

Clinical Study of Acute Intestinal Obstruction In Adults

*Saravanan P. S¹, Vivek Bala. P², Jaiganesh Sivalingam³,

¹Professor, Department Of General Surgery, Meenakshi Medical College Hospital And Research Institute(MMCH & RI). Kanchipuram.

²Post Graduate Student, Department Of General Surgery, Meenakshi Medical College Hospital And Research Institute(MMCH & RI). Kanchipuram.

³Associate Professor, Department Of Radiodiagnosis, Meenakshi Medical College Hospital And Research Institute(MMCH & RI). Kanchipuram.

Abstract: Intestinal obstruction is one of the most common surgical emergency and associated with significant mortality and morbidity.

Objective: The objective of this study is to identify the cause, mode of presentation, various modalities of treatment and outcome with least complications of acute intestinal obstruction.

Materials and Methods: 50 patients who were admitted in the surgical ward with diagnosis of acute intestinal obstruction in Meenakshi Medical College & Research Institute over a period of two years i.e from July 2014 – August 2016 were taken randomly and managed. Among these 41 were males and 9 were females.

Results: Obstructed hernia was present in 13 cases(26%) and the other causes were adhesions (22%), bands (10%), recto sigmoid growth (10%), volvulus (8%) and TB stricture (6%). The most common age group presented with intestinal obstruction were 41 – 50 years, followed by 31 – 40 years. Male patients were involved more than female patients.

Conclusion: Obstructed inguinal hernias were the most common cause of intestinal obstruction in our study (13 cases) followed by adhesions (11 cases) and the least common cause being Meckel's diverticulum (1 case). Resection and anastomoses was the most common procedure performed in our study. The most common complication was wound infection (7 cases) and death was found in 3 cases.

Keywords: Resection and anastomoses, Adhesions, Obstructed Hernia, Volvulus, Intussusception and Strangulation.

I. Introduction

Intestinal obstruction is a major cause of morbidity among surgical cases all over the world. Now with better understanding of pathophysiology, improvement in radiological techniques of diagnosis, introduction of antibiotics and techniques in gastrointestinal decompression, new surgical principles, as in large bowel obstruction, introduction of on table lavage and resection and primary anastomoses, has replaced staged procedures and number of days in hospital stay. In developed countries, the most important cause of intestinal obstruction is post operative adhesions whereas in developing countries, the most important cause is obstructed inguinal hernia. The dictum of never set sun set or rise in small bowel obstruction has made early surgical intervention. The purpose of this study was to determine the various causes and pattern of intestinal obstruction in our setup. This also involves different modalities of treatment and post operative complications.

II. Objectives

To analyse the different modes of presentation of acute intestinal obstruction in adults.

To analyse the various etiologies of intestinal obstruction.

To study the various lines of management adopted.

To study the prognosis, outcome, mortality and morbidity of intestinal obstruction.

III. Materials And Methods

The material of this prospective study is formed by the patients who were admitted in the surgical ward with intestinal obstruction at Meenakshi Medical College between July 2014 to August 2016. Case sheets and investigation reports also form the material. The methods are clinical examination, biochemical, Histopathological and radiological investigations, surgical methods and follow up. The patients on admission were subjected to physical examination, investigation, treated with IV fluids, antibiotics, blood transfusion and were subjected to appropriate surgical procedure. The post operative period was monitored for complications. After discharge follow up was done. Patients who underwent colostomy were followed till bowel continuity was restored.

IV. Results

A clinical study of 50 cases of acute intestinal obstruction in adults were studied during the period of July 2014 to August 2016 and the analysis is as follows:

TABLE – 1: AGE DISTRIBUTION

AGE GROUP	NO. OF CASES	PERCENTAGE
18 – 20 years	1	2 %
21 – 30 years	3	6 %
31 – 40 years	10	20 %
41 – 50 years	12	24 %
51 – 60 years	8	16 %
61 – 70 years	6	12 %
71 – 80 years	6	12 %
81 – 85 years	4	8 %
TOTAL	50 CASES	100 %

The table explains that the age group between 41 – 50 years is more susceptible for intestinal obstruction. There are 12 cases in the age group of 41 – 50 years in our study. The percentage of incidence in the 4th decade is 24%. Patients in the age group of 31 – 40 years were also common to present with intestinal obstruction. 10 cases were recorded in this age group in our study which constitutes about 20% of total cases. The incidence of obstruction in the age group less than 20 years in our study is only 1 which accounts only about 2% of our study population. 4 patients has presented with intestinal obstruction in the age group of 81 – 85 years. It accounts to about 8% of total cases. 8(16%) patients presented with obstruction in the age group of 51 – 60 years. 6(12%) patients are presented in the age group between 61–70 years and 71 – 80 years. Among the age group of 21–30 years, 3 patients i.e 6% presented with intestinal obstruction.

TABLE - 2 SEX DISTRIBUTION

AGE GROUP	MALE		FEMALE		TOTAL	
	Cases	Percent	Cases	Percent	Cases	Percent
18 - 20 yrs	1	2%	0	0%	1	2%
21 - 30 yrs	3	6%	0	0%	3	6%
31 - 40 yrs	8	16%	2	4%	10	20%
41 - 50 yrs	9	18%	3	6%	12	24%
51 - 60 yrs	7	14%	1	2%	8	16%
61 - 70 yrs	4	8%	2	4%	6	12%
71 - 80 yrs	5	10%	1	2%	6	12%
81 - 85 yrs	4	8%	0	0%	4	8%
TOTAL	41	82%	9	18%	50	100%

The occurrence of acute intestinal obstruction based on sex incidence is listed in the above table. The maximum incidence is common among males than females. 41 cases were males and 9 cases were females among 50 cases of intestinal obstruction managed in our study.

Table – 3: Analysis Of Symptoms And Signs

S.no	Symptoms and signs	No.of cases	Percentage
1.	Pain abdomen	37	74%
2.	Vomiting	35	70%
3.	Abdominal distension	32	64%
4.	Constipation	24	48%
5.	VGE	13	26%
6.	Increased bowel sounds	18	36%
7.	Absent bowel sounds	7	14%
8.	Decreased bowel sounds	10	20%
9.	Groin swelling	7	14%
10.	Tenderness	20	40%
11.	Guarding	18	36%
12.	Rigidity	10	20%
13.	Palpable mass	2	4%

14.	Significant pr finding	1	2%
-----	------------------------	---	----

The above table-3 shows the incidence of various presenting symptoms and signs during admission of patients were diagnosed as acute intestinal obstruction. Abdominal pain is the most frequent symptom in our study being 74% of all the symptoms. 37 patients were found to have colicky abdominal pain. The other common symptoms are vomiting(35 cases), abdominal distension(32cases), constipation(24cases) and visible gastric peristalsis(13cases).

Table – 4: Etiology Of Small Bowel Obstruction-39 Cases (78%)

S.No	Etiology	Cases	Percentage
1.	Adhesions	11	22%
2.	Bands	5	10%
3.	Intussusception	2	4%
4.	Meckel’s Diverticulum	1	2%
5.	Obstructed Hernia	13	26%
6.	Small Bowel Volvulus	4	8%
7.	Tb Stricture	3	6%
Total		39 Cases	78%

The etiology of small bowel obstruction is listed in the above table. The most common etiology is obstructed hernia in our study (13 cases), which is 26%. The next common etiology is adhesions (11 cases), which is 22% of our study. The least common cause is Meckel’s diverticulum (1 case), that is only 2% of our study.

The other causes responsible for intestinal obstruction in our study was bands (5 cases), which is 10% of the total small bowel causes. 8% of causes was small bowel volvulus (4 cases), 6% was due to TB stricture (3 cases) and 2 patients presented with ileocaecal intussusceptions which was 4% of our clinical study.

Table - 5: Etiology Of Large Bowel Obstruction- 11cases

S.No	Etiology	Cases	Percentage
1.	Neoplasms (Rectosigmoid (Growth)	5	10%
2.	Sigmoid Volvulus	4	8%
3.	Colo-Colic Intussusception	2	4%
Total		11 Cases	22%

The various etiology of large bowel obstruction is demonstrated in the above table. The most common cause of large bowel obstruction is rectosigmoid growth(5 cases) which is 10% out of 22% of large bowel cases. Sigmoid volvulus(4 cases) is also a common cause in large bowel obstruction followed by intussusception(2 cases) as recorded in our clinical study.

Table-6: Previous Surgeries Leading To Obstruction Due To Adhesions

S.No	Previous Surgery	No. Of Cases	Percentage
1.	Appendectomy	4	37%
2.	Peptic Ulcer Surgery	3	27%
3.	Surgery For Blunt Injury Abdomen	1	9%
4.	Gynaecological Surgery	2	18%
5.	Previous Surgery For Intestinal Obstruction	1	9%
Total		11	100%

The above table shows the previous surgeries which is invariably the cause of adhesions leading to intestinal obstruction. The various causes are appendectomy (4 cases), gynaecological surgery (2 cases), previous surgery for intestinal obstruction itself (1 case) and peptic ulcer surgery (3 cases). The most common is the appendectomy surgery.

Appendectomy is the most common cause of adhesions accounting to 37% of total 11 cases of adhesions. Peptic ulcer surgery causing adhesions was 27%, gynaecological surgeries 2% and previous surgery for intestinal obstruction was 9%.

Table – 7: Level Of Obstruction

Small Bowel Obstruction	Large Bowel Obstruction
39 Cases	11 Cases

The above table represents the levels of obstruction, both small bowel and large bowel. 78% of small bowel and 22% of large bowel accounts to intestinal obstruction.

Table - 8: Management Of Small Bowel Obstruction

S.no	Procedure	No.of cases	Percentage
1.	Adhesiolysis	11	22%
2.	Resection and anastomoses	6	12%
3.	Band release	5	10%
4.	Volvulus derotation	2	4%
5.	Hernia repair	7	14%
6.	Meckel's diverticulectomy	1	2%
7.	Resection and hernia repair	4	8%
8.	Stricture release	3	6%
Total		39	78%

The above table shows the different procedures carried out for the management of acute small intestinal obstruction. Hernia repair (7 cases), Adhesiolysis (11 cases) and Resection and anastomoses (6 cases) were commonly performed procedures followed by band release (5 cases), stricture release (3 cases), volvulus derotation (2 cases) and meckel's diverticulectomy (1 case). The most common procedure carried out was hernia repair with resection and anastomoses in our clinical study which is 22% (11 cases) of all procedures.

Table -9: Management Of Large Bowel Obstruction

S.No	Procedure	No.Of Cases	Percentage
1.	Resection & Anastomoses	5	10%
2.	Colostomy	3	6%
3.	Milking Of Intussusception	3	6%
Total		11	22%

The above table represents the different procedures for the management of large bowel obstruction. The most common procedure in our study for large bowel obstruction was resection and anastomoses (5 cases) followed by Colostomy (3 cases) and Milking of intussusceptions (3 cases).

Table - 10: Complications Of Acute Intestinal Obstruction

S.No	Complications	No.Of Cases	Percentage
1.	Septicemia	3	6%
2.	Pulmonary Infection	3	6%
3.	Multi Organ Failure	1	2%
4.	Anastomotic Leak	2	4%
5.	Wound Infection	7	14%
6.	Death	3	6%
Total		19	38%

The table – 10 represents the different complications of acute intestinal obstruction. The most common complication in our study was wound infection (7 cases) 14% of total cases. The other complications include pulmonary infection, septicemia, multi organ failure and anastomotic leak. Death was observed in 3 patients of our study accounting to 6% of total cases.

table - 11: causes of mortality

Case No.	Age	Symptoms Prior To Admission	Operative Findings	Operative Procedure	Cause Of Death
3.	42 Yrs	3 Days	Strangulation Due To Volvulus	Resection & Anastomoses	Septicemia & Death
37.	63 Yrs	15 Days	Obstruction Due To Adhesions	Resection & Anastomoses	Septicemia & Death
41.	63 Yrs	2 Days	Obstruction Due To Adhesions	Adhesiolysis	Septicemia & Shock

This table shows the various causes of mortality in our study. The most common cause of death was septicemia which lead to death. 3 cases were expired due to septicemia and shock in our clinical study of intestinal obstruction.

Table– 12: Percentage Of Morbidity And Mortality

Particulars	No. Of Cases	Percentage
-------------	--------------	------------

Morbidity	16	32%
Mortality	3	6%

This table shows the mortality and morbidity in our study, which was 6% and 32% respectively.

V. Discussion

Intestinal obstruction is one of the commonly encountered clinical entities. The mortality has reduced significantly and 1-4% of mortality in emergency surgeries is contributed by acute intestinal obstruction. The following were the observations made from the study of 50 patients of acute intestinal obstruction in adults at Meenakshi Medical College and Research Institute, Kanchipuram.

Incidence

At present small bowel obstruction contribute 82% and large bowel obstruction 18% which is comparable with reports of Michael¹ and Becker².

1. Age incidence

Acute intestinal obstruction occurs in all age groups. The age distribution in our study ranges from 18 to 85 years with mean age of 52 years. The standard deviation was 17.53. Maximum incidence was seen between 41-50 years.

Studies conducted by Gill and Eggleston³ has reported that the mean age was 34.5 years.

Fuzan⁴ reported mean age of 56 yrs. Ramachandran⁵ in his study reported the maximum incidence was between 21-40 yrs.

2. Sex incidence

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 4:1

Fuzan⁴ and Lee⁶ reported 2:1 male to female ratio. Budharaja⁷ reported in his study a ratio of 4:1 between male and female.

3. Etiology

Adhesions	22%
Hernias	26%
Volvulus	16%
CA colon	10%
Intussusceptions	08%
Tubercular stricture	06%

a. Adhesions

A total of 22% of cases attributed to adhesions. Most of the intestinal obstruction was due to postoperative adhesions. Majority of incidence was found within 1 year of surgery. Jain and Prasad⁸ reported that adhesions contributed for intestinal obstruction upto 25.5% Ti and Young⁹ found that postoperative adhesions and bands contributed upto 23.8%. Fuzan⁴ study in 582 patients showed that, in 246 (42.2%) patients the cause for intestinal obstruction was adhesions due to previous operations.

b. Hernia

A total number of 13 cases (11 males and 2 females) of intestinal obstruction are related to obstructed hernia in this study of 50 cases. It accounts for about 26% of causes of intestinal obstruction in our study.

In the series of Michael G. Sarr (1983) shows hernia related strangulation was present in 42% patients. Ramachandran⁵ reported 38.6% of overall incidence of strangulated small bowel obstruction with 21.4% of obstructed hernia in adults.

Budharaja⁷ studies revealed the etiology for acute intestinal obstruction secondary to obstructed hernia (small bowel and large bowel) accounted for 33%. In his study, the incidence of gangrene was up to 22%.

C. Volvulus

Volvulus constituted for about 16% in our studies that is 8 cases. Out of these 8 cases, 4 were small bowel volvulus and 4 cases were of sigmoid volvulus. A study conducted by Sankaran¹⁰ reported 24 cases of volvulus in South India among which sigmoid volvulus predominated forming 50% of cases. Budharaja⁷ series revealed that 18.2% of intestinal obstruction was due to volvulus & in that 11.9% was due to small bowel volvulus and 6.19% due to large bowel volvulus.

Peter study showed that 26% of small bowel obstruction was due to volvulus.

Gangrene of sigmoid volvulus was found in 50% of cases in present series but in studies by Sarkar¹¹ revealed 31% of gangrene. Roggo and Ottinger¹² series reported that the twisted segment was found to be gangrenous in 46% of patients.

Ramachandran⁵ in his study quotes that volvulus is the second commonest cause of small bowel obstruction which accounted for nearly 24%.

Gill³ reported that incidence of volvulus was 25%(36cases), out of these small bowel volvulus accounted for 23 patients and large bowel volvulus for 13 patients.

d. Malignancy

In our study of acute intestinal obstruction related to malignancy constituted for 10% (5 cases).

Ti⁹ noted that carcinoma of descending colon and rectum constituted 37.2%. Ascending colon and caecum constituted 9.8%. Thompson¹³ in his series recorded the incidence of obstructing carcinoma of right colon equals 26% and left colon 69%. Hsu TC¹⁴ series managed a total number of 214 cases, out of which causes of colonic obstruction found was 71 (34.8%) in right colon, 127 in left colon of which sigmoid colon obstruction was found in 54 (42.5%) patients.

E. Intussusception

In our study of 50 cases of acute intestinal obstruction 4 cases of intussusception was recorded.

Ti⁹ revealed in his study of 261 patients the incidence of intussusception accounted for 6.3% (17 cases) of intestinal obstruction. In this 17 cases, 3 were adults. Another series by Kuruvilla¹⁵ intussusception accounted for 6.3% of the cases of total intestinal obstruction.

F. Tubercular stricture

Our study accounted for 6% (3cases) of tubercular stricture as a cause for intestinal obstruction. Budharaja⁷ in review of 242 cases reported that intestinal tuberculosis giving rise to acute intestinal obstruction was seen only in 2.1% of cases.

The study series of Sircar¹⁶ reported to have 5% of cases of abdominal tuberculosis presenting with acute intestinal obstruction.

Kappor¹⁷ in series managed 109 cases of abdominal tuberculosis out of which 09(8.2%) cases were purely acute intestinal obstruction.

Table - 18 Incidence Of Intestinal Obstruction In Various Studies

Cause	Present Study	C.S.Ramachandran ⁵ 1982	Gill & Eggleston ²⁹ 1965
Adhesions	22%	23%	15%
Hernia	26%	13.6%	27%
Volvulus	16%	26%	25%
Intussusception	8%	7.4%	12%
Tuberculosis	6%	8.6%	3.5%

Clinical features: The most common presenting symptoms in this study was

Pain abdomen	– 74%(37cases)
Vomiting	– 70% (35 cases)
Distension abdomen	– 64% (32 cases)
Constipation	– 48% (24 cases)

In our clinical study of intestinal obstruction, the most common presenting symptom was pain abdomen (74%), followed by vomiting (70%) and abdominal distension (64%) Asbun¹⁸ in their retrospective analysis of 105 cases of small bowel obstruction found that incidence of pain abdomen 82%, vomiting 88%, were commoner than constipation (28%) and distension of abdomen (56%).

Budharaja⁷ in his study reported that, symptoms in order of frequency were pain abdomen 95%, distension of abdomen 82%, vomiting 75%, absolute constipation 50% constituting acute intestinal obstruction.

Small V/s Large gut symptoms

Constipation and distension are predominant symptoms in large bowel obstruction when compared to small bowel obstruction where pain abdomen & vomiting were more common.

Management

All cases were operated in this study.

Adhesiolysis done in 11 cases.

Resection and anastomosis was done in 11 cases
 3 cases of tubercular stricture (stricture release done)
 8 cases of volvulus (4 was small bowel volvulus and 4 was large bowel volvulus).
 5 cases of carcinoma colon
 Only hernia repair done in 7 cases
 Resection and hernia repair done in 4 cases and colostomy in 3 cases.
 Post Operative Complications
 Wound infection – 7 cases
 Pulmonary infection – 3 cases
 Anastomotic leak – 2 cases
 Multi organ failure – 1 case
 Septicemia –3 cases
 Death –3 cases

Mortality: Mortality rate comparison with other international studies.

Table - 19 - Incidence Of Mortality In Various Studies

Author	Year	No.Of Cases Studied	Mortality %
Wangensteen ¹⁹	1955	1252	11
Gill & Eggleston ³	1965	147	16
C.S.Ramachandran ⁵	1982	417	12.7
Present Study	2014-2016	50	6

This table shows the mortality rate in comparison with other world studies with our study. The mortality rate in our study was 6% (3 cases).

VI. Summary

In our study the most common cause of intestinal obstruction was obstructed inguinal hernia. Though adhesions forms the most common form of intestinal obstruction in the literature, in our study obstructed inguinal hernia forms the major cause (26%)

The second common cause was adhesions (22%), followed by volvulus (16%) and then tumors which forms 10% of causes. Intussusception contributes only 8% of our study..

Out of 13 cases, 8 inguinal hernia were obstructed and 5 were strangulated. In patients with obstructed inguinal hernias, they were treated by obstruction release with hernia repair. In strangulated hernias gangrenous part of the intestine was resected and end to end anastomosis done.

In patients with sigmoid volvulus, all the 4 cases underwent resection anastomosis, since the bowel was not viable. Defunctioning colostomy was also done to protect the anastomotic area, as the bowel was unprepared and heavily loaded with fecal matter.

In patients who presented with malignant growth loop colostomy was done as a temporary measure to relieve the obstructive symptoms. They were referred to higher institution for the follow up of chemo and radiotherapy.

The patients who presented with ileocaecal TB, intussusception, and small bowel volvulus underwent resection of the affected part of the bowel followed by end to end anastomosis.

The Male to Female ratio was 4:1(41 males & 9 females). The most common age group affected was 41-50 years.

Abdominal pain was the most common symptom followed by vomiting. Constipation and abdominal distension are almost equal in frequency.

The commonest postoperative complication was wound infection.

The mortality in our study was 6%. One patient with mesenteric vascular ischemia and extensive bowel gangrene died of anastomotic leakage and sepsis . The other patient who underwent colostomy for rectosigmoid growth died. The third patient died due to septicemia after operating for adhesive intestinal obstruction. The remaining cases were being followed up and the post op period was uneventful.

VII. Conclusion

Following conclusions were made from the study of 50 cases of acute intestinal obstruction in Meenakshi Medical College, Kanchipuram. Intestinal obstruction is the most common surgical emergency in our day to day practice. The most common age group involved in our study is 41 – 50 years. There is lower incidence of obstruction in younger age groups than older age groups. The incidence is more common in males.

Out of 50 patients of the study 41 were male and 9 were females. Obstructed hernia is the most common cause of intestinal obstruction.

Among 50 patients 13 cases presented with obstructed hernia and 5 cases were strangulated out of 13 obstructed hernia. Adhesions are the second most common cause of intestinal obstruction in our study. Adhesions are common in small bowel obstruction. Adhesions were mostly due to previous surgeries like appendectomy, gynaecological surgeries, peptic ulcer surgery etc. The other causes of intestinal obstruction were intussusceptions, volvulus, malignancy, tuberculosis etc.

Malignancies are more common in large bowel obstruction. Recto sigmoid growth is the most common cause of bowel obstruction. 5 cases presented with rectosigmoid growth in our study.

Routine investigations were carried out. Plain x-ray abdomen erect is the single most important diagnostic tool for intestinal obstruction. Blood investigations like WBC counts were markedly increased in patients with strangulation and sepsis.

Early recognition and treatment is important to prevent gangrenous changes. Prognosis was poor in elderly patients. The most common cause of morbidity and mortality was septicaemia, anastomotic leak, wound infection and pulmonary infection. Patients who presented with strangulation had poor outcome. In our study the most common cause of death was septicaemia.

References

- [1]. Michael ML Jr, Knapp L, et al. Acute intestinal obstruction; Comparative studies of small intestinal and colonic obstruction. *Surg* 1950; 28:90-110.
- [2]. Becker WF. Acute obstruction of colon – An analysis of 205 cases. *Surg. Gynaec. Obstet.* 1953;96: 677-82
- [3]. Gill SS, Eggleston FC. Acute intestinal obstruction. *Arch Surg* 1965; 91:389-92.
- [4]. Fuzan M, Kaymake E, et al. Principal causes of mechanical bowel obstruction in surgically treated adults in Western Turkey. *BJS* 1991; 78: 202-3.
- [5]. Ramachandran CS. Intestinal volvulus. *IJS* 1989; 66-70.
- [6]. Lee SH, Ong ETL. Changing pattern of intestinal obstruction in Malaysia – a review of 100 consecutive cases. *BJS* 1991; 78:181-2.
- [7]. Budharaja SN, Govindarajulu S, et al. Acute intestinal obstruction in Pondicherry. *IJS* 1976; 111-7
- [8]. Jain BL, Prasad N. Intestinal obstruction. *IJS* 1962: 784-90.
- [9]. Ti TK, Young NK. The pattern of intestinal obstruction in Malaysia. *BJS* 1976; 63: 963-5.
- [10]. Sankaran V. Volvulus in South India. *IJS* 1962: 784-90.
- [11]. Sarkar PK, Sarkar V. primary resection and anastomoses associated with rectal stretching (MRS) for treatment of acute sigmoid volvulus. *IJS* 2000; 62(2): 122-4.
- [12]. Roggo A, Ottinger LW. Acute small bowel volvulus in adults. *Ann surg* 1992; (2): 135-41.
- [13]. Thompson RW, James BD, et al. Obstructing adenocarcinoma of right side of the colon. *Arch surg* 1968; 96:100-3.
- [14]. Hsu TC. Comparison of one stage resection and anastomoses of acute complete obstruction of left and right colon. *AJS* 2005; 189: 384-7.
- [15]. Kuruvilla MJ, Challengi CR, et al. Major causes of intestinal obstruction in Libya. *BJS* 1987; 74: 314-5.
- [16]. Sircar S, Taneja VA, et al. Clinical presentation of abdominal tuberculosis – A prospective study. *Jr IMA* 1996; 94(9): 342-4.
- [17]. Kappor VK, Gupta S, et al. Acute tubercular abdomen. *IJS* 1991; 53:71.
- [18]. Asbun HJ, Perpinello C, et al. Small bowel obstruction and its management. *Int surg* 1989;74:2-27.
- [19]. Wangenstein OH, Rea CE, et al. Experiences with employment of suction in treatment of acute intestinal obstruction. *Surg. Gynaecol. Obstet.* 1939; 68:851-68.