

A Clinical Analysis of Acute Small Bowel Obstruction – A Review of Sixty-four Patients in a Tertiary Hospital

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Abstract

Background: Acute small bowel obstruction (SBO) is an ever increasing clinical problem. Successful management depends on comprehensive knowledge of the aetiology and patho-physiology of SBO, familiarity with imaging methods, good clinical judgment, and sound technical skills.

Aim of the Study: To study the incidence, clinical features, and operative findings of small bowel obstruction in a Tertiary Hospital of Kerala.

Materials and Methods: A prospective cross-sectional analytical study was conducted in the Department of General Surgery, Medical College, Kerala, including 64 patients. Inclusion criteria: (1) Patients aged between 18 and 87 years were included in the study. (2) Patients with complaints of vomiting, pain in the abdomen, fever, and abdominal distension were included. (3) Patients who had hernia with recent onset of irreducibility, pain, vomiting, and constipation were included in the study. Exclusion criteria: (1) Patients who were aged below 18 and above 80 years were excluded from the study. (2) Patients with signs and symptoms of subacute intestinal obstruction (IO) and paralytic ileus were excluded from the study. The following data were collected: A detailed record of the patient's history, physical examination, and necessary investigations such as baseline, X-ray abdomen erect and supine in all cases, and ultrasound abdomen was recorded based on the requirement for each case. The pro forma was used to record the age, sex, and symptom duration, past surgical and medical history of all patients. All patients were subjected to surgery as their clinical presentation was of acute nature. The patients were stabilized from shock, fluid-electrolyte imbalances, and nasogastric aspiration before taking them to the operation theater. All the patients were followed postoperatively for 2–4 months from the time of discharge. The events of post-operative period and complications were noted and tabulated. All the data were analyzed using standard statistical methods.

Observations and Results: A total of 64 patients presenting with acute IO were included in the study. Among the 64 patients, there were 49 male (76.56%) and 15 female (23.43%) with a male to female ratio of 3.26:1. The mean age of the patients was 49.36 ± 3.14 years. The youngest patient was aged 19 years and the eldest one was 76 years. It was observed that pain in the abdomen accounted for the most common symptom with 60/64 patients presenting with the symptom, followed by abdominal distension 49/64 (76.56%), vomiting in 43/64 (66.15%), and absent bowel sounds in 28/64 (43.75%) of the patients. Among the causes for small bowel obstruction (50/64), intussusceptions were noted in 13/64 (20.31%), volvulus in 10/64 (15.62%), adhesions in 8/64 (12.50%), hernia in 7/64 (10.93%), appendicitis in 6/64 (9.37%), and intestinal tuberculosis in 6/64 (9.37%) of the patients. Among the large bowel obstructions, volvulus was noted in 7/64 (10.93%), intussusceptions in 4/64 (6.25%), and large bowel tumor in 3/64 (4.68%) of the patients. Paralytic ileus was noted in 10/64 (15.62%) of the patients.

Conclusions: Acute IO is a common surgical emergency requiring timely intervention to reduce morbidity and mortality. Acute IO is more common in small bowel when compared to large bowel. Males are more commonly affected than females. The clinical presentation varies on the level of obstruction and hence the incidence of symptoms varies from study to study. Intussusceptions, volvulus, herniae, and adhesions account for more than 50% of the causes of IO. Laparotomy was the most common means of IO management, while bowel resection and anastomosis were the most common intraoperative procedure. Early recognition and timely intervention are important to prevent the bowel going for gangrenous changes. Mortality increases with the delay in the institution of surgical or medical treatment.

Key words: Intestinal obstruction, Intussusceptions and laparotomy, Paralytic ileus, Volvulus

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INTRODUCTION

IO is defined as an obstruction to the flow of its intraluminal contents.^[1] It can occur due to abnormal intestinal physiology or due to mechanical obstruction. It can present in acute or chronic forms.^[2,3] In prolonged intestinal obstruction (IO) bowel dilation and retention of fluid within the lumen

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proximal to the obstruction occurs, whereas distal to the obstruction, its luminal contents pass down the bowel decompressing it. In extreme cases of IO bowel dilation or strangulation occur leading to impaired perfusion to the resulting in necrosis or perforation of the bowel. Such complications increase the mortality associated with small bowel obstruction.^[4] The most common causes of mechanical small bowel obstruction are post-operative adhesions and hernias. Other etiologies are diseases intrinsic to the wall of the small intestine (e.g., tumors, stricture, and intramural hematoma) and processes that cause intraluminal obstruction (e.g., intussusceptions, gallstones, and foreign bodies),^[5] emergency operation being defined as those types of surgeries that should be performed by necessity within 24 h of a patient's admission, or within 24 h of the development of a specific complication.^[5] Of all IO cases, mechanical IO forms an important part of pathologies that necessitate emergency surgical interventions in parts of Asia, including India, Iran, and Pakistan.^[5-7] Recurrence of IO may occur in about 12% of patients after primary conservative treatment and in between 8% and 32% of patients after operative management for adhesive bowel obstruction.^[3,7] IO occurs in 80% of cases in the small bowel, while in 20% of cases, it occurs in the large intestine.^[1] The four cardinal features of IO are: Colicky abdominal pain, distension, vomiting, and constipation. The presentation of these symptoms is affected by the site and type of obstruction.^[4,8] In simple IO, apart from luminal flow obstruction, there is no compromise of its vascular supply.^[9] However, important and progressive changes occur in the bacteriologic content of obstructed bowel; gas accumulates with altered volume and composition above obstruction, changes in circulation of the distended bowel, and changes in the complex fluid and electrolyte fluxes.^[10] When strangulation complicates the situation such pathological changes are augmented by the progressive vascular changes in the affected intestine and its mesentery and eventually lead to toxemia associated with actual death of gut wall.^[11] Initial gaseous distension is due to significant overgrowth of both aerobic and anaerobic bacteria producing considerable gas. Swallowed air constitutes the largest sum of intestinal air whose constituents are nitrogen (80%) followed by hydrogen sulfide.^[12] The reason for fluid accumulates above the level of obstruction is partly due to deprivation of absorptive surface of the intestine distal to the occlusion and partly due to alteration in fluid and electrolytes across gut wall above the obstruction.^[13] Due to edema and inflammation in the obstructed intestine, absorption of 24 h secretions amounting to 7–8 l (gastric, biliary, pancreatic, and small intestinal secretions) pour into it resulting in sequestration of fluid from the circulation and due to lack of surface for absorption. The bacteria multiply rapidly and the toxins released cause toxemia. Toxemia leads to severe dehydration and electrolytic imbalance.^[14] Early recognition of intestinal strangulation in patients

with mechanical bowel obstruction is important to decide whether to perform an emergency surgery or to allow safe nonoperative management of carefully selected patients.^[15-18] Close and careful clinical evaluation, in conjunction with laboratory and radiologic studies, is essential for the decision making in proper management of patients with acute mechanical bowel obstruction;^[19] a pre-operative diagnosis of bowel strangulation cannot be made or excluded reliably by any known parameter, combinations of parameters, or by experienced clinical judgment.^[20-22] The mainstay of treatment in IO includes gastroduodenal suction, intravenous fluid administration, and operative correction. In this context, a prospective clinical study was conducted to highlight the common causes of IO, its clinical features, causes, and role of early surgical intervention.

Type of Study: A cross sectional prospective analytical study

Institute of Study: Department of General Surgery, Kerala

Period of study: June 2018 to December 2019.

MATERIALS AND METHODS

A prospective cross-sectional analytical study was conducted in the Department of General Surgery, Al Azhar Medical College, Thodapuzha, Kerala, including 64 patients. An ethical committee clearance certificate was obtained before the commencement of the study; an ethical committee approved consent pro forma was used for the study.

Inclusion Criteria

(1) Patients aged between 18 and 87 years were included in the study. (2) Patients with complaints of vomiting, pain in the abdomen, fever, and abdominal distension were included in the study. (3) Patients who had hernia with recent onset of irreducibility, pain, vomiting, and constipation were included in the study.

Exclusion Criteria

(1) Patients who were aged below 18 and above 80 years were excluded from the study. (2) Patients with signs and symptoms of subacute IO and paralytic ileus were excluded from the study. For all the patients data collection included – a detailed record of the patient's history, physical examination, and necessary investigations such as baseline, X-ray abdomen erect and supine in all cases, ultrasound abdomen, CT scan abdomen with or without contrast were recorded based on the requirement for each case. The pro forma was used to record the age, sex, and symptom duration in the past surgical and medical history of all patients. All patients were subjected to surgery as their clinical presentation was

of acute nature. The patients were stabilized from shock, fluid-electrolyte imbalances, and nasogastric aspiration before taking them to the operation theater. All the patients were followed postoperatively for 2–4 months from the time of discharge. The events of post-operative period and complications were noted and tabulated. All the data were analyzed using standard statistical methods.

OBSERVATIONS AND RESULTS

A total of 64 patients attending the department of general surgery of a tertiary teaching hospital and presenting with acute IO were included in this study. Among the 64 patients, there were 49 male (76.56%) and 15 female (23.43%) with a male to female ratio of 3.26:1. The mean age of the patients was 49.36 ± 3.14 years. The youngest patient was aged 19 years and the eldest one was 76 years. Distribution of the patients according to their age groups and gender was tabulated in Table 1.

The symptoms and signs with which these 64 patients were presented to the emergency room were noted in the pro forma and analyzed and tabulated in Table 2. In the study, it was observed that pain in the abdomen accounted for the most common symptom with 60/64 patients presenting with the symptom, followed by abdominal distension 49/64 (76.56%), vomiting in 43/64 (66.15%), and absent bowel sounds in 28/64 (43.75%) of the patients.

The types of IO and its prevalence were noted and tabulated in Table 3. Mechanical obstruction was noted in 54/64 (84.375) of the patients and paralytic ileus was noted in 10/64 (15.62%) of the patients. Small bowel obstruction was noted in 50/64 (78.12%) and large bowel obstruction was noted in 14/64 (21.87%) of the patients. The previous history of IO was noted in 37/64 (57.81%) of then patients. Previous history and surgery of adhesions were noted in 48/64 (75%) of the patients [Table 3].

Analysis of the study showed that among the causes for small bowel obstruction (50/64), intussusceptions were noted in 13/64 (20.31%), volvulus in 10/64 (15.62%), adhesions in 8/64 (12.50%), hernia in 7/64 (10.93%), appendicitis in 6/64 (9.37%), and intestinal tuberculosis (TB) in 6/64 (9.37%) of the patients. Among the large bowel obstructions, volvulus was noted in 7/64 (10.93%), intussusceptions in 4/64 (6.25%), and large bowel tumor in 3/64 (4.68%) of the patients. Paralytic ileus was noted in 10/64 (15.62%) of the patients [Table 4].

Among the various methods of surgical and medical management strategies used in the study showed that small bowel obstruction management was done by resection and

Table 1: The age and gender distribution (n-64)

Age group (years)	Male – 49 (76.56%)	Female – 15 (23.43%)
18–27	5- (10.20)	2- (13.33)
28–37	7- (14.28)	2- (13.33)
38–47	11- (22.44)	3- (20)
48–57	13- (26.53)	2- (13.33)
58–67	6- (12.24)	2- (13.33)
68–77	2- (04.08)	1- (06.66)
78–87	1- (02.04)	3- (20)

Table 2: The symptoms and signs of the subjects in the study (n-64)

Symptoms and signs	No. of cases	Total percentage
Pain abdomen	60	92.30
Vomiting	43	66.15
Tenderness	26	40.62
Abdominal distention	49	76.56
Constipation	12	18.75
Increased bowel sounds	16	25
Absent bowel sounds	28	43.75
Decreased bowel sounds	21	32.81
Groin swelling	10	15.62
Guarding+Rigidity	22	34.37
Palpable mass	09	14.06

Table 3: The type of IO and its prevalence (n-64)

Observation	Number (%)
Type of obstruction	
Mechanical	54 (84.37)
Paralytic ileus	10 (15.62)
IO and its prevalence	
Small bowel obstruction	50 (78.12)
Large bowel obstruction	14 (21.87)
Previous history of obstruction	
No	37 (57.81)
Yes	27 (42.18)
Previous history of adhesion	
No	48 (75)
Yes	16 (25)

IO: Intestinal obstruction

Table 4: The causes of intestinal obstruction in the study (n-64)

Cause of obstruction	Number (%)
Small bowel intussusceptions	13 (20.31)
Small bowel volvulus	10 (15.62)
Adhesions	8 (12.50)
Hernia	7 (10.93)
Appendicitis	6 (9.37)
Intestinal tuberculosis	6 (9.37)
Large bowel volvulus	7 (10.93)
Large bowel intussusceptions	4 (6.25)
Large bowel tumor	3 (4.68)
Paralytic ileus	10 (15.62)

anastomosis of the bowel in 11/64 (17.18%), adhesiolysis in 10/64 (15.62%), hernia repair in 7/64 (10.93%), band

Table 5: The surgical and medical management modalities used in the study (n-64)

Operative findings and/or medical management	Number of cases (%)
Resection and anastomosis	11 (17.18)
Adhesiolysis	10 (15.62)
Hernia repair	7 (10.93)
Band release	6 (9.37)
Milking	7 (10.93)
Colostomy	5 (7.81)
Derotation and sigmoidopexy	4 (6.25)
Paralytic ileus	10 (15.62)

release in 6/64 (9.37%), and milking in 7/64 (10.93%) of the patients. Large bowel obstruction was managed by colostomy in 5/64 (7.81%) and derotation and sigmoidopexy in 4/64 (6.25%) of the patients. All the 10/64 patients with paralytic ileus were managed by conservative medical management [Table 5].

Among the 64 patients, two patients developed complications; one patient died due to septicemia and another due to respiratory infection (Pneumonia). The remaining 62 patients were followed up for 4 months without complications or recurrences.

DISCUSSION

This prospective cross-sectional analytical study was conducted between June 2018 and December 2019 in the department of general surgery of a teaching hospital, wherein the total number of out patient department patients attending was 12,841. This revealed the prevalence of IO to be 4.98% among all surgical patients admitted to surgical ward. All over the world, the prevalence rate of acute abdomen due to IO is estimated to be 1 % of all hospitalizations, 3 % of emergency surgical admissions to general hospitals, and 4 % of major colostomies are secondary to IO.^[23] The incidence of IO is less common in the United States of America and Western Europe, whereas it is common in India, Pakistan, and other tropical countries.^[24] IO is the leading cause of acute abdomen in several African countries, including Ethiopia.^[7,25] Review of literature shows that there are wide variations in the prevalence of IO throughout the world depending on ethnicity, age group, dietary habits, and geographic location, among other factors; it varies from country to country and area to area in the same country.^[23] The incidence of IO in this study showed that there were 49 male (76.56%) and 15 female (23.43%) with a male to female ratio of 3.26:1. The mean age of the patients was 49.36 ± 3.14 years. Fuzan^[26] reported the mean age of 56 years. In a similar study by Souvik *et al.* and Budharaja *et al.*,^[27,28] the gender discrepancy with males outnumbering females by a huge margin was observed (4:1). They concluded that it can be possibly due to a large number

of their patients had obstructed inguinal hernia, and in their country, they mostly have males who suffer from this condition. Furthermore, women in rural India are mostly housewives which limit their exposure to tubercle bacilli in contrast to males. Furthermore, volvulus and malignant disease of the gastrointestinal tract are more common in males as compared to females. In this study, it was observed that pain in the abdomen accounted for the most common symptom with 60/64 patients presenting with the symptom, followed by abdominal distension 49/64 (76.56%), vomiting in 43/64 (66.15%), and absent bowel sounds in 28/64 (43.75%) of the patients. In similar studies reviewed in the literature, it was found that Budharaja *et al.*^[28] reported that symptoms in the order of frequency were pain abdomen 95%, distention of abdomen 82%, vomiting 75%, and absolute constipation 50% constituting acute IO. Al Salamah *et al.*^[29] in their study reported that symptoms in the order of frequency were pain abdomen 90%, distention of abdomen 80%, vomiting 72%, and absolute constipation 45% constituting acute IO. Analysis of the study showed that among the causes for small bowel obstruction (50/64), intussusceptions were noted in 13/64 (20.31%), volvulus in 10/64 (15.62%), adhesions in 8/64 (12.50%), hernia in 7/64 (10.93%), appendicitis in 6/64 (9.37%), and intestinal TB in 6/64 (9.37%) of the patients. Among the large bowel obstructions, volvulus was noted in 7/64 (10.93%), intussusceptions in 4/64 (6.25%), and large bowel tumor in 3/64 (4.68%) of the patients. Paralytic ileus was noted in 10/64 (15.62%) of the patients [Table 4]. Duron *et al.*^[30] observed that adhesions were the cause for IO in 25.5%, whereas Ti and Yong reported post-operative adhesions and bands to the cause for IO in 23.8%.^[31] Fuzan *et al.* from their study of 582 patients concluded that in 246 (42.2%) patients, the cause for IO was adhesions due to the previous operations.^[26] In the series study by Sarr *et al.*^[18] showed that hernia-related strangulation was present in 42% patients, whereas Ramachandran^[32] reported 38.6% of overall incidence of strangulated small bowel obstruction with 21.4% of obstructed hernia in adults. Budharaja *et al.*^[28] from his study concluded that the etiology of IO was common secondary to obstructed hernia (small bowel and large bowel) and it accounted for 33%. In his study, the incidence of gangrene was up to 22%. Sankaran^[33] from his study of patients with volvulus observed that sigmoid volvulus was common accounting to 50% of cases, whereas Budharaja *et al.*^[28] observed that 18.2% of IO was due to volvulus and in that 11.9% was due to small bowel volvulus and 6.19% due to large bowel volvulus. In a study by Sarkar and Sarkar,^[34] 31% of IO patients required bowel resection due to gangrene, whereas Roggo and Ottinger^[35] in their series observed twisted segment resulting in gangrenous bowel in 46% of patients. Ti and Yong^[31] noted that carcinoma of descending colon and rectum constituted 37.2% of their cases resulting in IO. Among them, ascending colon and cecum constituted to 9.8%. Ti and Yong^[31] observed from

their study of 261 patients an incidence of intussusceptions in 6.3% as a cause of IO. Another series by Kuruvilla *et al.*,^[36] intussusceptions accounted for 6.3% of the cases of total IO. Intestinal TB was reported by Sircar *et al.*^[37] in 5% of their cases with acute IO. Kappor *et al.*^[38] reported from their 109 cases of intestinal TB an incidence of 8.2% of IO cases.

CONCLUSIONS

Acute IO is a common surgical emergency requiring timely intervention to reduce morbidity and mortality. Acute IO is more common in small bowel when compared to large bowel. Males are more commonly affected than females. The clinical presentation varies on the level of obstruction and hence the incidence of symptoms varies from study to study. Intussusceptions, volvulus, herniae, and adhesions account for more than 50% of the causes of IO. Laparotomy was the most common means of IO management, while bowel resection and anastomosis were the most common intraoperative procedure. Early recognition and timely intervention are important to prevent the bowel going for gangrenous changes. Mortality increases with the delay in the institution of surgical or medical treatment.

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