

ORIGINAL RESEARCH

A Clinical Study of Acute Intestinal Obstruction – Changing Etiologic Pattern

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ABSTRACT

Background: Acute intestinal obstruction (AIO) is a common surgical emergency, requiring urgent diagnosis and prompt treatment. The cause of bowel obstruction has changed dramatically during the past century. Varying etiologic pattern has been noted in developing nations as compared to the industrialized nations.

Materials and Methods: This was a prospective study comprising of all the 68 patients admitted between August 2020 and August 2021 in the Department of General Surgery, Govt Medical Collge & Hospital, Suryapet with a clinical diagnosis of AIO and operated. The aim was to study the etiological pattern and other characteristics of AIO and to look for any variation in the pattern in this region.

Results: Cases operated for AIO constituted 6.84% of all emergency surgeries. The most common cause of AIO was complicated hernia (n=23, 33.82%) followed by adhesions (n=14, 20.59%) and abdominal tuberculosis (n=10, 14.71%). The mean age of presentation was 46.55 years \pm 15.76 years and male to female ratio was 2:1. The most common symptom was pain abdomen (n=63, 92.65%) while the most common sign was tachycardia (n=66, 97.06%). The most common preceding surgery leading to AIO due to adhesions was open appendicectomy and the most common complication was surgical site infection (n=15, 19.12 %). There were 4 mortalities (5.88%).

Conclusion: Obstructed hernia, though the leading etiology for AIO in this study, has lower incidence compared to similar studies, mostly due to improving socio-economic status of people and better accessibility to health care in this region. Adhesions, has a considerably high incidence, probably due to increased number of timely surgeries for diseases that previously went untreated, such as surgeries for various intra-abdominal malignancies. Tuberculosis is the third most common cause of AIO in this study and is mainly attributed to increasing incidence of HIV and its coexistence with tuberculosis.

Keywords: Intestinal Obstruction; Etiology; Intestine, Small; Intestine, Large; Hernia; Tissue Adhesions.

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INTRODUCTION

Acute Intestinal obstruction is defined as an obstruction in forwarding propulsion of the contents due to mechanical or neurological causes, is a common surgical emergency all over the world. Obstruction may occur in the small bowel or large bowel. Small bowel obstruction is mainly of two types, mechanical (physical block or obstruction) and functional obstruction (disturbances in gut motility also known as ileus). Large bowel obstruction can result from either mechanical interruption or due to dilation of the colon in the absence of an anatomic lesion. Intussusception is a unique type of obstruction that results from invagination of a segment of bowel into another.

Bowel obstruction in young age, in unscarred abdomen and large bowel obstruction needs early surgery. Early recognition and aggressive treatment can prevent irreversible ischemia and trans mural necrosis, thereby decreasing mortality and long-term morbidity. Although the mortality due to acute intestinal obstruction is decreasing due to better understanding of pathophysiology,

improved diagnostic techniques, fluid and electrolyte correction, more potent anti-microbials and knowledge of intensive care, still the mortality ranges from 10-15% and more so in developing countries.

Despite the advancements in the field of medicine, introduction of a safe surgery checklist, improved monitoring and related safety practices during anesthesia, surgical technique, and conservative management, the surgical management outcome of intestinal obstruction remains a challenge to the healthcare system.^[1-5]

A number of studies conducted in our part of the world had found obstructed/ strangulated hernias to be the most common underlying cause of acute intestinal obstruction.^[6,7]

Intestinal tuberculosis also appeared to be an important etiology given the high prevalence of tuberculosis in the Indian subcontinent as well as the rising incidence of HIV in the Indian population.^[8,9]

Objectives

- To study the etiological pattern of acute intestinal obstruction (AIO) in a Govt Medical College & Hospital Suryapet.
- To study the other characteristics of AIO in this region.

MATERIALS & METHODS

Source of Data:

The study group comprises of all the 68 patients admitted in the Department of General Surgery, Govt Medical College & Hospital, Suryapet with a clinical diagnosis of Acute intestinal obstruction (AIO) and operated between August 2020 and August 2021.

Methods of collection of data:

Inclusion criteria:

Patients admitted in Govt Medical college & Hospital with symptoms and signs of acute intestinal obstruction.

Patients above the age of 15 yrs.

Patients giving consent for the study.

Exclusion criteria:

Patient presenting with features of subacute intestinal obstruction and responded completely to conservative management.

Children below the age of 15 yrs.

Procedure:

Patients were admitted in emergency. Complete history eliciting cardinal features of intestinal obstruction like pain, vomiting, abdominal distension and constipation/obstipation along with history of fever, previous surgery was taken. Signs of dehydration, hemodynamic stability, tenderness, abdominal hernial orifices, palpable masses; scars of previous surgeries and bowel sounds were looked for and entered in the proforma.

Patients with features of obstruction who were ultimately categorized as having ileus based on history of medication intake, electrolyte abnormalities were excluded from the study.

Routine blood investigations including HIV (after taking patient consent) were done and X-ray abdomen was done to look for multiple air fluid levels.

Surgery was performed within the first 24 hours in most of the patients who presented with increasing pain and distension with gross abdominal tenderness, tachycardia, and other features of toxicity like fever and leukocytosis and failure of non-operative treatment. For patients with intestinal obstruction due to suspected intestinal tuberculosis or adhesions, there was a higher threshold for surgery and a trial of conservative management was given for 24-48 hours unless any of the above features were present. Patients who responded completely to conservative management were excluded from the study.

The selection criteria of the surgical procedure were based on the intraoperative findings. Obstructed hernia was managed by resection of the involved gut whenever gangrenous followed by anastomosis along with a primary anatomical repair of the hernia. Malignant disease was managed by primary resection, bypass or stoma creation. Patients with malignancy were subjected to further treatment on an elective basis later on. Adhesions were managed by open or laparoscopic adhesiolysis and resection of the gut whenever gangrenous. Intestinal tuberculosis resulting in perforation or stricture was managed by resection of the gut with anastomosis or ileostomy. Volvulus was managed by primary resection and anastomosis.

Detailed evaluation of the postoperative progress of the patients and any note of complications and the cause of mortality were made and documented in the proforma.

Study type: Prospective, Descriptive study.

Statistical Analysis:

All continuous variables will be expressed as mean and number and categorical variables as percentages.

Chi-square test, Student's t-test, One-Way ANOVA test and multivariate analysis were used.

$P < 0.05$ will be considered statistically significant.

All statistical analysis was carried out by SPSS 18 and Microsoft Word and Microsoft Excel were used to generate master chart, graphs and tables.

RESULTS

During a period of 1 year from August 1st, 2020 to August 1st, 2021, all the patients operated for acute intestinal obstruction (n=68) in Department of General Surgery, Govt Medical College & Hospital, Suryapet, constitute the study group.

A total of 2956 patients got operated in our department during that period, of which 994 were emergency surgeries and 249 were emergency laparotomies. Of these emergency laparotomies, 60 were due to Acute Intestinal Obstruction (AIO). Hence, cases operated for AIO constitute 2.30% of all surgeries, 6.84% of all emergency surgeries and 27.30% of all emergency laparotomies performed in our institute.

Table 1: Etiological distribution of emergency laparotomies

Etiology	Number of cases	Percentage (%)
Acute intestinal obstruction	60	25
Perforation- peritonitis	78	32.5
Appendicular abscess	24	10
Mesenteric ischaemia	6	2.5
Penetrating trauma abdomen	16	6.6
Blunt trauma abdomen	28	11.6
Biliary sepsis	5	2.08

Miscellaneous	23	9.58
Total	240	100

Hence, surgeries for AIO forms a major part of emergency laparotomies being the second most common in our institute (n=60, 25%).

Table 2: Age distribution

Age group(years)	Males	Females	Total number	Percentage (%)
16- 20	1	0	1	1.81
21- 30	9	3	12	21.81
31- 40	6	5	11	20
41- 50	4	0	4	7.27
51- 60	11	3	14	25.45
61- 70	8	4	12	21.81
71- 80	1	0	1	1.81

As per the above table and bar chart, the maximum incidence in the present study group is 51-60 year age group (n=14, 25.45%). Among males, maximum incidence was in 51-60 year age group (n=14) and among females, in 31-40 year age group (n=11).

The mean age of presentation was 46.41 years \pm 15.52 years (standard deviation), ranging from 20-80 years.

The mean age of presentation for male was 46.6 years and for female was 46.5 years.

Table 3: Sex distribution

Sex	Male	Female
Number of cases	40	20
Percentage (%)	66.6	33.4

Male patients were more commonly affected when compared to females in the ratio of 2:1 as shown in the above table.

Table 4: Symptoms

Symptoms	Total number of cases	Percentage (%)
Pain abdomen	57	95
Vomiting	56	82.35
Abdominal distension	62	91.17
Constipation/ Obstipation	60	88.23
Fever	8	11.76

In the present study, the most common symptoms were pain abdomen (n=57, 95%) and vomiting (n=56, 82.35%).

Table 5: Duration of symptoms

Duration	Total number of cases	Percentage (%)
\leq 1 day	22	36.6
2-3 days	24	40
4-7 days	10	16.6
> 7 days	4	6.6

In this study, most of the cases presented after 2-3 days of onset of symptoms (n=24, 40%). The mean duration of symptoms in the present study was 2.75 days.

Table 6: Signs

Signs	Total number of cases	Percentage (%)
Tachycardia	58	96.6
Hypotension	14	20.59
Tenderness	21	30.88
Palpable mass/ bowel	15	22.06
Exaggerated tympanic bowel sound	57	83.82

In the present study, the most common signs were tachycardia (n=58, 96.6%) and exaggerated tympanic bowel sounds (n=57, 83.82%).

Table 7: Etiological pattern (sex-wise distribution) of AIO in adults

Etiology	Total number of cases	No. of case in Males	No. of cases in Females	Percentage (%)
Hernia (Obstructed/Strangulated)	20	15	5	33.33
Adhesion	11	8	3	18.33
Malignancy	7	5	2	11.66
Abdominal tuberculosis	9	6	3	15
Volvulus	2	1	1	3.33
Intussusception	4	4	0	6.66
Intestinal bands	4	2	2	6.66
Stricture	2	0	2	3.33
Miscellaneous	1	1	0	1.66

The most common cause of AIO in our study was obstructed/strangulated hernias (n=20, 33.33%). The next common etiology was post-operative adhesions (n=11, 18.33%) followed by abdominal tuberculosis (n=9, 15%). There was no significant difference in the etiologic pattern between the two sexes. Two of the cases with AIO due to tuberculosis were HIV positive.

Table 8: Etiologic distribution of Obstructed/Strangulated Hernia

Type	Obstructed	Strangulated	Total number	Percentage (%)
Inguinal	8	2	10	50
Paraumbilical	4	2	6	30
Incisional	4	0	4	20

The hernia going for AIO most commonly was the inguinal hernia (n=10, 50%) whereas, paraumbilical hernia had the maximum propensity to strangulate (4 of 8= 50%). Moreover, lower socio-economic status and increased duration of symptoms were found to be significant association with complicated hernia (p-value = 0.001 and 0.01 respectively).

Table 9: Preceding surgeries in cases of AIO secondary to adhesions.

Total number of cases with intestinal obstruction due to adhesions secondary to prior surgeries = 11

Previous Surgeries	Number of cases	Percentage (%)	Comments
Appendectomy	5	45.45	Openappendectomy
Laparotomy	3	27.27	Lat.Pancreatico-jejunostomy. Ilealperforation- closure Lefthemicolectomy.
Hysterectomy	1	9.09	OpenTAH± BSO
Laparoscopic procedures	2	18.18	Lap.Cholecystectomy Lapappendectomy

The most common preceding surgery leading to AIO due to adhesions in this study was found to be open appendectomy (n=5, 45.45%) followed by laparotomy (n=2, 18.18%).

Investigations

Table 10: Blood investigations

Investigations	Total number of cases	Percentage
Anemia	9	15
Leucocytosis	5	8.33
Dyselectrolytemia(hypokalemia)	11	18.33
Deranged Renal function	2	3.33
Hypoalbuminemia	9	15

The presence of the above may add to the morbidity of AIO cases but the statistical significance could not be established due to inadequate number of cases for the same. Erect abdominal X-ray revealed multiple air fluid levels in 49 cases (81.66%).

Postoperative complications:

Table 11: Postoperative complications

Complications	Total number of cases	Percentage (%)
Surgicalsiteinfection	11	18.33
BurstAbdomen	5	8.33
Prolongedileus(>72hours)	9	15
Septicemia	8	13.33
Respiratory (effusion,atelectasis,consolidation)	8	13.33
Anastomoticleak/Fecalfistula	3	5
Repeatprocedure(s)	6	10

In the present study group, 41 cases (68.33%) had no complications, and the most common complication was surgical site infection (n=11, 18.33 %) followed by prolonged ileus (n=9, 15 %).

DISCUSSION

Acute intestinal obstruction (AIO) continues to be one of the most common surgical emergencies worldwide and its clinical pattern, especially with regards to etiology, has been changing over the last few decades. Varying etiologic pattern has been noted in developing

nations (Indian subcontinent and some African nations) as compared to the industrialized nations.

In this study, we have analyzed the characteristics of cases of AIO in Govt Medical College & Hospital, Suryapet, which caters to a large population belonging to diverse socio-economic background from the city and the neighbouring towns and villages. A total of 60 patients were studied over one year from August 2020 to August 2021.

Study group characteristics:

Etiological pattern

The etiology of intestinal obstruction varies from one geographical location to another. Post-operative adhesions appear to be the most common cause in the Western world⁵⁵ as well as in parts of Asia (such as China).^[5]

In our present study, we found obstructed hernia to be the most common etiology of AIO which was comparable with a similar study done in Eastern India by Souvik Adhikari et al,^[6] in 2010.

The second most common etiology in our study was adhesions and its incidence was higher than Souvik Adhikari et al. study but half of what was found in other study groups like Playforth et al (54%) and Arshad Malik et al. (41%).^[6-10]

The most common preceding surgery in patients with adhesions was open appendectomy (50%) followed by laparotomy (22%) and hysterectomy (14%) which was comparable with studies by Adesunkanmi AR et al and Foster NM et al.^[2,11]

Adhesions, the second most common etiology for AIO in this study, has a considerably high incidence, which is comparable with other studies, probably due to increased number of timely surgeries for diseases that previously went untreated, such as surgeries for various intra-abdominal and pelvic malignancies.

Tuberculosis assumes great importance as a cause of AIO and is mainly attributed to increasing incidence of HIV and its coexistence with tuberculosis.^[12]

Disease Incidence

In our clinical study incidence of AIO is 2.30% of all operated cases (emergency and elective) and 6.84 % of all emergency surgeries. In Souvik Adhikari et al series incidence was 9.87% of total surgical cases.^[6] In Bhargava Anderson's series incidence was 3% of total surgical cases.

In the present study, the frequencies of the clinical features were comparable with the other study groups- Souvik Adhikari et al.^[6]

The most common signs in this study were tachycardia (96.6 %) and exaggerated tympanic bowel sounds (83.82%) which were also comparable with the abovementioned studies.

Laboratory investigation

Haematological investigation for anemia, leukocytosis, hypokalemia, deranged renal functions and hypoalbuminemia did not yield much statistical significance in this study.

Radiology

The erect abdomen X-ray helps us in the diagnosis of intestinal obstruction as well as in differentiating the small bowel with large bowel obstruction. Multiple air fluid level can be seen in small multiple intestinal obstruction whereas only gas shadow seen in large bowel observation until the ileo-caecal valve is competent.

In the present study of the 60 cases, 83.82% of X-ray abdomen showed multiple air fluid levels. IV contrast enhanced CT scan can identify the transition zone and help find the level of bowel obstruction when diagnosis is doubtful but it wasn't a part of this study.

Surgical Management

In this study, the surgeries preferred for each of the etiologies of AIO are similar to the studies by Souvik Adhikari et al,^[6] Reduction of obstructed hernia with anatomical repair and laparotomy with resection-anastomosis were the most common surgeries performed in this study (26.47% and 25.00% respectively).

The pattern of complications in this study was comparable with that found by Souvik Adhikari et al with surgical site infection being the most common complication followed by prolonged ileus.^[6]

Limitations of the study

The cases of intestinal obstruction that responded to conservative management were not included in this study and were considered 'subacute', unlike other studies compared above. Hence, some etiologies like adhesions and tuberculosis were not totally comparable with the previous studies.

CONCLUSION

Obstructed hernia is the leading etiology for AIO in this institution, located in Bangalore, Southern India. However, the incidence is lower compared to similar studies, mostly due to improving socio-economic status of people and better accessibility to health care in this region, leading to early surgical repair of hernia.

Adhesions, the second most common etiology for AIO in this study, has a considerably high incidence, probably due to increased number of timely surgeries for diseases that previously went untreated, such as surgeries for various intra-abdominal and pelvic malignancies.

Tuberculosis is the third most common cause of AIO in our study, mainly attributed to increasing incidence of HIV and its coexistence with tuberculosis.

Acknowledgements

The author is thankful to Department of General Surgery for providing all the facilities to carry out this work.

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