

A CLINICAL STUDY OF INTESTINAL OBSTRUCTION AND ITS SURGICAL MANAGEMENT IN RURAL POPULATION

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ABSTRACT: BACKGROUND: 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 in urban areas due to early presentation and prompt medical attention, the same is not true in rural population because of late presentation with complications. With better understanding of pathophysiology, improvement in diagnostic techniques, fluid and electrolyte correction, much potent antibiotics and surgical management the complications arising due to late presentation can be limited. However, 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. **OBJECTIVES:** To study various causes, clinical features, and modalities of treatment of intestinal obstruction and their outcome. **METHODOLOGY:** A total of 50 cases of intestinal obstruction, after admission in our hospital that were surgically managed, were chosen by simple random technique for the study. Statistical analysis was done using SPSS software.

RESULTS: Intestinal obstruction is more common in the age group of 30-60 years. Small bowel obstruction is more common than large bowel obstruction. Four cardinal features of intestinal obstruction are pain abdomen, vomiting, distension and constipation. Most common etiological factor is postoperative adhesions followed by abdominal hernia. Malignancy as a cause for obstruction is more common in large bowel than small bowel. Intravenous fluids and electrolytes, gastrointestinal aspiration, antibiotics and timed appropriate surgery are still the mainstay of treatment. **CONCLUSION:** Intestinal obstruction still remains a common and important surgical emergency. Obstruction due to adhesions is increasing in incidence due to increased abdominal & pelvic surgeries. The obstruction due to external hernias is decreasing due to early elective surgeries. The morbidity and mortality depends on the age of the patient, etiology of obstruction, site of obstruction, state of hydration, viability of the bowel, delay in diagnosis and surgical intervention and associated medical illness.

KEYWORDS: Intestinal obstruction, adhesions, hernia, intraperitoneal malignancy, tubercular stricture.

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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 or 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, skillful 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 in diagnostic techniques, fluid and electrolyte correction, much potent anti-microbials 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-morbidities¹. Most of the mortality occurs in elderly individuals who seek late treatment and who are having associated pre-existing diseases like, diabetes mellitus, COPD and cardiac diseases.

AIMS AND OBJECTIVES

- To study the various causes of intestinal obstruction.
- To study the various clinical features of intestinal obstruction.
- To study various surgical procedures for intestinal obstruction and its outcome in relation to etiological factors in intestinal obstruction patients.

MATERIALS AND METHODS:

The materials for the clinical study of intestinal obstruction and its surgical management were collected from surgical wards in Adichunchanagiri Institute of Medical Sciences, B.G. Nagara admitted during the period from November 2010 to October 2012. 50 cases of intestinal obstruction have been studied with age groups ranging from 11 years to 70 years.

INCLUSION CRITERIA:

- Patients presenting with features of intestinal obstruction and in whom surgical management was proposed
- Age group from 11 years to 70 years

EXCLUSION CRITERIA:

- Patients with sub acute intestinal obstruction treated conservatively

Soon after the admission, clinical data were recorded according to the proforma. The diagnosis was mainly based on clinical examination, 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 - Albumin, sugar and microscopy.

Radiology Imaging - Plain x-ray of erect abdomen or lateral decubitus. Plain CT scan of abdomen was done in selective cases.

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Immediately after admission, resuscitation with IV fluids especially Ringer's lactate and normal saline infusion was given till hydration and urine output become normal. Nasogastric decompression with Ryle's tube carried out and antibiotic prophylaxis with IV Ceftriaxone and IV Metrogyl started. Histopathological examination of the specimen of resection/biopsy was done whenever necessary.

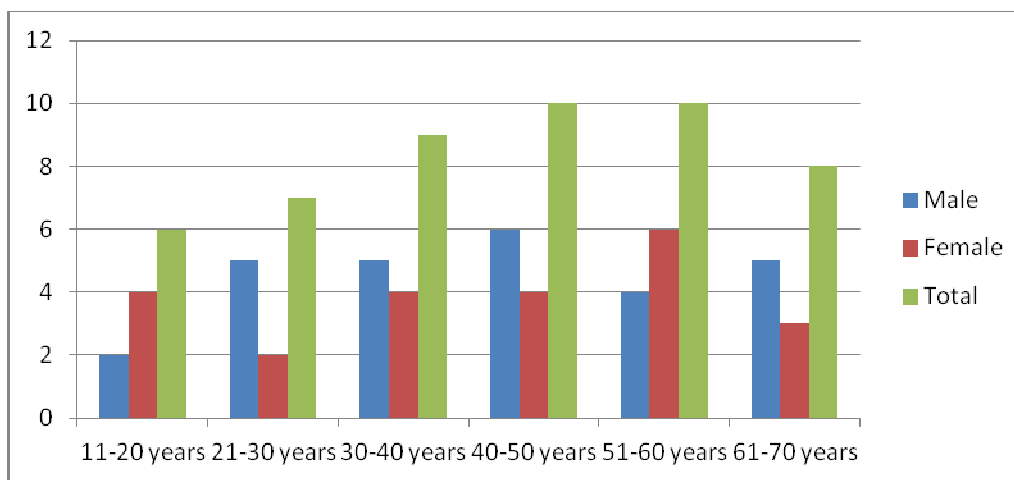
Postoperative follow up after the discharge of patients was done in majority upto 1 year. Many patients were lost for follow up after one or two visits.

RESULTS: The study of 50 cases of intestinal obstruction during November 2010 to OCTOBER 2012 at Adichunchanagiri Hospital & Research Centre, Balangadharanatha Nagara is as follows

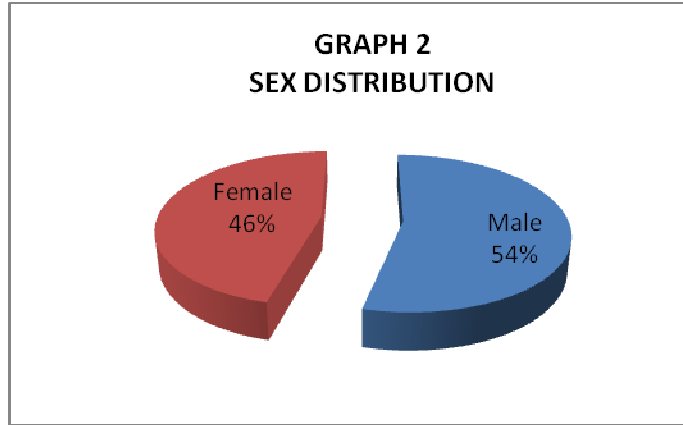
TABLE 1: AGE AND SEX DISTRIBUTION OF CASES

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%
Total	27	23	50	100

GRAPH 1: AGE AND SEX DISTRIBUTION



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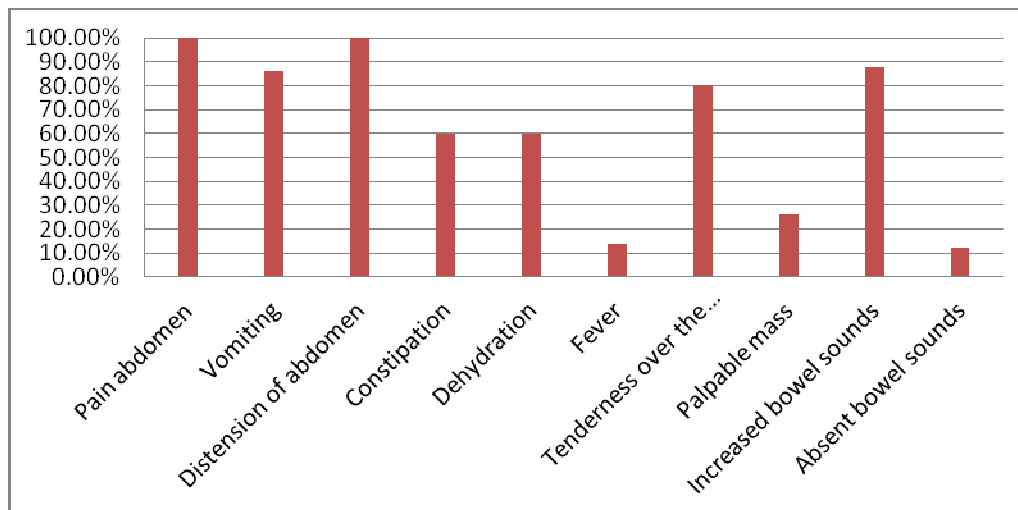


There were 27 male and 23 female in present study cases. The male and females are nearly in equal ratio. Case distribution across all ages was just about same.

TABLE 2: PRESENTING SYMPTOMS AND SIGNS

SI 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	40	80%
8	Palpable mass	13	26%
9	Increased bowel sounds	44	88%
10	Absent bowel sounds	6	12%

GRAPH 3: PRESENTING SYMPTOMS AND SIGNS



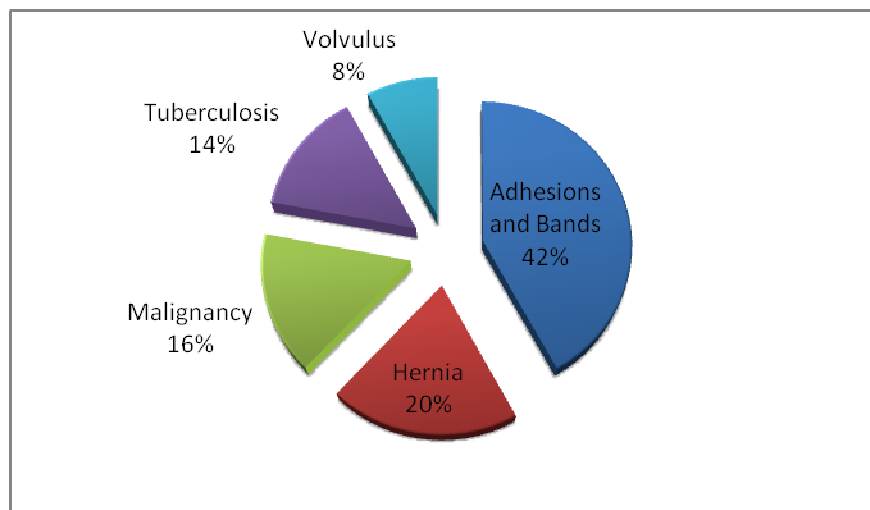
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Main mode of presentation was in terms of pain abdomen, vomiting and constipation. Distension of abdomen, tenderness and hyperperistaltic sounds were common finding in the cases.

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	16%
	Carcinoid tumor of small intestine	2		
	Ovarian tumor with peritoneal metastasis with adhesions between ileal loops	1		
	Stomach carcinoma infiltrating transverse colon	1		
4. TB stricture			07	14%
5. Volvulus			04	08%

GRAPH 4: ETIOLOGY OF INTESTINAL OBSTRUCTION



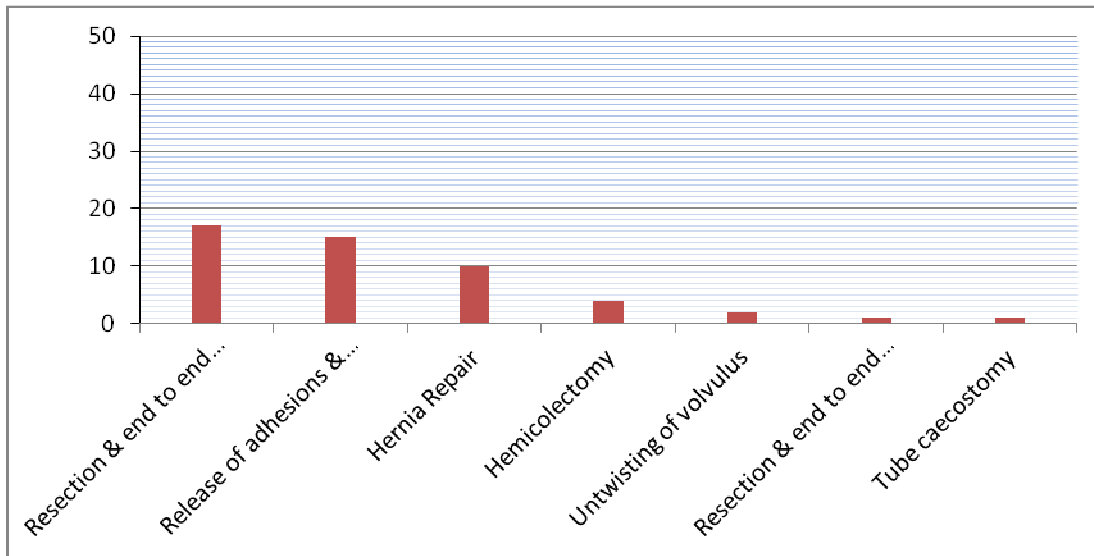
Bulk of the cases in this study was due to adhesions / bands followed by hernia, malignancy and TB stricture.

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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. Hernia Repair	10	20%
D. Hemicolectomy	4	8%
E. Untwisting of volvulus	2	4%
F. Resection and end-to-end jejuno-ileal anastomosis	1	2%
G. Tube caecostomy	1	2%

GRAPH 5: Types of operation



Resection and end-to-end ileo-ileal primary anastomosis was done in 17 cases, which included cases of adhesion, stricture, ileo-caecal 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 and 3 were incisional hernia. Untwisting of sigmoid volvulus was done in 2 cases & hemicolectomy was done in 4 cases. Resection and end-to-end jejuno-ileal primary anastomosis was done in 1 case with multiple strictures of the jejunum due to carcinoid tumor. Tube caecostomy was done in 1 case of carcinoma stomach infiltrating transverse colon.

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TABLE 5: Previous Surgeries

Sl No.	Previous Surgeries	No. of cases(n=50)	Percentage
1	Appendicectomy	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%

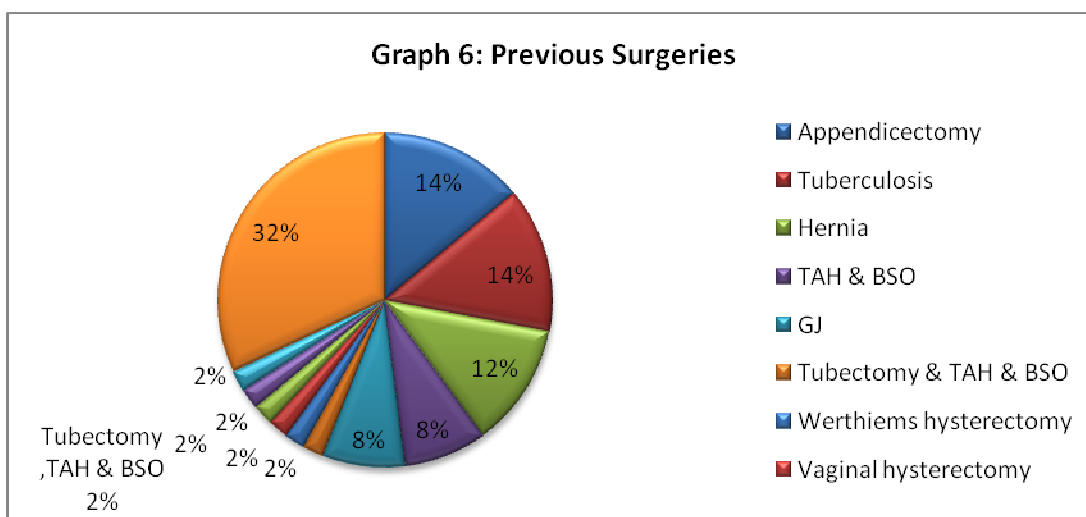


TABLE 6: Postoperative complications

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%

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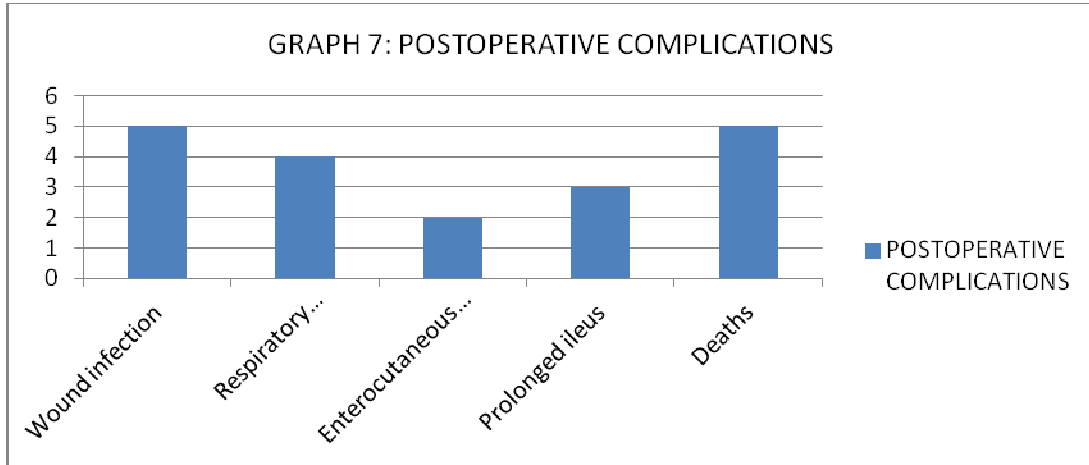
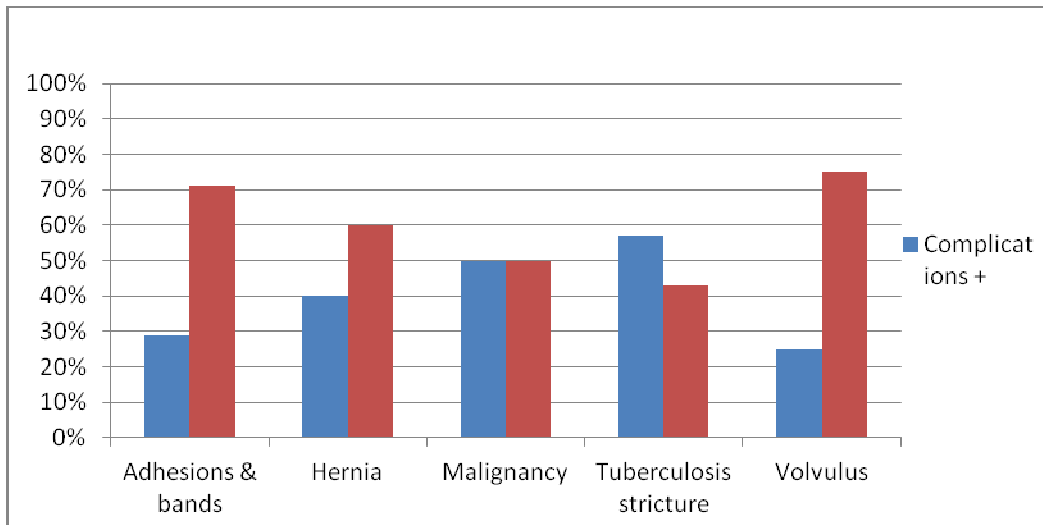


Table 7: Association of etiology with postoperative complications

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

GRAPH 8: Association of etiology with postoperative complications



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MORTALITY: In present study 5 persons died during postoperative period. The analysis of cause of death is shown below:

TABLE 8: Mortality

Case No.	Operative findings	Operative procedure	Cause of death
1	Acute large bowel obstruction due to descending colon adenocarcinoma	Emergency exploratory laparotomy - left hemicolectomy with end colostomy	Multi organ failure due to septicaemia
2	Multiple adhesions causing constriction of the ileum	Resection & end to end ileoileal primary anastomosis	Septicaemia due to peritonitis
3	Multiple strictures in the jejunum	Resection & end to end jejunoileal primary anastomosis	Acute respiratory distress syndrome due to respiratory infection
4	Adhesions causing kinking of ileum & Gangrenous ileal segment	Emergency exploratory laparotomy - adhesiolysis, segmental ileal resection and end to end ileo-ileal anastomosis	Septicaemia due to peritonitis
5	Inflamed appendix & Inflammatory adhesions causing kinking of ileum with gangrenous ileal segment	Resection & end to end ileoileal primary anastomosis	Acute respiratory distress syndrome due to respiratory infection

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. Recurrence	Nil	Nil	Nil
H. Death	Nil	Nil	Nil

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DISCUSSION: Intestinal obstruction continues to be a frequent emergency, which surgeons have to face (1-4% of emergency operations). 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 hospital, 1667 cases of total abdominal surgeries were done in November 2010 to October 2012, of which 50 cases were intestinal obstruction comprising about 3%. The involvement of small bowel in obstruction is much more common than that of large bowel (Sufian and Mostsumoto)⁴. 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 consistently⁵. The associated medical problems (like respiratory cardiac or metabolic diseases) and advanced age carries a considerable contribution in adding the mortality.

AGE INCIDENCE: 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 Eggleston⁶, 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 Singh⁷ and C. S. Ramachandran⁸ say that the maximum number of cases occurs in 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 ⁷	Playforth ⁹	G. J. Cole ¹⁰	S.S. Gill ⁶	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%

SEX INCIDENCE:

In present study, there are 27 male and 23 females. Male and female are nearly in equal ratio. Among previous studies, Budharaja et al¹¹ and Harban Singh et al⁷, reported 4:1 and Shakeed¹² found equal incidence.

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TABLE 11: Comparison of sex incidence in different studies

Studies	Male : Female ratio
Budharaja et al ¹¹	4:1
Harban Singh et al ⁷	4:1
Shakeed ¹²	1:1
Present study	1.17:1

ETIOLOGY: 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 ⁶ 1965	G.J.Cole ¹⁰ 1965	Playforth ⁹ 1970	C. S. Rama chandran ⁸ 1982	Brooks and Buttler ¹³ 1996	Biarj et al ¹⁴ 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 surgery¹⁵, of these every third patient will be having one of the other clinical signs and symptoms related to adhesion¹⁶. Among 93% of the postoperative adhesions, 5% of the cases can develop acute intestinal obstructions; 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.

McIver¹⁷ 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 obstructions were related to adhesion and more recent studies in 1982 reports 23%. The rise in the incidence of adhesions

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

OPERATIONS: All the cases of our study were subjected to surgery. 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.

Postoperatively IV fluids and nasogastric decompression and antibiotics were given till the good bowel movements appeared.

MORTALITY: 5 cases died following surgery for acute intestinal obstruction (10%). Among the patients who died are due to following causes

1. ARDS due to respiratory infections
2. Septicemia due to peritonitis
3. Multiple organ failure due to septicemia

TABLE 13: Mortality comparison with other world series

Author	Year	No. of cases studied	Mortality(%)
Wangensteen ¹⁸	1955	252	11.0
Gill and Eggleston ⁶	1965	147	16.0
Sufian and Matsumoto ¹⁹	1975	171	19.0
C. S. Ramachandran ⁸	1982	417	12.7
Cheadle et al ²⁰	1998	300	9.0
Present study	2010-2012	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 anesthesia.

The mortality in intestinal obstruction is high in individuals who develop strangulation and gangrene of the bowel, those present beyond 72 hours and in those are having pre-existing associated diseases and elderly people, though early treatment can reduce the mortality, advanced age and associated metabolic, cardiopulmonary diseases, still leads to high rate of mortality. Hence the predisposing causes like hernia should be promptly attempted early in elderly individuals before they go for complication.

So, it is quite evident that the duration of symptoms, age, general condition of the patient and associated diseases and operative procedures adopted has a definite role on the prognosis and mortality.

CONCLUSION

- Intestinal obstruction remains still an important surgical emergency

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- Late presentation of the patient with complications possesses a challenging problem to the surgeons for management
- Patients with a clinical picture of obstruction of the bowel demand vigorous correction of fluid and electrolyte, which can be severe, and life threatening
- Postoperative adhesions are the common cause to produce intestinal obstruction as abdominal and pelvic surgeries are on rise
- Hernia is second most common cause of intestinal obstruction. Hernia related obstruction were higher in early twentieth century. Due to early surgical treatment for hernia the incidence is decreasing
- Intestinal tuberculosis with stricture is next common cause of intestinal obstruction
- Malignant obstruction is far more common in large bowel, than in small bowel. In large bowel, malignant obstruction is more common on the left side than the right side
- Volvulus is next common cause of intestinal obstruction. Sigmoid volvulus is the commonest in large bowel obstruction
- Rare causes of intestinal obstruction are also important like in this study we found carcinoid tumor of the small intestine
- Intestinal obstruction whether in small bowel or large bowel occurs nearly in equal ratio in both sexes. Intestinal obstruction is more common in the age group of 30-60, the active period of one's life. Large bowel obstruction is more common in patients above 40 years than in younger group
- Small bowel obstruction is more common than large bowel obstruction.
- Pain abdomen, vomiting, distension and constipation are the four cardinal features of intestinal obstruction, present in most of the cases. Tenderness, guarding, rigidity, rebound tenderness and shock are the cardinal features of strangulated intestinal obstruction. When the strangulation occurs in external hernia, the hernia is tense, tender, and irreducible with no expansible impulse
- Plain X-ray abdomen taken in erect posture is the single most important investigation required for the patients
- Clinical, radiological and operative findings put together can bring about the best and accurate diagnosis of intestinal obstruction
- Mechanical obstruction is not associated with any specific bio-chemical marker, which can help the surgeon for differentiate simple obstructions from ischemia or a closed loop obstruction with impending bowel infarction. Diagnosis of strangulation is still a challenge
- Intravenous fluids and electrolytes, gastrointestinal aspiration, antibiotics and then appropriate surgery are still the main stay of the treatment
- Majority of the patients intestinal obstruction needs surgical relief of obstruction
- Among the factors influencing the mortality and morbidity are age, state of hydration, nutritional status, viability of the bowel, etiology of obstruction, site of obstruction, delay in diagnosis and surgical intervention and associated medical illness
- Early operation is mandatory to avoid the development of peritonitis and systemic sepsis associated with multi-system organ failure

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- Early diagnosis of obstruction, careful selection of cases for surgery, skillful operative management, proper technique during surgery and intensive post-operative treatment yield grateful results

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