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A Clinical Study of Surgical Management of Intestinal Obstruction

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ABSTRACT

In routine practice every surgeon has to come across this surgical emergency and treatment would largely depend on early diagnosis and skillful management. The objective is to study various causes, symptomatology, various modalities (surgical) of treatment, the role of imaging studies in determining the etiology and intervention and complications of various surgical procedures of intestinal obstruction. A total number of 50 cases of intestinal obstruction have been studied between April 2014 to june 2015, patients who attended OPD and emergency department at Govt Medical college and Associated Group of Hospitals, KOTA Rajasthan with history and clinical picture suggestive of intestinal obstruction, also the patients who had hernia with recent onset of irreducibility, pain, vomiting and constipation were also included in this study. Paediatric patients and patients who were having sub acute or adynamic intestinal obstruction treated conservatively were excluded from the study. The study was of 50 patients done in all age groups ranging from 11 to 80yrs with a mean age of 44.8 years. Maximum incidence was seen between age group of 51-60 yrs (22%) followed by the age group 41-50 (20%). Males are more commonly involved (4.5:1) than females and small bowel is more commonly involved (70%). And adhesion followed by obstructed hernia are common cause of intestinal obstruction. Apart from postoperative adhesion other causes of intestinal obstruction like obstructed inguinal hernia, tubercular stricture, large bowel volvulus and large bowel neoplasms should be dealt promptly to prevent strangulation. Early diagnosis and emergent management are the key of better outcome.

Keywords: Small intestine, Large intestine, Intestinal obstruction, Adhesions, obstructed inguinal hernia, Volvulus, Intussusception, Ultrasonography, CECT scan, Serum electrolyte, Resection and anastomosis.

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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 as obstruction in the intestine either due to mechanical or neurological cause. It is predisposed by varying underlying anomalies and diseases, which are difficult to define preoperatively.

Though intestinal obstruction can be diagnosed easily, the underlying cause except postoperative adhesions and external hernias are difficult to be diagnosed preoperatively.

The mortality due to acute intestinal obstruction is decreasing with better understanding of pathophysiology, improvement in diagnostic techniques, fluid and electrolyte management, potent anti-microbial and the knowledge of intensive care.

Various studies in India report mortality about 8-12% . Most of the mortalities occurs in elderly individuals who seek late treatment and who are having associated pre- existing comorbid conditions.

The dictum of never let the sun set or rise in small bowel obstruction has made early surgical intervention for intestinal obstruction. This in turn has reduced the incidence of strangulation and gangrene of bowel, which was major cause of mortality in seen patients.[1]

Early diagnosis of obstruction skillful operative management, proper technique during surgery and intensive postoperative treatment carries better results.

MATERIALS AND METHOD

A clinical study of intestinal obstruction was selected because in routine practice every surgeon has to come across this surgical emergency and treatment would largely depend on early diagnosis and skillful management.

The study was undertaken with the aim of evaluating/studying the various causes (etiology) and the most common cause of intestinal obstruction with its associated complications at our institution, mode of presentation(symptomatology)&its surgical management and also to evaluate/study the role of imaging studies in determining the etiology and intervention in intestinal obstruction. A total number of 50 cases of intestinal obstruction have been studied between April 2014 to June 2015.

Inclusion criteria:

In this study I have selected patients who attended OPD and emergency department at Govt Medical college and Associated Group of Hospitals, KOTA Rajasthan with history and clinical

picture suggestive of intestinal obstruction, also the patients who had hernia with recent onset of irreducibility, pain, vomiting and constipation were also included in this study.

Exclusion Criteria

Patients who were having sub acute or adynamic intestinal obstruction treated conservatively were excluded from the study.

All patients with provisional diagnosis of acute intestinal obstruction were assessed clinically in detail as proforma after admission.

On admission relevant pathological and biochemical investigations were carried out in all cases. Plain X-ray erect abdomen was done in almost all cases.

Ultrasonography of abdomen was done in some cases whose diagnosis by X-ray was inconclusive. CT scan abdomen done in selected cases. Immediately after the admission along with the relevant investigations, resuscitation with IV fluids especially ringer lactate and normal saline infusion, was started till the hydration and urine output became normal. Nasogastric decompression with Ryles tube was carried out and antibiotic prophylaxis started. Close observation of all bedside parameters (like pulse rate, BP, RR, abdominal girth, bowel sounds and tenderness and guarding) was done.

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 by extending the supportive treatment for further 12 to 24 hours, those who showed improvement by moving bowels, reduction in pain/tenderness were kept for conservative treatment, such individuals are excluded from this study.

Patients with clear-cut signs and symptoms of acute obstruction were managed by appropriate surgical procedure after resuscitation. I attended operative procedures in majority of the cases and findings were recorded and photographs were taken.

Surgery adopted and criteria for deciding the procedure were noted. Histopathological examination of the specimen of resection/biopsy was done.

The postoperative period was monitored carefully and all parameters were recorded hourly or four hourly basis depending upon the patients general condition and toxemia.

Postoperative follow up period ranged between 2-6 months from time of discharge, some patients were not regular in their follow up visits. The results were tabulated mostly stressing on following points i.e age, sex, symptoms, signs, investigations, probable causative factors, operative findings and operative procedure adopted.

Statistical Methods: Chi-square and Fisher Exact test has been used to find the significant of proportion of Postoperative complications in association with etiology of Intestinal Obstruction.

Management

General principles of management of intestinal obstruction:-

This includes supportive management and surgical management.

- GI decompression by nasogastric (ryle's) tube
- Fluid and electrolyte replacement with vitals monitoring (pulse rate, BP, RR, urine output, abdominal girth, bowel sound, tenderness and guarding)
- Appropriate investigations if needed (as abdominal x-ray or CECT abdomen and pelvis)
- Relief of obstruction usually surgical

Operative management:

The timing of surgical management or intervention is dependent on the clinical picture, early operation is indicated in:

1. Obstructed and strangulated hernia
2. Internal intestinal strangulation
3. Acute obstruction

Procedures in form of adhesionolysis, resection-anastomosis, hernia repair etc. Postoperative period was closely monitored for above mentioned vitals and complications treated efficiently if any. Follow up was done upto 6 months in most patients, some patients were followed up telephonically.

Figure 1: Sigmoid Volvulus

Figure 2:- Meckel's diverticulum

Figure 3: Adhesive Band

Figure 4: Post op Adhesion

Figure 5: Post op Adhesion

RESULTS AND DISCUSSION

A clinical study of 50 cases of intestinal obstruction was conducted during period of April 2014–june 2015 at Govt Medical college and Associated Group Hospitals, KOTA RAJASTHAN. Analysis is as follows:

Age distribution:

The study was done in all age groups ranging from 11 to 80yrs with a mean age of 44.8 years. Maximum incidence was seen between age group of 51-60 yrs (22%) followed by the age group 41-50 years (20%).

Table 1: Age Distribution

Age (years)	Total Cases
11-20	5
21-30	8
31-40	8
41-50	10
51-60	11
61-70	6
>71	2

Sex incidence:

The occurrence of intestinal obstruction was common in male (82%) in comparison to female (18%). There were 41 males& 9 females with male to female ratio 4.5: 1.

Table 2: Sex Incidence

Age(years)	Male	Female
11-20	5	0
21-30	4	4
31-40	7	1
41-50	9	1
51-60	8	3
61-70	6	0
>71	2	0

Levels of obstruction:

There were more of small bowel obstruction (70%) when compared to large bowel Obstruction (30%).

Table 3: levels of obstruction

Small bowel	Large bowel
35	15

Analyses of symptoms and signs:

Table 4: Analyses of symptoms and signs:

Sl No.	Symptoms & signs	No. of cases(50)	Percentage (%)
1	Pain abdomen	46	92
2	Vomiting	34	68
3	Groin swelling	6	12
4	Distension	50	100
5	Constipation	28	56
6	Tenderness	27	54
7	Guarding	16	32
8	Rigidity	15	30
9	Palpable mass	7	14
10	Bowel sounds- decreased	17	34
11	Bowel sounds- increased	33	66
12	PR findings(significant)	6	12

Distention abdomen (100% cases) was the most common presenting symptom followed by pain abdomen (92% cases), vomiting (68% cases), constipation (56% cases).

Etiology of intestinal obstruction:

Table-5.a Small bowel obstruction 35 cases (70%)

Cause	No. of Cases	Percentage (%)
Adhesions & bands	17	34
Obstructed hernias	7	14
TB strictures	6	12
Meckels diverticulum	4	8
Mesentric cyst	1	2

Table 5 b. Large bowel obstruction - 15 cases (30%)

Cause	Case	Percentage
Neoplasm	4	8
Large bowel volvulus	5	10
Post op adhesion	4	8
Intussusception	2	4

Radiological features:

Plain X-ray erect abdomen was done in 50 cases. The lower the obstruction, higher the accuracy. In dubious cases CECT Abdomen and Pelvis was done for more accuracy.

Management

Table 6a: Small bowel obstruction - 35 cases

Procedure	No. of Cases
Adhesiolysis	9

Resection &Anastamosis	11
Band release	4
Hernia repair	4
Resection & hernia repair	2
Meckel's diverticulectomy and anastomosis	4
Marsupialisation of cyst	1
Total	**35**

Small bowel obstruction:

Resection and anastomosis (6 cases of TB strictures, 2 cases of strangulated inguinal hernia and 3 gangrenous bowel) adhesiolysis (9 cases) were carried out commonly followed by band release (4 cases), hernia repair (4 cases), & Meckel's diverticulectomy and anastomosis (4 cases).

Table 6.b: Large bowel obstruction- 15 cases

Causes	Cases
Resection &Anastamosis	8
Volvulus derotation	3
Colostomy	4

Large bowel obstruction:

Colostomy was done in 3 cases(1 case of TB stricture of splenic flexure of colon and 2 cases of growth in descending colon), resection & anastomosis in 8 cases(1 cases of gangrenous sigmoid volvulus,1 case of malignant growth in descending colon), volvulusderotation 2 cases.

Postoperative complications observed in this study:

Table 7: Total no. of cases - 50

Particulars	No. of Cases	Percentage
Morbidity	16	32
Mortality	3	6

Moderate to high degree of fever was noticed in cases of ileocaecal tuberculosis, strangulated hernia and colonic growth.

In 12 patients wound infection was present, ranging from stitch abscessto superficial gaping. In one case of a stricturous growth of carcinoma descending colon post-op faecal fistula formed, for which re exploration was done. 3 patients died due to MODS, and chest infection.

Table 8

Postoperative complications	Number of patients (n=50)	Percentage (%)
Wound infections	12	24
Respiratory infections	3	6
Faecal fistula	1	2
Deaths	3	6

Causes of mortality:

1. A case of carcinoma hepatic flexure colon with liver metastasis, operative procedure – loop ileostomy, develop post operative CHEST INFECTION – Death.
2. A case of strangulated large bowel volvulus, operative procedure – resection anastomosis, developed MODS(multi organ dysfunction) post operatively –Death.
3. A case of post operative adhesion with gangrenous small bowel, operative procedure resection and double ileostomy ,developed MODS(multi organ dysfunction) post operatively –Death.

Table 9 Association of etiology with postoperative complications:

Etiology of Intestinal Obstruction	Postoperative Complications		Total
	Present	Absent	
Adhesions & bands	6	15	21
Obstructed hernias	2	5	7
TB strictures	3	3	6
Volvulus	1	4	5
Intussusception	1	1	2
Meckels diverticulum	2	2	4
Neoplasm	1	3	4
Mesentric cyst	0	1	1

Patients presented with T.B Stricture are more likely to develop post- operative complications

Follow up status:

Table 10: Follow up was done till 6 months post operative.

Follow-up Complications	Follow-up status		
	one month	3rd months	6th months
Wound infection	NIL	NIL	NIL
Septicaemia	NIL	NIL	NIL
Respiratory infections	NIL	NIL	NIL
Fever	NIL	NIL	NIL
Deaths	NIL	NIL	NIL
FECAL FISTULA	NIL	NIL	NIL

Almost all post operative complications were treated till one month of follow up.

Intestinal obstruction is one of the commonly encountered surgical entities. More than once in a day surgeon come across the possible diagnosis of intestinal obstruction. Intestinal obstruction continues to be a frequent emergency, which surgeons have to face (1-4% of emergency operations).

Table 11: Incidence of intestinal obstruction out of all abdominal surgeries

Study	Brewer et al	Jain et al	Present study
Incidence of Intestinal Obstruction in total Abdominal Surgeries(%)	2.5	3.2	2.2

Brewer et al analyzed 1000 consecutive abdominal surgeries in 1976 and reported an incidence of 2.5%[2]. Jain et al in 1973 reported an incidence of 3.2% [3]. In our study the incidence of intestinal obstruction out of all the abdominal surgeries was about 2.2% which is slightly lower to previous studies.

Incidence:

Table 12: Percentage of level of intestinal obstruction

Study	Sufian et al	Michel et al	Present study
Small bowel obstruction (%)	67	80	70
Large bowel obstruction (%)	33	20	30

The involvement of small bowel in intestinal obstruction is much more common than that of large bowel in study of Sufian and Matsumoto[4]small bowel obstruction constituted 67% and large bowel obstruction constituted 33%.In study of Michel[5] and Becker[6] small bowel obstruction constituted to 80% and large bowel obstruction constituted 20%.

In the present series small bowel obstruction contributed to 70% and large bowel obstruction 30% . Our study shows that small bowel obstruction is less as compare to Michelet al study but more as compare to Sufian et al study.

Age incidence

Table 13: Age incidence (%)

Age group (years)	Cole GJ et al	SouvikAdhikari et al	Harbansingh et al	Present study
11-20	10	9	10	10
21-30	10	11	16	16
31-40	18	15	18	16
41-50	16	24	15	20
51-60	15	13	10	22
61-70	16	20	20	12
>70	15	12	9	4

The acute intestinal obstruction occurs in all age groups. Earlier studies conducted by Cole GJ et al [7] has reported maximum number of cases 18% in age group of 31-40 yrs, Harban Singh[8] says that the maximum number of cases 20% occur in the age group of 61-70 years, Souvik Adhikari [9] found that maximum number of cases occur in the age group of 41-50 years and

maximum incidence was seen between age group of 51-60 yrs (22%)in our study, which shows that in our study maximum age group is higher than study of Cole et al , Souvik et al study and lesser than Harbansingh et al study.

However, Cole GJ et al study reported main bulk of cases reported 65% in the age group of 30-70 years, in Souvik et al study bulk of cases reported 72% in the age group of 30-70 years, in Harbansingh et al study main bulk of cases reported 63% in the age group of 30-70 years, in our study main bulk of cases reported 70% in the age group of 30-70 years, which shows that our study shows more cases in this group more than Cole GJ et al and Harban Singh et al study but less than Souvik et al study.

In the age group 51-60 years which is maximum incidence age group for our study has more incidence than other studies that might be because of our study has higher incidence of large gut causes of intestinal obstruction which has higher age group involved.

In our study age group more than 70 yrs has least incidence than other studies.

Sex incidence

Table 14: Male to female ratio

Study	Fuzan et al	Budharaj et al	Present et al
Male to female ratio	2:1	4:1	4.55:1

Fuzan[10] and Lee[11] reported 2:1 male to female ratio. Budharaj[12] reported in his study a ratio of 4:1 between male and female. In our study the incidence of intestinal obstruction in males was 41 (82%) and that of females was 9 (18%). Male to female ratio is 4.5:1 The male preponderance is consistent with series reported from other studies. In our study male preponderance is very high than Fuzan et al study but not having much difference with Budharaj et al study.

Etiology

Below mentioned are different causes of intestinal obstruction.

Table 15: Etiology of intestinal obstruction(%)

Causes	SouvikAdhikari et al	Thampi D et al	Present study
Adhesions & Bands	16	40	42
Obstructed hernia	36	30	14
Intestinal tuberculosis	14	04	12
Volvulus	06	04	10
Neoplasm	17	14	08
Meckel’s diverticulum	-	-	08
Intussusception	08	06	04
Miscellaneous	03	02	-

In our study total of 42% of cases attributed to adhesions and bands. Out of which adhesions were 34% and bands contributed to 8% which is comparable to Thampi D et al study but significantly more than Souvik et al study that might be because according to latest studies adhesion as a cause of intestinal obstruction increasing because of increasing number of abdominopelvic surgeries.

Obstructed hernia, intestinal tuberculosis, volvulus, neoplasms ,meckel's diverticulum are the other causes of intestinal obstruction in decreasing order. The incidence of neoplasm is higher in western countries due to various factors, which includes increased aged population, consumption of high animal fat and lack of fibre diet.

Clinical features:

Table 16: Symptoms and signs of intestinal obstruction

Sl No.	Symptoms & signs	Thumpi D et al	Souvik et al	Present study
1	Pain abdomen	88	72	92
2	Vomiting	78	91	68
3	Distension	66	93	100
4	Constipation	54	82	56

The typical clinical features of intestinal obstruction is not present in all cases.

In Thumpi D et al study pain abdomen found in 88% cases and in Souvik et al study 72% so in our study pain was present in more cases.

In Thumpi D et al study vomiting found in 78% cases and in Souvik et al study 91% so in our study vomiting was present in less cases, that might be because of higher cases of large bowel obstruction in compare to these studies.

In Thumpi D et al study distension found in 66% cases and in Souvik et al study 93% so in our study distension was present in more cases, that might be because of higher cases of large bowel obstruction in compare to these studies.

In Thumpi D et al study constipation found in 54% cases and in Souvik et al study 82% so in our study constipation was present in less cases than Souvik et al study but similar to Thumpi D et al study.

Management:

- All cases were operated in this study.
- Adhesiolysis done in 9 cases.
- Resection and anastomosis was done in 12 cases.
- Release of bands was done in 4 cases.
- Derotation / undoing of volvulus was done in 2 cases.

- Only hernia repair done in 5 cases.
- Resection and hernia repair done in 2 cases.
- Colostomy done in 3 cases (2 cases of carcinoma descending colon , 1 T.B stricture of splenic flexure colon).
- Meckel's deverticulectomy with anastomosis in 4 cases.

Postoperative complications :

- Wound infections – 12
- Respiratory infections-3
- Faecal fistula-1
- Deaths-3

CONCLUSION

The intestinal obstruction is more common in small bowel, more common in males compared to females and can involve all age groups. Patients of intestinal obstruction demand vigorous correction of fluid and electrolyte imbalance, which can be severe, and life threatening and timely intervention can prevent bowel gangrene. Large bowel obstruction is commoner in patients above age 40 year. Mode of presentation also differs at different levels of intestinal obstruction. Adhesions accounted for majority of small bowel obstruction followed by obstructed inguinal hernia. And malignancies for large bowel. Plain X-ray erect abdomen - single important diagnostic tool.

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