudo obstruction which were managed conservatively.

Chen XZ and Wei T [8] in their study also found that the most common site of obstruction was the small bowel (71.1%) as compared to the large bowel (28.9%). Arshad Malik and Madiha Shah [9] found small bowel obstruction in 85% and large bowel obstruction in 15% cases. Similar results were obtained by Haridimos et al (2007) [15] who found incidence of small bowel obstruction to be 76% as compared to large bowel obstruction where the incidence was 24%. All patients in our study were investigated with blood investigations like serum electrolytes and KFTs followed by radiological investigations like X-rays, USG and if required CT scan of the abdomen. CT abdomen was done in only 10 patients in our study, out of which 4 had colonic malignancy, 3 had carcinoma rectum. Two patients showed evidence of stricturous obstruction with changes suggestive of strangulation on CT and hence were explored. Intra-operatively there was evidence of matted abdomen with tubercles over the bowel and mesentery (suggestive of Koch's) with ileal

stricture. CT was also done in a patient of suspected post-operative adhesions in order to decide whether immediate exploration was desirable or not.

In the present study only 3% patients i.e. (3 cases) were managed conservatively as they were found to be cases of pseudo obstruction. Out of these 2 cases had paralytic ileus due to electrolyte imbalance in the form of hypokalemia due to preceding history of severe gastroenteritis. In 1 case, the cause could not be identified. In the remaining 97% cases, where mechanical intestinal obstruction was suspected, patients underwent immediate resuscitative measures followed by investigations and then were posted for surgery at the earliest. In 9 patients, two operative procedures were performed and they were included in both those groups. Resection and anastomosis was the most common surgery performed in 33% cases. Adhesiolysis was the second most common operation done (28%). Hernia repair with simple reposition of the bowel loop was done in 13% cases as the loop in the obstructed hernia was found to be viable. Sigmoidectomy was done in 8% patients, who were inclusive of malignancy as well as sigmoid volvulus. Simple derotation of volvulus was done in 4% patients. Right hemicolectomy was done in 2% cases. Appendectomy with adhesiolysis was done in 4% cases. Resection of Meckel's diverticulum with ileo- ileal anastomosis was done in 5% cases. Exteriorization of bowel loop was done in 2% cases and strictureplasty was done in 1% cases. Proximal diversion in the form of colostomy was done in 7% patients.

### Conclusion

Colicky abdominal pain is the most common presenting symptom of acute intestinal obstruction. Most common sign of acute obstruction is noted to be tenderness followed by abdominal distention and absent bowel sounds.

It is observed that bowel obstruction is much more common in males than in females. The small bowel obstructions are more common than those of the large bowel. The most common cause of acute bowel obstruction in adults is adhesions (post operative) followed by obstructed external hernias. The most

**Table 9:** Comparison of various etiologies between different studies

Etiology	Our study	Chen XZ	Malik	Adhikari	Osuigwe	Ohene	Haridimos	Lawal
Adhesions	27	62	41.04	15.53	17.1	27.20	64.8	44
Obstructed hernia	19	3.7	19.21	35.96	18.4	63.18	14.8	11
Volvulus	15	1.4	3.93	06.26	2.6	5.83	-	15
Malignancy	13	23.7	2.18	16.62	18.2	2.15	13.4	0
SMA thrombus	2	-	-	-	1.3	-	-	-
Intussusception	3	2.8	-	2.18	-	0.47	-	8
Pseudo	-	-	-	-	-	-	-	-
Obstruction	0	-	-	-	-	-	-	-

common surgery responsible for adhesions is appendectomy followed by laparotomy for perforation peritonitis and then by gynaecological surgeries. Among the external hernias responsible for obstruction, inguinal hernias are noted to be much more common than other types (femoral, incisional, umbilical). Volvulus (both small and large bowel) is the next common cause after adhesions and hernias. In large bowel obstructions, malignancy is the most common cause (mostly left sided). Most common procedures performed for acute bowel obstruction in adults is resection and anastomosis followed by adhesiolysis.

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