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ORIGINAL ARTICLE

**THE CLINICAL STUDY AND MANAGEMENT OF ACUTE
INTESTINAL OBSTRUCTION IN ADULTS**

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ABSTRACT

Background and Objectives

Bowel obstruction remains one of the most common intra-abdominal problems faced by general surgeons in their practice whether caused by hernia, neoplasm, adhesions or related to biochemical disturbances intestinal obstruction of either the small or large bowel continues to be a major cause of morbidity and mortality. To identify and analyse the clinical presentation, management and outcome of patients with acute mechanical, obstruction along with the etiology of obstruction and the incidence and causes of bowel ischaemia, necrosis and perforation. The objectives are to study the: (1) various modes of presentation, various causes, importance of early recognition, diagnosis and management. (2) influence of various factors like age, sex, diet and socio-economic status in the pathogenesis of acute intestinal obstruction. (3) morbidity and mortality rates in acute intestinal obstruction. **Methods** The materials for the clinical study of intestinal obstruction were collected from cases admitted to various surgical wards. Fifty cases of intestinal obstruction have been studied. Patients belonged to the age groups ranging from 12 years to 85 years, paediatric age group is excluded from this study. The criteria for selection of cases was based on clinical history, physical findings, radiological and haematological investigations. The study was divided into Clinical study, Investigations and Treatment. Postoperative follow up after the discharge of patients was done in majority of the patients upto six months. The results are tabulated stressing on following points age, sex, symptoms, examination findings, investigations, abnormalities, probable causative factors, operative findings and operative procedure adopted and complications if any. **Results:** The study group consisted of 50 cases of acute intestinal obstruction in the adult age group from 12 years on wards to 85 years. The common age group is 31-40 and 51-60 age group with 20% each in the total study. The commonest cause of intestinal obstruction in the adults in this study series was postoperative Adhesions (40%) followed by obstructed Hernia (30%). The clinical features of pain abdomen, vomiting, constipation were the main symptoms in this study. Tenderness, guarding, rigidity, rebound tenderness and shock are the cardinal feature of strangulated obstruction. The most common type of obstruction was due to adhesions or band arising from the previous surgeries. This constituted about 40% of the cases of the study group. The second most common type of intestinal obstruction was due to obstructed/strangulated external hernia. Salient features were pain in the groin lump, acute onset of swelling which is tender, irreducible and absence of cough impulse. Obstructed hernia constituted about 30% of the total cases studied. Volvulus of the sigmoid was 4% in this series. Conservative measures included insertion of flatus tube but all the cases were undergone laparotomy due to failure in the recovery of symptoms. Derotation and sigmoidopexy was done in one case and in one case where there was vascular compromise, resection and anastomosis was done. Malignancy of the large bowel was seen in 7 cases constituting 14% of cases. 65% of the cases diagnosed as malignancy were in the age group 35-75 years. Of these 2 cases were managed with Hartman's procedure. One case was managed with transverse loop colostomy and remaining cases were managed with resection and anastomosis. Most of the deaths occurred in malignancy. Although pulmonary tuberculosis more prevalent in India due to advent use of antitubercular drugs incidence of abdominal tuberculosis is becoming less. In our study incidence of ileocaecal tuberculosis was 4% and both were managed with resection and anastomosis. In the present study intussusception causing intestinal obstruction was 6%. One case was managed with simple reduction and the remaining two were undergone resection and anastomosis. One case of mesenteric ischaemia was present in our study. The case was managed with resection and anastomosis but patient died due to septicemia. The complication in this study was 18%. Overall mortality of this study was 14%. The result obtained from this study was comparable to various other studies. Malignancy and mesenteric ischaemia had more mortality outcomes than simple obstruction caused by postoperative adhesions. The poor outcome of the disease were due to late presentation to the hospital which had high incidence of bowel damage with associated faecal contamination of the peritoneum. The mortality in the postoperative period was mainly due to faecal peritonitis, bronchopneumonia and respiratory tract infection.

Interpretation and Conclusion

Acute intestinal obstruction remains an important surgical emergency in the surgical field. Success in the treatment of acute intestinal obstruction depends largely upon early diagnosis skilful management and treating the pathological effects of the obstruction just as much as the cause itself. Erect abdomen X-ray is valuable investigation in the diagnosis of acute intestinal obstruction. Postoperative adhesions are the common cause to produce intestinal obstruction. Clinical radiological and operative findings put together can diagnose the intestinal obstruction. Mortality is still significantly high in acute intestinal obstruction.

Keywords: Blood pressure; Computed tomography; Central venous pressure; Superior mesenteric artery; Acute inguinal obstruction; Gastrointestinal; Extra cellular fluid; Intravenous

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1.INTRODUCTION

Bowel obstruction remains one of the most common intra-abdominal problems faced by general surgeons in their practice whether caused by hernia, neoplasm, adhesions or related to biochemical disturbances intestinal obstruction of either the small or large bowel continues to be a major cause of morbidity and mortality. They account for 12% to 16% of surgical admissions for acute abdominal complaints. Manifestations of acute intestinal obstruction can range from a fairly good appearance with only slight abdominal discomfort and distension to a state of hypovolemic or septic shock (or both) requiring an emergency operation. To identify and analyse the clinical presentation, management and outcome of patients with acute mechanical, obstruction along with the etiology of obstruction and he incidence and causes of bowel ischaemia, necrosis and perforation.² The death due to acute intestinal obstruction is decreasing with better understanding of pathophysiology, improvement in diagnostic techniques, fluid and electrolyte. Correction, much potent anti-microbials and knowledge of intensive care. Most of the mortalities occurs in elderly individuals who seek late treatment and who are having associated pre-existing diseases like, diabetes mellitus, cardiac diseases or respiratory disease. Early diagnosis of obstruction skillful operative management, proper technique during surgery and intensive postoperative treatment carries a grateful result.

2.METHODOLOGY

The materials for the clinical study of intestinal obstruction were collected from cases admitted to various surgical wards in Rajah Muthiah Medical College, Annamalai University, Chidambaram. During the period of June 2012 to September 2014 fifty cases of intestinal obstruction have been studied. Patients belonged to the age groups ranging from 12 years to 85 years, paediatric age group is excluded from this study. The criteria for selection of cases was based on clinical history, physical findings, radiological and haematological investigations.

Patients who were having subacute intestinal obstruction treated conservatively were excluded from the study, and only those cases of acute intestinal obstruction which were managed surgically were studied to establish the pathology of intestinal obstruction with an aim to know the mode of presentation, physical findings, radiological and haematological findings, operative findings and outcome of acute intestinal obstruction. After the admission of the patient, clinical data were recorded as per Proforma. The diagnosis mainly based on clinical examination and often supported by haematological and radiological examinations.

Methods

Study divided into

- a. Clinical study
- b. Investigations
- c. Treatment

Study was conducted under the following headings:

- a. History taking
- b. Physical examination
- c. Laboratory examination
- d. Radiological examination – Plain X-ray erect

abdomen

- e. Ultrasound examination in selected cases
- f. Surgical treatment and results
- g. Follow-up

a. History taking

A complete history was obtained from the patient and the complaints entered in the proforma in a chronological order. Each complaint in the history of presenting illness was documented in detailed enquiry.

b. physical examination

- (i) General physical examination – evidence of dehydration and the severity of it were looked into it and vital parameters were recorded.
- (ii) Local examination – Abdominal examination was done under standard headings inspection, palpation, percussion and palpation. Per rectal examination was done and findings were noted.
- (iii) Systemic examination – All other systems were examined carefully to rule out associated anomalies and to assess the fitness for surgery.

c. Laboratory examination

- (i) Haemoglobin
- (ii) TC & DC
- (iii) BT and CT
- (iv) Blood grouping and Rh typing
- (v) Urine for albumin and microscopy

d. Radiological examination

Erect abdomen X-ray done in all cases, barium enema and ultrasound examination in selected cases.

Surgical Management

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 Ryles tube carried out and antibiotic prophylaxis started. And close observation of all bedside parameters (like pulse rate, BP, RR, urine output, urine output, abdominal girth, bowel sounds and tenderness and guarding) was done. Blood transfusion was given in required cases. Patients who showed reduction in abdominal distension and improvement in general condition especially in individuals with postoperative adhesions conservative management was confined (by extending the supportive treatment) for next 24 hours, those who showed improvement by moving bowels, reduction in pain/tenderness were decided 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. Surgery adopted and criteria for deciding the procedure were noted, e.g. release of a band or adhesion, reduction and caecopexy for intussusception, resection and anastomosis for gangrenous bowel and release and repair for strangulated obstruction. Histopathological examination of the specimen of resection/biopsy was done whenever necessary. The postoperative period was monitored carefully and all parameters were recorded hourly or four hourly basis depending upon the patients general condition and toxemia. Postoperatively Ryle's tube aspiration, intravenous fluids and antibiotics were administered. Any complications noted and treated accordingly. Postoperative follow up after the discharge of patients was done in majority of the patients upto

6 months. Most of the patients did not come for follow up after one or two visits. The results are tabulated stressing on following points age, sex, symptoms, examination findings, investigations, abnormalities, probable causative factors, operative findings and operative procedure adopted and complications if any.

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.

1. Chi-Square Test

$\sum(O_i - E_i)^2 / E_i = \chi^2$, Where O_i is observed frequency and E_i is Expected frequency E_i

Statistical software

The Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables, etc.

3.RESULTS

The incidence of acute intestinal obstruction in adult age group was studied from the cases admitted in Department of Surgery of Rajah Muthiah Medical college, Annamalai University, Chidambaram. During the period of June 2012 to September 2014. The data regarding the symptoms and signs and laboratory investigations has been adopted in 50 cases during the study period. During the period of 28 months, the total number of admissions in surgery were 12,233 cases. Of which 228 cases of acute intestinal obstruction were treated during these period which comprise 1.9% of total number of admissions among these surgically treated cases, 50 cases were randomly selected for the present study. Total number of emergency surgeries done in the department of Surgery were 1,569 and acute intestinal obstruction in this group consisted of about 14.53% of these surgeries.

Table 1: Age incidence

Age (years)	Male	Female	Total
11 to 20	5	1	6
21 to 30	5	3	8
31 to 40	7	3	10
41 to 50	3	1	4
51 to 60	8	2	10
61 to 70	5	3	8
71 to 80	2	1	3
81 to 90	1	0	1
Total	36	14	50

Table 2: Sex incidence

Sex	Number of Cases	Percentage
Male	36	72
Female	14	28

Table 3: Socio-economic status

Socio-Economic	Number of Cases	Percentage
Poor	38	76
Middle	12	24
Upper	0	0
Total	50	100

Table 4: Diet

Diet	Number of Cases	Percentage
Vegetarian	18	36
Non-Vegetarian	32	64
Total	50	100

Table 5: Symptoms and signs

Symptoms and signs	Number of cases	Percentage
Pain abdomen	44	88
Vomiting	39	78
Distension	33	66
Constipation	27	54
Tachycardia	40	80
Previous surgical scar	22	44
Tenderness	13	26
Rigidity	13	26
Mass	12	24
Visible peristalsis	30	60

Incidence of Different Aetiology

The incidence of different etiologies of intestinal obstruction in the present series are as follows.

Table 6: Causes of intestinal obstruction in adults

Clinical condition	Number of cases	Percentage
Postoperative adhesions	20	40
Obstructed hernia	15	30
Volvulus	2	4
TB abdomen	2	4
Malignancy	7	14
Intussusception	3	6
Mesenteric ischaemia	1	2
Total	50	100

The most common cause of intestinal obstruction in our study was postoperative adhesions. The next common was obstructed hernia. Other conditions include volvulus, intussusception, tuberculosis, malignancy, mesenteric ischaemia, in descending frequency.

Table 7: Management

Management ROA	Number of cases 20	Percentage 40
Ra and H	4	8
DVS	2	4
Reduction	1	2
RA	11	22
Hart	2	4
Roa and H	9	18
TLC	1	2
Total	50	100

Table 8: Postoperative complications

Postoperative complication	Number of Cases
WI	2
RTI	2
Wound dehiscence	-
Faecal fistula	-
Septicaemia	5

Table 9: Mortality

Mortality		Number of Cases	Percentage
Cured		43	86
Dead		7	14

Age and sex	Symptoms prior to admission	Operative findings	Operative procedure	Cause of death
75/F (Case No. 8)	3 days	Carcinoma sigmoid colon	Resection and anastomosis	Septicaemic shock
72/M (Case No.11)	8 days	Carcinoma rectum	Hartman's procedure	RTI
65/M (Case No.21)	5 days	Mesenteric ischaemic	Resection anastomosis	Septicaemic shock
45/M (Case No.36)	3 days	Carcinoma caecum	Resection and anastomosis	RTI
38/F (Case No. 37)	5 days	Carcinoma ovary with sigmoid colon infiltration	Transverse loop colostomy	Septicaemic shock
63/M (Case No.39)	3 days	Carcinoma rectum	Hartman's procedure	Septicaemia
55/M (Case No.43)	4 days	Carcinoma colon	Resection and anastomosis	Septicaemia

Table 10: Follow-up status

Follow-up complications	Follow-up status		
	One month	3rd month	6th month
A. Wound infection	1	Nil	Nil
B. Septicemia	Nil	Nil	Nil
C. Enterocutaneous fistula	Nil	Nil	Nil
D. Prolonged ileus	Nil	Nil	Nil
E. Fever	2	3	Nil
F. Respiratory infection	2	1	Nil
G. Death	Nil	Nil	Nil

4.DISCUSSION

Acute intestinal obstruction continues to be the most common surgical emergency. In our study a total number of 12233 patients were admitted in the surgery department from June 2012. to September 2014. A total of 228 patients resented with features of acute intestinal obstruction. Among these 50 cases of operated cases were randomly selected for the present study.

DISEASE INCIDENCE

In our clinical study incidence of acute intestinal obstruction is 1.9% of total surgical cases. In Souvik Adhikari et al. series incidence was 9.87% of total surgical cases. In Bhargava Anderson's series incidence was 3% of total surgical cases. The commonest cause was found to be postoperative adhesions followed by obstructed/ strangulated inguinal hernia, malignancy, intussusception, volvulus, tuberculosis and mesenteric ischaemia. Although in developing countries like India, the commonest cause used to be obstructed/strangulated hernia, in our study commonest cause was adhesions followed by obstructed/strangulated hernia as second cause. The decrease in the incidence of obstructed hernias indicate a changing trend towards early operation before hernia gets complicated. The data of the present series is comparable to Souvik Adhikari series, Cole series and Jahangir-Sarwar Khan series. Souvik Adhikari et al. (2010)44 reported an incidence of 9.87%, Bhargava and Anderson series reported an incidence of 3%. In our hospital 1569 cases of total emergency surgeries were done in January 2009 to June 2010, of which 228 cases of intestinal obstruction comprising of 14.3% incidence were present. Among these 50 cases were selected as random study group.

Age Incidence

Intestinal obstruction although occurs in all age groups, the age spectrum in our clinical study, with the spectrum age group of 15 years to 85 years. The study showed the peak incidence is in the age group 31-40 of 20% and 51-60 years of 20% which is comparable with the previous study groups Souvik Adhikari et al., Cole GJ et al. group, which are almost similar to our clinical study of intestinal obstruction. The mean age is our current study is 45 years where as Souvik Adhikari et al.44 shows mean age of 44 years, Jahangir Sarwar Khan45 series shows mean age is 33 years These studies are almost comparable with our current study.

Table 11: Age incidence of intestinal obstruction in different studies

Age group	Cole GJ ⁴⁶	Souvik Adhikari ⁴⁴	Harban Singh ⁴⁷	Present study
12-20	10%	9%	10%	12%
21-30	10%	11%	16%	16%
31-40	18%	15%	18%	20%
41-50	16%	24%	15%	8%
51-60	15%	13%	10%	20%
61-70	16%	20%	20%	16%
71-80	9%	8%	5%	6%
81-90	6%	4%	4%	2%

Sex Incidence

In Souvik Adhikari et al.⁴⁴ study male to female ratio was 4:1. In Osuigwe AN et al. study male to female ratio was 2:1. In the present study male to female ratio is 4:1.

Etiology

The cause of intestinal obstruction differs from different geographical locations. In the present clinical study about 76% of the patients were poor socio-economic class and remaining 24% were middle class which does not yield much statistical significance. But our hospital being a government hospital, which is serving most of the poor socio-economic status hence the percentage of poor socio-economic status are high. The diet pattern in this study showed 64% non-vegetarians and 36% were vegetarians which did not indicate any significance in relation to the disease. In the present study of 50 cases of acute intestinal obstruction 40% of the cases are due to post operative adhesions who has undergone previous

Table 12: Comparison of etiology with other studies

Cause	Souvik Adhikari	Jahangir	Arshad M. Malik	Cole GJ	Brooks and Buttler ⁴⁸	Playforth 49 1970	Present study
Adhesions	16%	49%	41%	10%	23%	54%	40%
Hernia	36%	34%	19%	35%	25%	23%	30%
Volvulus	6%	5%	4%	3%	1%	3%	4%
Tuberculosis	14%	1%	24%	3%	-	-	4%
Malignancy	17%	3%	2%	9%	5%	9%	14%
Intussusception	2%	6%	-	12%	18%	5%	6%
Mes. Ischaemia	9%	2%	10%	-	-	6%	2%
Miscellaneous							

In the present study, postoperative adhesion is the commonest cause of intestinal obstruction, which is comparable with the other study groups Playforth et al. with 54% and Arshad Malik et al. with 41%. Although the incidence of

obstructed/strangulated hernia is more in the developing countries in this study group it is the second common aetiology for obstruction. It may be because the awareness of public, the availability of surgical facilities in the periphery for the hernia repair, the hernias are treated early.

Clinical features

The clinical feature of intestinal obstruction pain abdomen, vomiting distension of abdomen and constipation are not present in all cases. Pain abdomen was present in 88% of the cases in the present study, whereas the vomiting was present in 78% of the cases. Whereas distension was present in 66% and constipation was present in 64% of the cases. The comparative table showing percentage of clinical features by various other study group are as follows.

Table 13: Comparison of clinical features with other studies

Study group	Pain abdomen	Vomiting	Distension	Constipation
Present study	88%	78%	66%	64%
Souvik Adhikari ⁴⁴	72%	91%	93%	82%
Jahangir-Sarwar Khan ⁴⁵	100%	92%	97%	97%

In the present study, the clinical features of pain abdomen was 88%, vomiting was 78% which comparable with the other study group. Souvik Adhikari et al. and Jahangir Sarwar Khan et al. Only 66% of the patients in the present study group had distension of abdomen. It may be due to early approach to the hospital by patients in the present study. The mass per abdomen on palpation is present in 24% of the total study move in Malignancy and ileocaecal tuberculosis. Visible peristalsis is present in 60% of the intestinal obstruction cases. The rectal examination did not reveal any abnormality except in four cases of intussusception (8%) and 2 cases of malignancy (4%) where in red current Jelly and rectal growth were the per rectal findings respectively.

Laboratory investigation

Among the total study population 30% of the cases were having Anaemia other wise the basic haematological investigation did not yield much statistical significance.

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 where as only gas shadows seen in large bowel observation until the ileocaecal valve is competent. Taneja et al. report shows 90% of cases with multiple air fluid level and Savage et al. reports 95% cases with significant findings. In the present study of the 50 cases 60% of X-ray shows multiple air blood levels. Contrast study of barium enema may help to locate the obstruction in the colon but in our study contrast study was not done.

Surgical Management

The surgical management for the present study group includes release of adhesions for postoperative adhesions 40%, resection of anastomosis for many of the cases of obstructed/strangulated hernia where the viability of the bowel was doubtful and also for ischaemic bowel 22%, release of constricting agents and herniorrhaphy was done in 18% of the obstructed/strangulated hernia cases. Derotation of volvulus and sigmoidopexy was done in 4% of the cases. Resection anastomosis and herniorrhaphy done in 8% of the cases. Reduction of intussusception in one case. Two cases were managed with Hartman's procedure and one case with transverse loop colostomy.

Complications

In the present study group out of 50 cases, complications like septicaemia 5 cases, respiratory tract infection 2 cases, wound infection in two cases occurred. The complication of septicemia was more in the cases of malignancy and one case of mesenteric ischaemia case where in there was already sepsis at the time of admission, and for these cases bowel surgeries were done which were unprepared. Two cases one with obstructed inguinal hernia and one with the case of carcinoma rectum, the patients had prior comorbid conditions of COPD were suffered from respiratory tract infection.

Mortality

Frequency of mortality in our study is 14% i.e. 7 cases out of 50 cases. Among these 6 cases were due to malignancy and one due to mesenteric ischaemia. Mortality that have occurred during various studies have been tabulated as follows.

Table 14: Morality rate in various studies

Studies	Year	No. of cases studied	Mortality
Present study	2009	50	14%
Souvik Adhikari ⁴⁴	2005	367	7.35%
Safian Matsu Moto ³⁰	1975	171	19%
Jahangir-Sarwar Khan ⁴⁵	2001	100	7%
Ramachandran CS ¹	1982	417	12.7%

The mortality rate in the present study is much comparable to Ramachandran CS et al. study but it is more when compared to Souvik Adhikari et al., Jahangir et al. studies. Out of 7 cases died, 6 cases were due to malignancy.

As the malignancy was more in the aged group and the unprepared bowel surgeries done to the patient led to septicemic condition and resulted in death. Two patients were chronic smoker who suffered respiratory tract infection and died. Hence most of the deaths were due to malignancy which played significant role in the outcome of the disease. The mortality in intestinal obstruction is more in patients who develop strangulation and gangrene of the bowel, also who reached the hospital after 3 days. With all these, the age of the patient, general condition of the patient, duration of symptoms. Operative procedures carries a high role in progress as well as the mortality.

Table 15: Comparison of mortality in relation to duration of symptoms with other studies

Sl.No.	Duration of symptoms before hospitalization	No. of cases	Death
1	1-2 days	18	2
2	3-4 days	17	2
3	> 5 days	15	3
	Total	50	7

The table shows the time interval from the onset of symptoms to the hospitalization and the relation with complications as well as death. The prognosis of the patient is directly proportional to the duration of the disease symptom i.e. higher the duration higher the mortality.

5.CONCLUSION

Acute intestinal obstruction remains an important surgical emergency in the surgical field. Success in the treatment of acute intestinal obstruction depends largely upon early diagnosis skilful management and treating the pathological effects of the obstruction just as much as the cause itself. Erect abdomen X-ray is valuable investigation in the diagnosis of acute intestinal obstruction. Postoperative adhesions are the common cause to produce intestinal obstruction. Clinical radiological and operative findings put together can diagnose the intestinal obstruction. Mortality is still significantly high in acute intestinal obstruction.
