

A Study of Surgical Management in Relation to Etiological Factors of Intestinal Obstruction

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Abstract:

Aim: To study the surgical management in relation to etiological factors of intestinal obstruction.

Materials and Methods: The prospective study was conducted on 50 patients of intestinal obstruction admitted to various surgical wards in ESIC Medical College & Hospital, Kalaburagi from October 2023 to October 2024.

Result: Intestinal obstruction was more common (58%) in the age group of 30-60. Small bowel obstruction was more common than large bowel obstruction. Most common etiological factor for intestinal obstruction was adhesions (42%) due to postoperative and inflammatory causes. Other causes of intestinal obstruction included hernia (20%), malignancy (16%), intestinal tuberculosis (14%), and volvulus (8%). Rare causes of intestinal obstruction in this study were found to be carcinoid tumor of the small intestine. Mortality rate was 10% in this study.

Conclusion: This study concluded that pattern of intestinal obstruction varies from the previous studies with less mortality.

Keywords: Intestinal obstruction, etiological factor for intestinal obstruction, mortality.

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Introduction

Intestinal obstruction is a common surgical emergency all over the world. It is defined as obstruction in forward propulsion of the contents of the intestine either due to dynamic, adynamic-pseudo-obstruction. It is predisposed by varying underlying anomalies and diseases, which are difficult to define pre-operatively. Though intestinal obstruction can be diagnosed easily, the underlying cause except postoperative adhesions and external hernias are difficult to be diagnosed preoperatively.

Early diagnosis of obstruction, pre-operative preparation, skilful operative Management, proper technique during surgery and intensive postoperative treatment carries a grateful result.

The diagnosis and management of the patient with intestinal obstruction is one of the more challenging emergency that a general surgeon can come across. Although the mortality due to acute intestinal obstruction is decreasing with better understanding of pathophysiology, improvement India gnostic techniques, fluid and electrolyte

correction, much potent anti-microbial and surgical management, but still mortality ranges from 3% for simple obstruction to as much as 30% when there is vascular compromise or perforation of the obstructed bowel. This is further influenced by the clinical setting and related co-morbidities.

Aim of the study

To study the surgical management in relation to etiological factors of intestinal obstruction.

Objectives

1. To study the various clinical features of intestinal obstruction Modalities of treatment required.
2. To study the various surgical procedures and its outcome in relation to etiological factors in intestinal obstruction patients.

Material and Methods

The prospective study was conducted on 50 patients of intestinal obstruction admitted to various surgical wards in ESIC Medical College &

Hospital, Kalaburagi from October 2023 to October 2024.

Inclusion Criteria:

Age groups ranging from 11 years to 70 years.

Exclusion Criteria:

Patients belonged to the paediatric age group or patients who were having sub-acute intestinal obstruction treated conservatively were excluded from the study. Cases selection was done in the criteria of history, clinical examination and radiological examination. All the cases studied subjected to surgery and the diagnosis was established.

Soon after the admission, clinical data were recorded according to the proforma. The diagnosis mainly based on clinical examination and often supported by radiological examinations.

The investigations done in the cases for study were:

Blood: Routine examination includes haemoglobin percentage, WBC count and differential count, ESR and blood urea, serum creatinine, serum electrolyte, blood grouping and typing.

Urine: Routine examinations – albumin, sugar and microscopy.

Radiology Imaging: Plain X-ray erect abdomen or lateral decubitus to detect fluid gas levels and ultrasound abdomen was done in all cases. CT scan abdomen done in selected cases of mass abdomen.

Immediately after the admission along with above procedure, resuscitation with IV fluids especially ringer lactate and normal saline infusion started till the hydration and urine output become normal. Nasogastric decompression with Ryle's tube carried out and antibiotic prophylaxis started. And close observation of all bedside parameters like pulse rate, blood pressure, respiratory rate, abdominal girth, bowel sounds, tenderness and guarding were looked for. Patients who showed reduction in abdominal distension and improvement in general condition especially in individuals with postoperative adhesions, a chance of conservative management was taken for further 12 to 24 hours, those who showed improvement by moving bowels, reduction in pain/tenderness, is decided for conservative treatment. Such individuals were excluded from this study.

Postoperative follow up after the discharge of patients was done in majority of the patients up to 6 months. Most of the patients did not come for follow up after one or two visits. The results were tabulated mostly stressing on following points - age, sex, symptoms, examination findings, investigations, abnormalities, probable causative factors, operative findings and operative procedure adopted.

Results

There were 27 male and 23 female in present study cases. The male and females are nearly in equal ratio.

Table 1: Showing the Age and Sex Distribution of the Cases

Age group	Male	Female	Total	Percentage
11-20	2	4	6	12%
21-30	5	2	7	14%
31-40	5	4	9	18%
41-50	6	4	10	20%
51-60	4	6	10	20%
61-70	5	3	8	16%
	27	23	50	100

Table 2: Presenting Symptoms and Signs

Sl. No.	Clinical features	No. of Cases	Percentage
1	Pain abdomen	50	100%
2	Vomiting	43	86%
3	Distension of abdomen	50	100%
4	Constipation	30	60%
5	Dehydration	30	60%
6	Fever	7	14%
7	Tenderness over the abdomen	40	80%
8	Guarding	20	40%
9	Palpable mass	13	26%
10	Increased bowel sounds	44	88%
11	Absent bowel sounds	6	12%

Table 3: Etiology of Intestinal Obstruction

Etiology of Intestinal Obstruction		Number of patients (n=30)	Percentage
1. Adhesion and band		21	42%
2. Hernia		10	20%
3. Malignancy	Adenocarcinoma of colon	4	08
	Carcinoid tumor of small intestine	2	
	Ovarian tumor with peritoneal metastasis with adhesions between ileal Loops	1	
	Stomach carcinoma infiltrating transverse colon	1	
4. T.B stricture		07	14%
5. Volvulus		04	08%

Table 4: Types of operation

Types of operation	No. of Patients (n=50)	Percentage
A. Resection and end-to-end ileo-ileal Anastomosis	17	34%
B. Release of adhesions and bands 15		30%
C. Herniorrhaphy	10	20%
D. Hemicolectomy	4	8%
E. Untwisting of volvulus	2	4%
F. Resection and end-to-end jejunio-ileal anastomosis	1	2%

Resection and end-to-end ileoileal primary anastomosis were done in 17 cases, which included cases of adhesion, stricture, ileocaecal growth, volvulus of small intestine.

Adhesiolysis was done in 15 cases which included postoperative adhesions, inflammatory adhesions & constricting bands Anatomical hernia repair was

done in 10 cases of which 7 were inguinal hernia (Bassini repair) and 3 incisional hernia. Untwisting of sigmoid volvulus was done in 2 cases & hemicolectomy was done in 4 cases.

Resection and end-to-end jejunioileal primary anastomosis were done in 1 case with multiple strictures of the jejunum due to carcinoid tumor.

Table 5: Showing past history

Sl. No.	Past history	No. of cases(n=50)	Percentage
1	Appendectomy	7	14%
2	Known case of Tuberculosis	7	14%
3	Hernias	6	12%
4	TAH & BSO	4	8%
5	Gastrojejunostomy	4	8%
6	Tubectomy, TAH & BSO	1	2%
7	Wertheim's hysterectomy	1	2%
8	Vaginal hysterectomy	1	2%
9	LSCS	1	2%
10	Tubectomy	1	2%
11	Hernioplasty	1	2%
12	Non-significant	16	32%

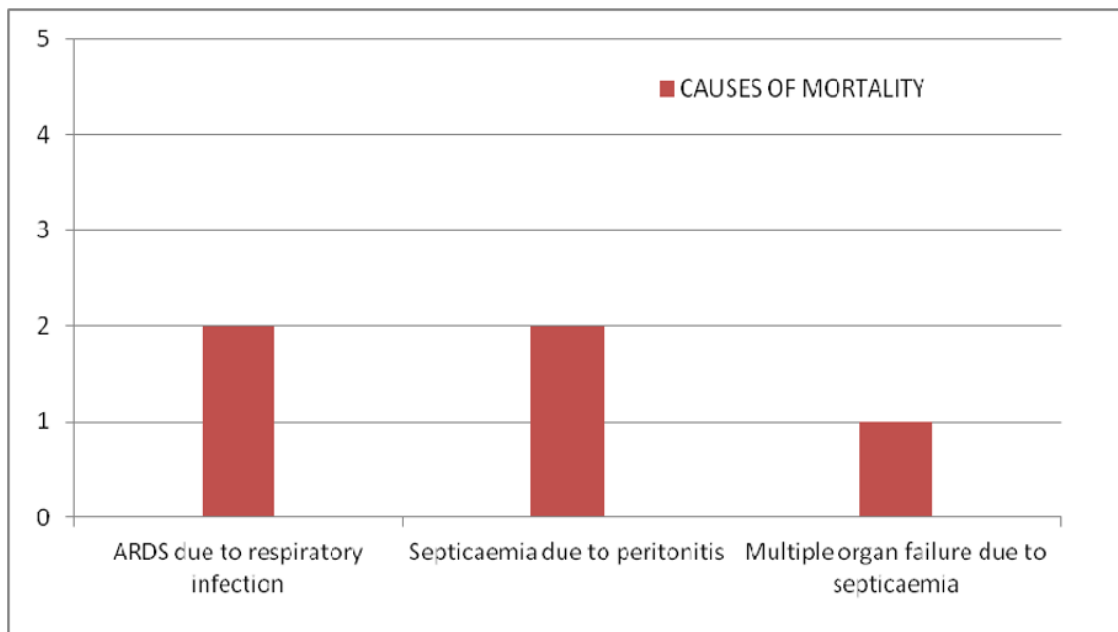
Table 6: Postoperative complications

Postoperative Complications	Number of patients(n=50)	Percentage
A. Wound infection	5	10%
B. Respiratory infection	4	8%
C. Enterocutaneous fistula	2	4%
D. Prolonged ileus	3	6%
E. Deaths (Septicaemia)	5	10%

Table 7: Association of etiology with postoperative complications

Etiology of Intestinal Obstruction	Postoperative Complications		Total
	Present	Absent	
A. Adhesion and bands	6	15	21
B. Hernia	4	6	10
C. Malignancy	4	4	8
D. T.B stricture 4	3		7
E. Volvulus	1	3	4
Total	19	31	50

In present study 5 persons died during postoperative period. The analysis of cause of death is shown below. Graph 1 showing causes of mortality.



Graph 1:

Table 9: Follow up status

Follow-up complications	Follow-up up status		
	One month	3rd month	6th Month
A. Wound infection	3	Nil	Nil
B. Septicemia	Nil	Nil	Nil
C. Enterocutaneous Fistula	Nil	Nil	Nil
D. Prolonged Ileus	Nil	Nil	Nil
E. Fever	3	1	Nil
F. Respiratory Infection	4	1	Nil
G. Death	Nil	Nil	Nil
H. Recurrence	Nil	Nil	Nil

Discussion

Intestinal obstruction continues to be a frequent emergency, which surgeons have to face (1-4% of emergency operations). Brewer et al analysed 1000 consecutive abdominal surgeries in 1976 and reported an incidence of 2.5%. Jain et al in 1973 reported an incidence of 3.2%.

In our hospital from October 2023 to October 2024, 50 cases of intestinal obstruction are done. The involvement of small bowel in obstruction is much

more common than that of large bowel (Sufian and Mostsumoto).

The delay in the treatment will lead to high mortality. Since the advancement in understanding the anatomy/physiology, fluid and electrolyte management along with modern antibiotics and intensive care unit, the mortality has been decreasing consistently.

The associated medical problems (like respiratory cardiac or metabolic diseases) and advanced age

carries a considerable contribution in adding the mortality.

Though intestinal obstruction occurs in all age groups, here the youngest patient was 11 years and oldest patient was 70 years.

In this study, 20% belongs to 50-60 years age group & 58% belongs to 30-60 years age group. Studies by Gill Eggleston has reported 17% of cases in the age group of 50-60 years and 60% of the Cases of intestinal obstruction occur in the age group of 30-60 years. Their studies almost correlate

with the present study. However, studies reported by Harban Singh and C. S. Ramachandran says that the maximum number of cases occurring the age group of 21-40 years, of these the etiological factors were obstructed hernia. The explanation which I would like to give in presently the etiological shift is towards adhesions and then hernia, which are decreasing from the earlier twentieth century commonest cause of intestinal obstruction due to awareness as people are seeking treatment early for hernia.

Table 10: Age wise incidence of intestinal obstruction in different studies

Age group	Harban Singh	Play forth	G. J. Cole	S.S. GillPr	Present Study
11-20	10%	4	10	12	12%
21-30	16	5	10	12	14%
31-40	18	13	18	13	18%
41-50	15	18	16	13	20%
51-60	10	14	15	16	20%
>60	20	40	16	13	16%

In present study, there are 27 male and 23 females. Male and female are nearly in equal ratio. Among previous studies, Budharaja et al and Harban Singh et al, reported 4:1 and Shakeed found equal incidence.

Table 11: Comparison of sex incidence in different studies

Studies	Male: Female ratio
Budharaja et al	4:1
Harban Singh et al	4:1
Shakeed	1:1
Present study	1.17:1

The etiology of intestinal obstruction varies from one country to other and from one part of the country to another party. The comparative study of previous report is as follows:

Table 12. Comparison of causes of intestinal obstruction in different studies

Cause	Present Study	S.S. Gill and Eggleston 1965	G. J. Cole 1965	Playforth 1970	C. S. Ramachandran 1982	Brooks and Buttler 1996	Biarj et al 1999
Adhesion	42%	15%	15%	10%	23%	23%	53%
Hernia	20%	27%	27%	35%	13.6%	25%	26%
Intussusception	-	12%	12%	12%	7.4%	18%	-
Tuberculosis	14%	3.5%	3.5%	3%	8.6%	-	-
Malignancy	16%	3.4%	3.4%	4%	9.3%	5%	-
Volvulus	8%	3.4%	25%	4%	26.6%	1%	3%
Mesenteric vascular thrombosis	-						26%

The most common etiological factor in the present study is adhesion which included postoperative, inflammatory and congenital bands. Postoperative adhesion occurs in 93% of cases of previous abdominal surgery, of every third patient will behaving one of the other clinical signs and symptoms related to adhesion. Among 93% of the postoperative adhesions, 5% of the cases can develop acute intestinal obstruction, most of them

will be within first year (39-60%). In the present series 42% of the cases of obstruction are due to adhesion and bands. Among adhesion and bands 61.9% are due to post-operative adhesion, 23.8% are due to inflammatory adhesions and 15.3% are due to congenital bands. McIver found that 80% of adhesions and 21% are due to congenital causes, Perry et al, found that 79% were post-operative adhesions, 18% inflammatory and 28% were

congenital. In the inflammatory causes 42% followed acute appendicitis, 14.5% diverticulitis and other resulted from pelvic infection, Crohn's disease and Cholecystitis. On review of the earlier Indian studies, 10% of intestinal obstruction were related to adhesion and more recent studies in 1982 reports 23%. The rise in the incidence of adhesions

related obstructions is attributed to increased number of abdomino-pelvic surgeries. In the Western studies, the adhesion related obstruction ranges from 40-60%. Developing countries like Virginia also reported 40% of the obstructions related to adhesions.

Table 13: Comparison of hernia causing intestinal obstruction in different studies

Sl. No.	Studies	%
1.	S.S. Gill 1965	15
2.	G. J. Cole 1965	15
3.	Playforth 1970	10
4.	C. S. Rama Chandran 1982	23
5.	Brooks and Buttler 1996	23
6.	Biarj et al 1999	53
7.	Present study	20

Tuberculosis is one of the common health problems in developing countries. In the present series, tuberculosis found to be a causative factor in 7 cases (14%) in the form of ileocaecal tuberculosis with stricture and adhesions.

Table 14: Comparison of intestinal tuberculosis causing intestinal obstruction in different studies

Tuberculosis in percentage		
Harbans et al	1972	17.2%
C. S. Ramachandran	1982	8.6%
Present study	2018-20	14%

Our present study corresponds well with the other Indian studies by Harbans et al. However, disparity with western literature is due to the increase in number of tuberculosis patients in the rural population. The incidence of large bowel

obstruction is higher in western countries due to various factors, which includes increased aged population, consumption of high animal fat and lack of fibre diet.

Table 15: Comparison of malignancy causing intestinal obstruction in different studies

Studies	No. of cases	Malignancy
Harbans et al (1971)	53	15%
Kostner et al (1997)	300	53%
Present study	50	16%

This present study correlates with Harbans et al mentioned above. In our study, we found two interesting causes of intestinal obstruction i.e., carcinoid tumors in jejunum and ileum, 1 case each Lubarsch first described carcinoid tumors in 1888. Oberndorfer used the term Carcinoid tumors involving the small intestine should however be regarded as malignant. They are most commonly found in the ileum, 73% of malignant carcinoids are found at this site, 4% in the jejunum. Small bowel carcinoid tumors usually present with intestinal obstruction, in 40% of cases metastasis are found at laparotomy. About 4% of patients with small bowel carcinoid tumors develop carcinoid syndrome characterised by flushing, intestinal hyper-motility & bronchospasm.

In our study we had 2 case of sigmoid volvulus and 2 cases of small bowel volvulus. Total percentage of volvulus in our study is 8%. Small bowel volvulus is a rare but life-threatening surgical

emergency. The etiology may be primary where cause is not known and secondary due to adhesions, bands, Iwuagwu et al 1999, reported incidence of 3.5% to 6.2%. Our study had 4% of small bowel volvulus. This corresponds to the study done by Iwuagwu et al. Most common operation performed was resection of ileal segment and end to end ileo-ileal primary anastomosis 34%, release of adhesions and bands 30%. Hernia repair in 20%, hemicolectomy in 8% cases, reduction and untwisting of volvulus in 4%, resection of jejunal segment and end to end jejuno-ileal primary anastomosis 2% and tube caecostomy in 2% case. 5 cases died following surgery for acute intestinal obstruction (10%). Among the patients who died are due to following causes

- ARDS due to respiratory infections
- Septicaemia due to peritonitis
- Multiple organ failure due to septicaemia

Table 16: Mortality comparison with other world series

Author	Year	Cases studied	Mortality (%)
Wangensteen	1955	252	11.0
Gill and Eggleston	1965	147	16.0
Sufian and Matsumoto	1975	171	19.0
C.S. Ramachandran	1982	417	12.7
Cheadle et al	1998	300	9.0
Present study	2018-2020	50	10

In our study we had mortality rate of 10%. The decrease in overall mortality is due to better understanding of pathophysiology of obstruction, improvement in resuscitative and supportive treatment, aggressive surgical therapy in combination with improved technique in anaesthesia.

Conclusion

An important surgical emergency is intestinal obstruction. Surgeons face a difficult management challenge when a patient presents late with problems. Patients who exhibit symptoms of intestinal blockage require strict fluid and electrolyte correction, which can be dangerous and life-threatening. As the number of abdominal and pelvic procedures increases, postoperative adhesions are the most frequent cause of intestinal obstruction. The best and most accurate diagnosis of intestinal obstruction can be made by combining clinical, radiographic, and surgical data. There is no particular biochemical marker linked to mechanical obstruction that can assist the surgeon in distinguishing between simple obstructions and ischemia or a closed loop blockage with an imminent bowel infarction.

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