



ETIOLOGY AND OUTCOME OF INTESTINAL OBSTRUCTION

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ABSTRACT

Background : Acute intestinal obstruction is a frequently encountered surgical emergency and present study aimed to study the cause, clinical course and outcome of patients in mechanical bowel obstruction, to justify the rationale for surgical intervention and conservative management and also to assess usefulness of different radiological investigations.

Patients and Methods: 62 newly diagnosed patients of Mechanical intestinal obstruction were recruited from IPD over 1 year period at a tertiary centre in dehradun . Intestinal obstruction was diagnosed clinically and confirmed on radiological investigation . Different parameters were studied with help of SPSS 22.0.

Results: A total of 62 patients of mechanical intestinal obstruction cases were enrolled in the study and evaluated thoroughly clinically and radiologically in order to reach at a diagnosis and to determine a suitable intervention. Age of patients ranged from 18 to 83 years (Mean age 46.47±18.30 years). Majority (59.7%) were males. Abdominal pain was the universal presenting complaint. Distension was the most common sign (71%). On radiological evaluation , X-ray abnormalities were detected in 58/61 (95.1%), on USG abnormalities were seen in only 19/38 (50%) cases. All the 20 patients undergoing CT showed abnormalities. A total of 14 (22.6%) cases had previous history of abdominal surgery. Adhesion was the most common etiology (22.6%) followed by hernia (17.7%) and intestinal tuberculosis (11.3%). Along with clinical findings, X-ray was able to identify the underlying etiology in 34 (54.8%) cases . Conservative management was done in 21 (33.9%) cases. Complications were seen in a total of 14 (22.6%) cases. Outcome was favourable in 57/62 (91.9%).

Conclusion: A successful diagnosis of etiology and thereafter appropriate intervention based on overall clinic-radiological picture is the key to a successful outcome.

KEYWORD

Etiology, Intestinal Obstruction

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INTRODUCTION

Acute intestinal obstruction is a fairly common surgical condition and frequently encountered problem in abdominal surgery (1). It is a severe acute surgical emergency associated with high morbidity and mortality (2) and warrants rapid resuscitation, pertinent investigations and often surgical intervention (3). It accounts for approximately 15 percent of all emergency department visits for acute abdominal pain (4).

Multitude of problems complicate bowel obstruction cases such as strangulation, bowel gangrene, perforation, peritonitis, etc. which complicate cases and increase morbidity and mortality manifold. (5). Morbidity and mortality associated with intestinal obstruction have declined since the advent of more sophisticated diagnostic tests (6). Careful clinical evaluation to distinguish simple obstruction from strangulation and decision making on surgery or conservative management is of paramount importance (7).

Thus, for the proper management of intestinal obstruction whether to initiate immediate surgical intervention or to recommend a trial of conservative management, it is mandatory to identify the cause of obstruction, imaging play a crucial role (8). Even the contrast enhanced X-ray is useful (9). Computed tomography (CT) has been shown to be useful in revealing the level and cause of obstruction (10). It thus provides useful details regarding obstruction location (11). In recent years, multidetector CT scanning has been proven to be very useful (12). Multidetector CT has the advantage of providing images in multiple planes in same physiologic state (13). Judicious use of sonography in evaluating patients with bowel obstruction may be helpful in confirming the presence of obstruction, in determining the level of obstruction, and in identifying of the cause of obstruction (14). In some cases diagnostic laparoscopy could help in understanding the underlying pathology (15). It is often an elective diagnostic tool (16).

It must be kept in mind that bowel obstruction cases comprise a large share of emergency patients in tertiary hospitals and impose huge financial burden on the patient and the healthcare system and hence pattern of intestinal obstruction in a referral hospital might be helpful in understanding the etiology specific to that geographic region and would help in early management of these cases.

Present prospective observational study was conducted at Himalayan Hospital, Swami Ram Nagar, Dehradun in order to observe and analyze the demography, etiology, clinical features, usefulness of imaging studies and different approaches of management. The complications, mortality and morbidities were also observed and analysed in this study.

MATERIAL AND METHOD

All subject were provided written detailed informed consent prior to inclusion into the study . It is a observational study that was conducted in the Department of General Surgery , Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun ,as approved by the ethics committee of the concerned institute . Total of 62 patients were recruited from the IPD from department of Surgery. All cases of mechanical acute and sub-acute intestinal obstruction cases were included over a period of one year and patients with adynamic obstruction/paralytic ileus and all patients below 18 year of age were excluded The prospective study focused on the demography, clinical history, physical symptoms and signs and condition of the patient. Physical parameters e.g. blood pressure, heart rate; complete blood counts were documented. Any radiological investigation undertaken was evaluated and compared with the physical findings. The timing and nature of any surgical intervention was recorded in detail. The morbidity and mortality and outcome were tabulated carefully. The Study was limited up to discharge of patients. Any immediate and early complications were included in study. The data collected during the study was transferred to a master chart which was then be subjected to statistical analysis. The data was analyzed with SPSS software version 21. Qualitative variables were represented in form of frequency and percentage. Quantitative data were represented in form of mean standard deviation. The level of significance was set at 'p' value of < 0.05

RESULTS

In our study age of patients ranged from 18 to 83 years with a mean age of 46.47±18.30 years (Table 1). Majority of patients (n=37; 59.7%) were males with male to female ratio of study population was 1.48 (Table 2). Abdominal pain was the universal presenting complaint (Table 3). Distension was the most common sign seen in 71% of patients (Table 4).

X-ray abdomen was done in 61 cases. A total of 3 (4.9%) of these were normal. In maximum cases (n=48; 78.6%), had dilated bowel loops along with multiple air fluid levels only followed by 41 (67.2%) cases having multiple air fluid levels. There were 34 (55.7%) cases in whom only dilated loops was seen on X-ray. A total of 3 (4.9%) cases were categorized as others – two patients with sigmoid volvulus, and one with pleural effusion without and specific features of obstruction (Table 5).

USG was done in 38 cases, among these exactly half (50%) had normal USG. There were 10 (26.3%) cases in whom dilated/distended bowel loops were seen. In 3 (7.9%) cases each ascites and hepatosplenomegaly was seen. There were 3 (9.1%) cases classified as others – these included one case each with contrast filled bowel loop, left renal cortical cyst and mid right hydronephrosis respectively (Table 6).

CT was performed in 20 cases. There were 6 (30%) cases in whom dilated small bowel loops were confirmed by CT, obstruction was confirmed in 7 (35%) cases, multiple

peripherally enhancing collection with few air pockets were confirmed in 2 (10%) cases. There was 1 (5.9%) case each with ascites with thickening/gall bladder sludge, diffusely prominent loops in iliac fossa, heterogenous bowel thickening, Koch's disease and hernia etiology respectively (Table 7).

In our study Adhesion was the most common etiology (22.6%) followed by hernia (17.7%), tuberculosis (11.3%), fecal impaction (9.7%), malignancy and Meckel's diverticulum (4.8% each) respectively. There were eight cases in whom other etiologies were established, these included – two cases (3.2%) of intraabdominal sepsis and one case (1.6%) each of inflammation, Crohn's disease, ileal gangrene, intussusception, sigmoid volvulus and stricture with granulomatous inflammation respectively (Table 8)

Among imaging tools, X-ray alone was responsible for final diagnosis in 34 (54.8%) cases while CT was responsible for (17.7%). USG alone was used in 2 (3.2%) cases. Combination of X-ray and USG in 6 (9.7%), X-ray and CT in 8 (12.9%) and combination of all three in 1 (1.6%) case (Table 9).

A total of 21 (33.9%) patients were managed conservatively. Surgical need was done in 41 (66.1%) cases. Exploratory laparotomy was done in (31.70%) adhesive obstruction, followed by exploratory laparotomy and exploratory laparotomy with hernioplasty/ herniorrhaphy (24.39% each), Patients with multiple stricture and resectable obstructing masses were managed by exploratory laparotomy with resection anastomosis (17.1%), exploratory laparotomy with colostomy (9.8%) and exploratory laparotomy with band release (4.9%) were also done respectively . There were 5 (12.2%) cases classified as miscellaneous – 2 patients (4.9%) underwent reduction of obstructed hernia with hernioplasty and 1 (2.4%) with antegrade decompression of bowel contents without any enterotomy or resection and 1 (2.4%) was managed by stricturoplasty in small bowel and remaining 1 (2.4%) was managed with enterotomy with removal of enterolith. All above procedures have been included in miscellaneous group (Table 10).

Complications were seen in a total of 14 (22.6%) cases. Wound infection (n=12; 19.4%) was most common followed by ileus formation in 8 (12.9%), sepsis in 7 (11.3%) and anastomosis leak in 1 (1.6%).

Table 1: Age Profile of patients enrolled in the study

SN	Age Group	No. of patients	Percentage
1.	18-20 Years	3	4.8
2.	21-30 Years	12	19.4
3.	31-40 Years	8	12.9
4.	41-50 Years	14	22.6
5.	51-60 Years	11	17.7
6.	61-70 Years	8	12.9
7.	71-80 Years	4	6.5
8.	>80 Years	2	3.2
Mean Age±SD (Range) in years	46.47±18.30 (18-83)		

Table 2: Gender Profile of patients enrolled in the study

SN	Gender	No. of patients	Percentage
1.	Male	37	59.7
2.	Female	25	40.3

Table 3: Distribution of patients according to presenting complaints

SN	Presenting Complaint	No. of patients	Percentage
1.	Abdominal pain	62	100
2.	Vomiting	26	41.9

3.	Constipation/ Inability to pass stool	17	27.4
4.	Distension	12	19.4

Table 4: Distribution of patients according to Signs

SN	Signs	No. of patients	Percentage
1.	Distension	44	71.0
2.	Tenderness	34	54.8
3.	Visible peristalsis	10	16.1
4.	Guarding / rigidity	08	12.9

Table 5: Radiological Profile of Patients (X-ray) (n=61)

SN	Finding	No. of patients	Percentage
1.	Normal	3	4.9
2.	Dilated bowel loops only	34	55.7
3.	Dilated bowel loops + Multiple air fluid levels	48	78.6
4.	Multiple air fluid levels	41	67.2
5.	Others	3	4.9

Table 6: USG Profile of Patients (n=38)

SN	Finding	No. of patients	Percentage
1.	Normal	19	50.0
2.	Ascites	3	7.9
3.	Dilated/distended bowel loops	10	26.3
4.	Hepatosplenomegaly	3	7.9
5.	Others	3	7.9

Table 7: CT Diagnosis of Patients (n=20)

SN	Finding	No. of patients	Percentage
1.	Obstruction	7	35.0
2.	Dilated small bowel loops	6	30.0
3.	Ascites with thickening/gall bladder sludge	1	5.0
4.	Diffusely prominent loops in iliac fossa	1	5.0
5.	Heterogenous bowel thickening	1	5.0
6.	Koch's disease	1	5.0
7.	Multiple Peripherally enhancing collection with few air pockets	2	10.0
8.	Herniation	1	5.0

Table 8: Etiology (n=62)

SN	Finding	No. of patients	Percentage
1.	Adhesion	14	22.6
2.	Hernia	11	17.7
3.	Tubercular	7	11.3
4.	Fecal impaction	6	9.7
5.	Malignancy	3	4.8
6.	Meckel's diverticulum	3	4.8
7.	Others	8	12.9
8.	No definitive cause	10	16.1

Table 9: Imaging modalities used

SN	Route	No. of patients	Percentage
1.	X-ray	34	54.8
2.	USG	2	3.2
3.	CT	11	17.7
4.	X-ray+USG	6	9.7
5.	X-ray+CT	8	12.9
6.	X-ray+CT+USG	1	1.6

Table 10: Type of Surgical Procedures (n=41)

SN	Procedure	No. of patients	Percentage
1.	EL with adhesiolysis	13	31.70
2.	EL with hernioplasty/ herniorrhaphy	10	24.39

3.	EL with resection anastomosis	7	17.1
4.	EL with colostomy	4	9.8
5.	EL with band release	2	4.9
6.	EL with miscellaneous procedures	5	12.2

DISCUSSION

Acute intestinal obstruction is one of the most common surgical emergencies. The mean age of patients in present study was 46.47 years which is similar to the age of patients reported in several other studies from India. As far as dominance of males (59.7%) over females is concerned, except two studies (Husain *et al.* and Soressa *et al.*) all the other report a male dominance with males comprising nearly 54% to 75.2% of total study sample. Thus, the age and gender profile of patients in present study was similar to that reported in contemporary regional and global literature.

In present study, abdominal pain was the universal presenting complaint. There were 26 (41.9%) patients who also had vomiting. Constipation was reported as one of the presenting complaints by 17 (27.4%) and distension by 12 (19.4%) patients. With respect to signs distension was the most common sign (71%) followed by tenderness (54.8%), guarding/rigidity (45.2%) and visible peristalsis (16.1%) respectively. Thus clinical profile of patients was in agreement with the classical four cardinal features of intestinal obstruction *i.e.* colicky abdominal pain, distension, vomiting and constipation as reported by Cirocchi *et al*(2). and Khanzada *et al.* (17) while describing the etiological spectrum of intestinal obstruction.

In present study, on X-ray abnormalities were detected in 58 of 61 (95.1%), on USG abnormalities were seen in only 19 of 38 (50%) cases. All the 20 patients undergoing CT showed abnormalities. Subsequently, along with clinical findings, X-ray was able to identify the underlying etiology in 34 (54.8%) cases, CT in 11 (17.7%), X-ray in combination with CT in 8 (12.9%), X-ray in combination with USG in 6 (9.7%), USG in 2 (3.2%) and X-ray in combination with CT and USG in 2 (1.6%) case. In present study in one patient combination of X-Ray , USG and CT Scan failed to demonstrate the actual cause of obstruction and the patient responded to conservative treatment. In another case of obstruction USG revealed loculated intraperitoneal collection which on CECT abdomen revealed pus pockets in abdomen causing extragenous compression on bowel with resultant obstruction. So , this patient was managed surgically.

In present study, judgments for selection of management strategy were based on a systematic evaluation of patient. First of all clinical stability of patient was taken into consideration, hence emergency exploratory laparotomy as a diagnostic procedure could be averted. In radiological assessment, the focus was on three major causes, *i.e.* vascular compromise or perforation, complete obstruction and partial obstruction respectively. In cases with vascular compromise or perforation exploratory laparotomy was done directly, however, when it was not present or there was partial or complete obstruction then the patients were first managed with no oral intake, nasogastric intubation and intravenous rehydration for 24 to 48 hours. In cases who did not show an improvement with these conservative management, exploratory laparotomy was necessitated whereas the cases responding to conservative management were placed on advanced dietary management and those showing complete resolution were finally left without surgical intervention ,Similar approach has been adopted by Sharif *et al.* too (). In present study for confirmed etiologies like herniation, sigmoid volvulus, Crohn's disease, ileal gangrene, malignancy and Meckel's diverticulum, surgical management was preferred over conservative management.

In present study, Adhesion was the most common etiology

(22.6%) followed by hernia (17.7%), tuberculosis (11.3%), fecal impaction (9.7%), malignancy and Meckel's diverticulum (4.8% each) respectively. There were 8 cases in whom other etiologies were established, these included – two cases (3.2%) of intraabdominal sepsis and one case (1.6%) each of inflammation, Crohn's disease, ileal gangrene, intussusception, sigmoid volvulus and stricture with granulomatous inflammation respectively. There is difference regarding the spectrum of underlying etiologies among different studies. Although the trend of different aetiologies encountered in present study was similar to the classically reported profile In a Study by Cox *et al.* in 1993 about 80% of patients with adhesive bowel obstruction could be managed conservatively. This percentage was also reflected in Bologna guidelines 2010. The disparity between our data and international papers may be explained by the fact that ours is a tertiary care hospital and majority of patients referred here have previously been managed by conservative trails elsewhere, only those not responding are referred here.

In present study, tuberculosis was the next most common etiology (11.3%). Abdominal tuberculosis causing intestinal obstruction were managed both surgically and conservatively. In the patients undergoing adhesiolysis for intestinal obstruction, no tissue diagnosis could be reached for tuberculosis. The difficulty in diagnosis and the relative low specificity and sensitivity of different diagnostic modalities have been demonstrated by Murat O. *et al.* in their study in 2016.

In different studies it has been reported to be present in nearly 14% to 25%. Malik *et al.* (18) reported it to be present in 25% of their cases while Souvik *et al.* (5) found it in 14.17% of their cases. Although, tuberculosis was not the most common etiology in present study yet it was one of the major etiologies.

In present study, surgical intervention was the mainstay of management strategy (66.1%). Conservative management was done in only 21 (33.9%) cases. In present study, most of the cases were clinically stable. In western literature, conservative management has been reported to be successful in 40 to 70 percent of clinically stable patients as observed by Mosley *et al.* (19), Fevang *et al.* (20) and Williams *et al.* (21) in their studies. The management strategy in different studies have also showed a wide variability primarily depending on the clinical status of the patient

Conservative management rate in different previous studies has ranged from 0% to 29.2%. Conservative management rate close to ours has been reported by Sharif *et al.* (16) who reported it to be 29.2%.

With respect to different surgical interventions, in present study exploratory laparotomy with adhesiolysis was the most common procedure performed (24.4%), followed by exploratory laparotomy with hernioplasty (19.5% each), exploratory laparotomy with resection anastomosis (12.2%), colostomy only (7.3%) and exploratory laparotomy with band release (4.9%) respectively. There were 5 (12.2%) cases classified as others : 2 (4.9%) hernioplasty and 1 (2.4%) each exploratory laparotomy with bowel decompression and sigmoidectomy and colo-colic anastomosis. There was one case in whom hernioplasty was done along with resection anastomosis.

Type of surgery performed has also shown considerable variability in different series, and that might be attributed to the difference in clinical spectrum in different studies. In present study, outcome was favourable in 57/62 (91.9%) resulting in successful discharge after recovery. There were 3 (4.8%) deaths. A total of 2 (3.2%) cases underwent re-exploration.

In present study, complications were seen in a total of 14 (22.6%) cases. Wound infection (n=12; 19.4%) was most

common followed by ileus formation in 8 (12.9%), sepsis in 7 (11.3%) and anastomosis leak in 1 (1.6%). These complications rates are in agreement with the complications rates and morbidity profile reported in different studies. Similar to present study, Souvik *et al.* (5) reported complications in 25.89% of their cases and reported wound infection as the most common complication (11.99%) followed by ileus formation (9.26%). Most of the studies in general report wound-infection and sepsis as the most common complications which is similar to the picture emerging in present study.

The mortality rate in present study was similar to that reported by Malik *et al.* (18) who reported it to be 3.49%. Nevertheless the mortality rates in present study were neither extraordinarily low nor extraordinarily high and was within the range defined by other contemporary workers.

The findings of present study ruled out role of independent diagnostic techniques either clinical or radiological, thus underlining the need for a systematic evaluation of patient presenting with intestinal obstruction.

Thus present the spectrum of etiologies of intestinal obstruction as observed at Himalayan Institute, Jolly Grant and also showed the usefulness of a systematic radiological / imaging assessment in reaching at a diagnosis. The present study also showed that the meticulous selection of intervention based on diagnosis and observation approach helps in keeping the mortality rate and complications under check. Further studies in this respect are needed to accumulate more knowledge on the issue in order to bring the mortality rate to nil and in order to reduce the complication rate.

REFERENCES

- Mucha P Jr. Small intestinal obstruction. *Surg Clin North Am* 1987;67:597-620.
- Cirocchi R, Abraha I, Farinella E, Montedori A, Sciannoneo F. Laparoscopic versus open surgery in small bowel obstruction. *Cochrane Database Syst Rev*. 2010;17(2):751-5.
- Cheadle WG, Garr EE, Richardson JD. The importance of early diagnosis of small bowel obstruction. *Am Surg* 1988; 54(9):565-569.
- Irvin TT. Abdominal pain: a surgical audit of 1190 emergency admissions. *Br J Surg*. 1989;76(11):1121-1125.
- Souvik A, Zahid Hossein M, Amitabha D, Nilanjan M, Udipta R. Etiology and Outcome of Acute Intestinal Obstruction: A Review of 367 Patients in Eastern India. *Saudi Journal of Gastroenterology : Official Journal of the Saudi Gastroenterology Association*. 2010;16(4):285-287.
- Jackson PG, Rajji M. Evaluation and Management of Intestinal Obstruction. *Am Fam Physician*. 2011 Jan 15;83(2):159-165.
- Richards WO, Williams LF Jr. Obstruction of the large and small intestine. *Surg Clin North Am* 1988;68:355-376.
- Herlinger H, Maglinte DDT. Small bowel obstruction. In: Herlinger H, Maglinte DDT (eds) *Clinical radiology of the small intestine*. Philadelphia, Saunders, 1989, pp 479-509.
- Dunn JT, Halls JM, Berne TV. Roentgenographic contrast studies in acute small bowel obstruction. *Arch Surg* 1984; 119:1305-1308.
- Megibow AJ, Balthazar EJ, Cho KC, Medwid SW, Birnbaum BA, Noz ME. Bowel obstruction: evaluation with CT. *Radiology* 1991;180:313-318.
- Taourel PG, Fabre JM, Pradel JA, Seneville EJ, Megibow AJ, Bruel JM. Value of CT in the diagnosis and management of patients with suspected acute small bowel obstruction. *Am J Roentgenol* 1995;165:1187-1192.
- Sinha R, Verma R. Multidetector row computed tomography in bowel obstruction. Part 1. Small bowel obstruction. *Clin Radiol* 2005;60:1058-1067.
- Sinha R, Verma R. Multidetector row computed

- tomography in bowel obstruction. Part 2. Large bowel obstruction. *Clin Radiol* 2005;60:1068–1075.
14. Farinella E, Cirocchi R, La Mura F, et al. Feasibility of laparoscopy for small bowel obstruction. *World Journal of Emergency Surgery* :WJES.2009;4:3.
 15. Chowbey PK, Panse R, Sharma A, Khullar R, Soni V, Baijal M. Elective laparoscopy in diagnosis and treatment of recurrent small bowel obstruction. *Surg Laparosc Endosc Percutan Tech*. 2006;16(6):416-22.
 16. Sharif A, Akhtar T, Zia N. Intestinal Obstruction- Etiological and Treatment Outcome. *Journal of Rawalpindi Medical College (JPMC)*;2015;19(3):215-219.
 17. Khanzada TW, Samad A, Sushel C. Etiological spectrum of dynamic intestinal obstruction. *Gomal J Med Sci*. 2007;5(2):59-61.
 18. Malik AM, Shah M, Pathan R, Sufi K. Pattern of Acute Intestinal Obstruction: Is There a Change in the Underlying Etiology? *Saudi Journal of Gastroenterology : Official Journal of the Saudi Gastroenterology Association*.2010;16(4):272-274.
 19. Mosley JG, Shoaib A. Operative versus conservative management of adhesional intestinal obstruction. *Br J Surg*.2000;87(3):362-373.
 20. Fevang BT, Jensen D, Svanes K, Viste A. Early operation or conservative management of patients with small bowel obstruction? *Eur J Surg*.2002;168(8-9):475-481.
 21. Williams SB, Greenspon J, Young HA, Orkin BA. Small bowel obstruction: conservative vs. surgical management. *Dis Colon Rectum*. 2005;48(6):1140-1146.