

An Analytical Study of Causes, Clinical Presentation and Prognosis of Intestinal Obstruction in Tertiary Care Hospital

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Abstract: Obstructed hernias are the common cause of intestinal obstruction in our study, due to lack of awareness among rural population, followed by adhesions and bands, with pain abdomen as the most common presenting symptom. Majority of patients with intestinal obstruction needs surgical relief of obstruction. Clinical, radiological and operative findings put together can bring about the best and accurate diagnosis of intestinal obstruction. Plain x ray is the single most important diagnostic tool for intestinal obstruction. Early recognition and aggressive treatment is needed to prevent gangrenous changes. Prognosis was poor in elderly patients. The most common cause of morbidity and mortality was septicemia, 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 septicemia.

key words intestinal obstruction, obstructed hernia, strangulation, wound infection, septicaemia

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I. Introduction

Intestinal obstruction is one of the most common surgical emergencies which should be diagnosed urgently and promptly treated. It is defined as an obstruction in forward propulsion of the contents of the intestine either due to dynamic, adynamic or pseudo-obstruction. Common causes of intestinal obstruction are obstructed hernias, postoperative or tuberculous adhesions, neoplasms, foreign bodies, inflammatory bowel disease, faecal impaction and volvulus. Intestinal obstruction can be of either small bowel or large bowel; small bowel obstruction accounts for majority of cases¹. Mortality varies widely according to cause and any associated complications, being 100% in patients with untreated strangulated obstructions².

Although mortality was reduced with better understanding of pathophysiology, improvement in diagnostic techniques, fluid and electrolyte correction, much potent antibiotics, intestinal tube decompression, introduction of new surgical techniques and improvement in the field of anaesthesia, still mortality ranges from 3 % for simple obstruction to 30% when there is perforation of obstructed bowel or vascular compromise. This is further influenced by clinical setting and related comorbidities³. Success in treatment of patients with intestinal obstruction depends largely on early diagnosis, timely fluid resuscitation, skillful operative management, proper surgical technique and intensive postoperative treatment.

II. Aims And Objectives

- To study the causes and clinical presentations of intestinal obstruction
- To study the prognosis of surgery for intestinal obstruction including procedure, complications, morbidity and mortality .

III. Methodology - Patients And Methods

This is a prospective observational study of 100 cases of intestinal obstruction who are admitted in surgical wards at S.V.R.R.G.G. Hospital, Tirupati between August 2016 to November 2017.

3.1 Inclusion Criteria:

- All patients between the age of 18 to 80 years admitted in department of general surgery with signs and symptoms of intestinal obstruction.
- Patient giving written informed consent.

3.2 Exclusion Criteria:

Patients who are not willing to be a part of this study.

Patients with pseudo obstruction, paralytic ileus are excluded.

Soon after the admission, clinical data was recorded according to the proforma. All the cases studied were subjected to surgery and the diagnosis was established. The diagnosis was mainly based on clinical examination and often supported by radiological examinations.

3.3 The investigations done in the cases for study were:

3.3.1 Blood

Routine examination includes haemoglobin percentage , WBC count and differential count , ESR and blood urea , serum creatinine, serum electrolytes, blood grouping and typing. 27

3.3.2 Radiology Imaging

Plain x-ray erect abdomen to detect fluid gas levels and ultrasound abdomen was done in all cases. CT scan abdomen done in selected cases .

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 IV antibiotic prophylaxis started. Close observation of all bedside parameters like pulse rate, blood pressure, respiratory rate, abdominal girth, bowel sounds, tenderness and guarding was looked for.

Patients with clear-cut signs and symptoms of intestinal obstruction were managed by appropriate surgical procedure after resuscitation. Findings were recorded and photographs were taken. The postoperative period was monitored carefully and all parameters were recorded hourly or fourth hourly basis depending upon the patients general condition and toxemia. Intermittent oxygen inhalation was instituted in patients having strangulation of the bowel to reduce the damage induced by ischemia.

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.

3.3.3 Statistical analysis:

Microsoft word and excel have been used to generate tables, graphs etc,

IV. Observations And Results

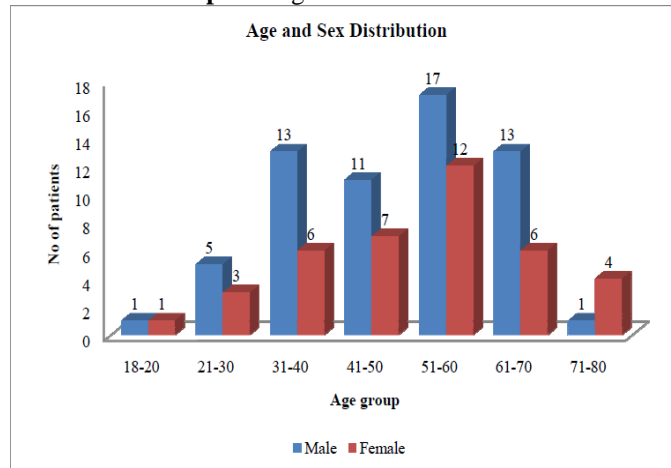
The study of 100 cases of intestinal obstruction who admitted in surgical wards during August 2016 to November 2017 are as follows:

Table 1 : Age and Sex Distribution of Cases with Intestinal Obstruction

S.No	Age group (years)	Male	Female	Total	Percentage
1	18-20	1	1	2	2%
2	21-30	5	3	8	8%
3	31-40	13	6	19	19%
4	41-50	11	7	18	18%
5	51-60	17	12	29	29%
6	61-70	13	6	19	19%
7	71-80	1	4	5	5%
	Total	61	39	100	100%

Out of 100 cases studied, maximum incidence was seen in the age group 51 to 60 years followed by 31-40 years and 61-70 years age group. 61% of cases are males and 39% are females. Thus males outnumbered females.

Graph-1: Age and sex distribution



Graph-2: Age Distribution Pie Chart

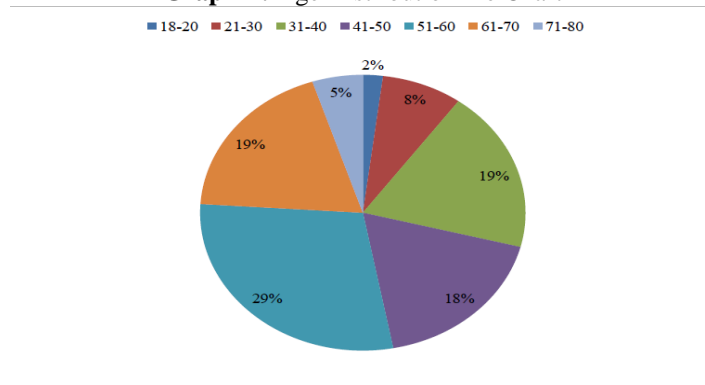


Table-2 : Levels of Intestinal Obstruction

S.No	Level of obstruction	No of cases	Percentage
1	Small bowel obstruction	73	73%
2	Large bowel obstruction	27	27%
	Total	100	100%

In the present study, small bowel obstruction constituted for 73% and large bowel obstruction 27%.

Graph-3: Pie Chart Showing Levels of Obstruction

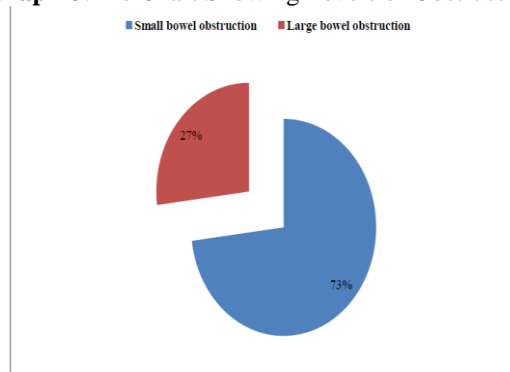


Table-3 : Presenting Symptoms and Signs

S.No	Clinical features	No of cases	Percentage
1	Pain abdomen	100	100%
2	Vomiting	81	81%
3	Constipation	75	75%
4	Distension of abdomen	85	85%
5	Groin swelling	31	31%
6	Tenderness	89	89%
7	Guarding & rigidity	59	59%
8	Absent bowel sounds	47	47%

In the present study, pain abdomen was the most common symptom followed by distension of abdomen, vomiting and constipation.

Graph 4: Presenting Symptoms & Signs

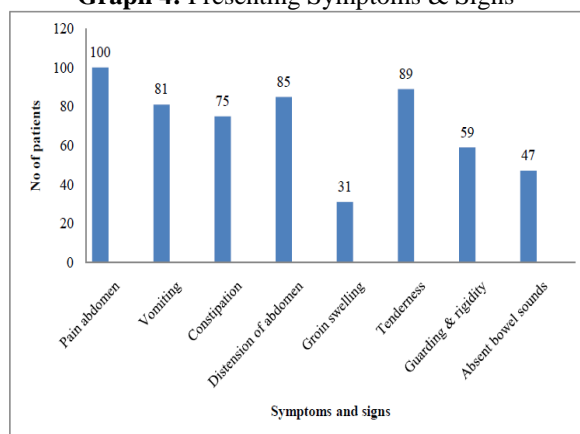


Table 4 : Etiology of Intestinal Obstruction

S.No	Cause	Male	Female	No of cases	Percentage
1	Adhesions and bands	20	16	36	36%
2	Obstructed hernias	27	12	39	39%
3	Tumours	3	5	8	8%
4	Volvulus	3	2	5	5%
5	TB abdomen	5	3	8	8%
6	Meckels diverticulum	2	-	2	2%
7	Intussusception	-	1	1	1%
8	Mesenteric ischemia	1	-	1	1%
Total		61	39	100	100%

In our study, obstructed hernia (39%) was the most common cause of intestinal obstruction followed by adhesions and bands (36%). Other causes were tumours, TB abdomen, volvulus, meckels diverticulum, intussusception and mesenteric ischemia in decreasing order of frequency.

Graph-5: Etiology of Intestinal Obstruction:

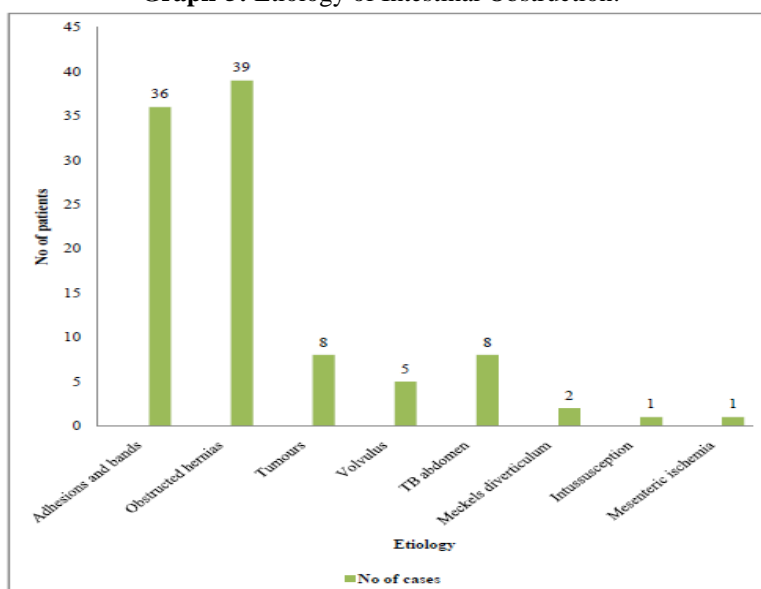


Table-5: Management of intestinal obstruction

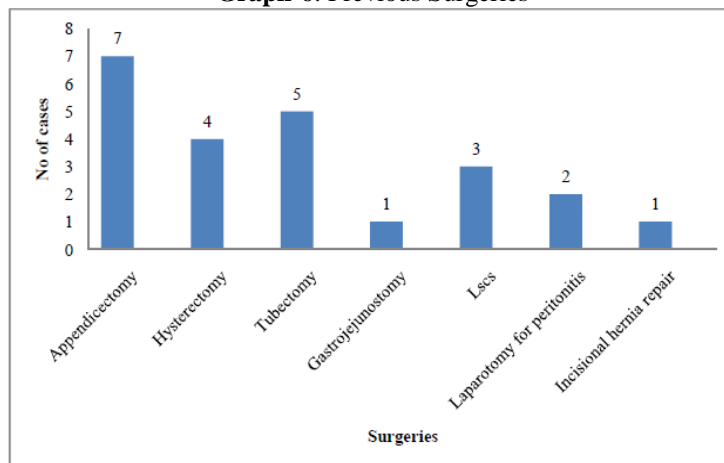
S.No	Type of obstruction	procedure	Noof cases
1	Adhesive obstruction	1.Adhesiolysis	22
		2.Resection & anastomosis	5
		3.Release of band	6
		4.Ileostomy	3
2	Obstructed hernias	1.Release & repair	30
		2.Resection & anastomosis	9
3	Tumours	1.Colostomy	6
		2.Resection & anastomosis	1
		3.Rt hemicolectomy	1
4	TB Abdomen	1.Resection & anastomosis	6
		2.Ileostomy	2
5	Volvulus	1.Resection & anastomosis	3
		2.Colostomy	1
		3.Volvulus detorsion	1
6	Meckels diverticulitis	Meckels diverticulectomy	2
7	Mesenteric ischemia	Resection & anastomosis	1
8	Intussusception	Rt hemicolectomy	1

Table-6: Previous Surgeries

S.No	Previous surgery	No of cases	percentage
1	Appendicectomy	7	7%
2	Hysterectomy	4	4%
3	Tubectomy	5	5%
4	Gastrojejunostomy	1	1%
5	LSCS	3	3%
6	Laparotomy for peritonitis	2	2%
7	Incisional hernia repair	1	1%
Total		23	23 %

Out of 100 cases, 23 cases had previous history of surgery. Among previous surgeries most common surgery was appendicectomy followed by tubectomy, hysterectomy, lower segment caesarian section, laparotomy for peritonitis, gastrojejunostomy and incisional hernia repair in decreasing order of frequency.

Graph-6: Previous Surgeries



Graph 7: Pie Chart Showing Previous Surgeries

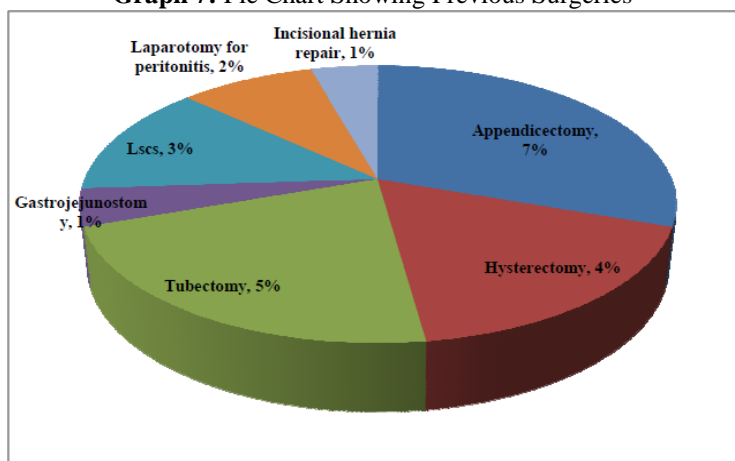
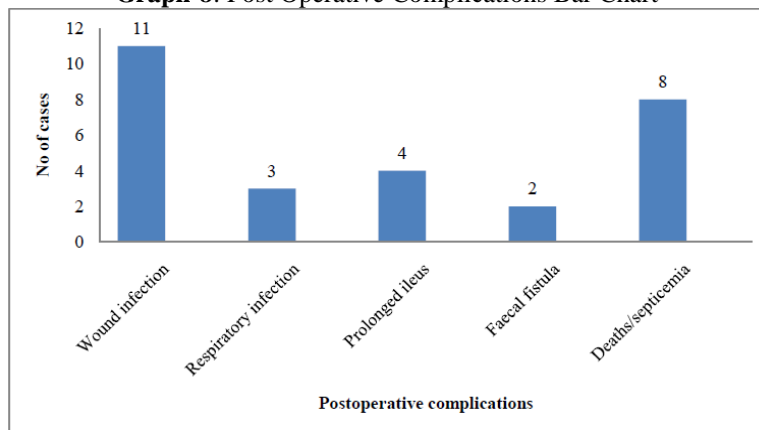


Table-7: Postoperative Complications:

Post operative complication	No of cases	Percentage
Wound infection	11	11%
Respiratory infection	3	3%
Prolonged ileus	4	4%
Faecal fistula	2	2%
Deaths/septicemia	8	8%

Wound infection was the most common postoperative complication observed in this study followed by septicemia, pulmonary infection, prolonged ileus and faecal fistula. Out of 100 cases, 8 cases died due to septicemia.

Graph-8: Post Operative Complications Bar Chart



Graph-9: Pie Chart Showing Post Operative Complications

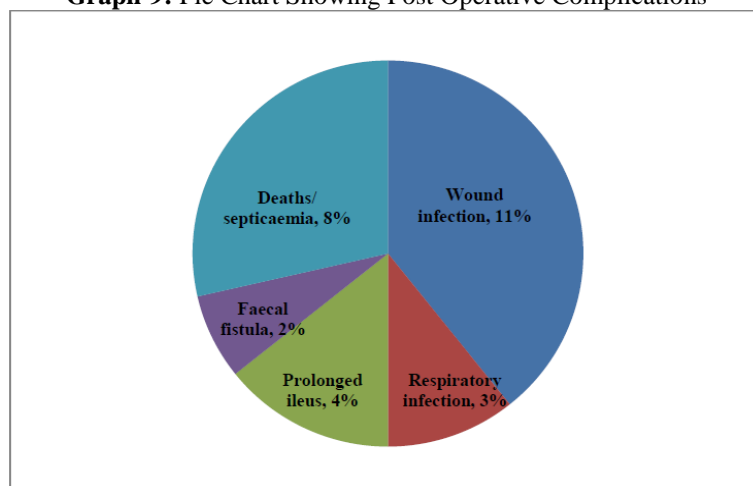


Table- 8 : Mortality

Outcome	No of cases	Percentage
Cured	92	92%
Deaths	8	8%

Graph-10: Pie Chart Showing Mortality

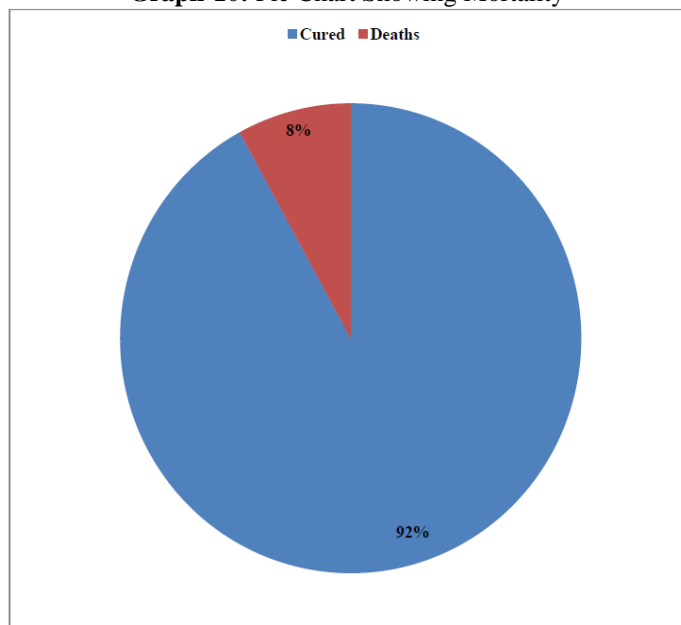


Table -9 : Cause of Death

Case no	Age sex &	Operative findings	Operative procedure	Cause of death
5	45Y/F	Intestinal obstruction due to adhesions	Resection & ileoileal anastomosis	Septicemic shock
13	60 Y/M	Sigmoid volvulus	Colostomy	MODS+ Septicemia
42	76Y/F	Strangulated femoral hernia	Resection & anastomosis	MODS + Septicemia
53	65Y/F	Strangulated inguinal hernia	Resection & anastomosis	ARDS due to RTI
57	46Y/M	Mesenteric ischemia	Resection & anastomosis	MODS+Septicemia
76	60Y/M	Descending & sigmoid colon carcinoma	Colostomy	ARDS due to RTI
78	50Y/F	Strangulated incisional hernia	Resection & colocolic anastomosis	Septicemic shock
98	52Y/M	TB Stricture colon	Resection & colocolic anastomosis	RTI+Septicemia

Table-10 : Association of Etiology with Postoperative Complications

Etiology of intestinal obstruction	Postoperative complications		No of cases
	Yes	No	
Adhesions & bands	6	30	36
Obstructed hernias	10	29	39
Tumours	2	6	8
TB Abdomen	4	4	8
Volvulus	3	2	5
Meckel's diverticulum	-	2	2
Mesenteric ischemia	1	-	1
Intussusception	-	1	1

V. Discussion

Acute intestinal obstruction is a common life threatening surgical emergency all over the world presenting as acute abdomen and requiring surgical intervention. 100 patients between 18 to 80 years of age admitted to the surgical wards with provisional diagnosis of intestinal obstruction were taken for this study.

5.1 Age Incidence:

Intestinal obstruction occurs in all age groups. Here the youngest patient was 18 years old and the oldest patient was 80 years old. The present study showed maximum incidence in the age group 51-60 years (29%) followed by 31-40 years (19%) and 61-70 years age group(19%) .

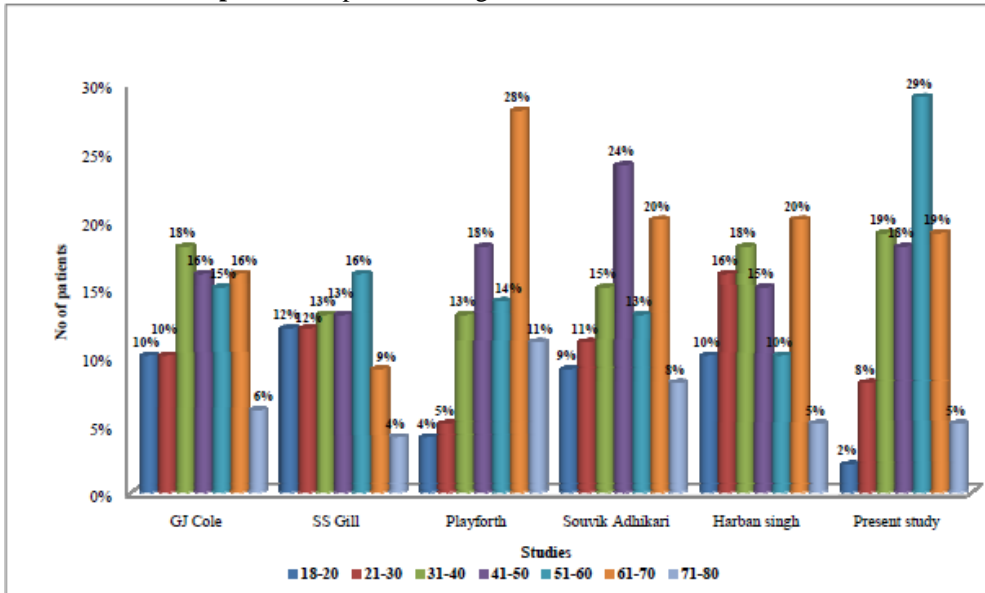
In a study conducted by Deshmukh SN and Maske AN²⁶, peak incidence was seen in the age group 51-60 years (22%) followed by 61-70 years (18%) of age which is similar to our study. Studies reported by Gill and Eggleston²⁷ has reported 17% of cases in the age group of 50-54 years and 60% of cases of intestinal obstruction occur in the age group of 30-60 years.

Adhikari S et al ²⁸ and Khan JS et al ²⁹ series shows maximum incidence in the age group of 31-40 years. Studies reported by Harban Singh³⁰ and C S Ramachandran ³¹ says that the maximum no of cases occur in the age group of 21-40 years, of these the etiological factors were obstructed hernia.

Table -11 : Comparison of Age Incidence in Different Studies

Age group	Cole GJ ³²	SS Gill ²⁷	Play forth ³³	Souvik Adhikari ²⁸	Harban Singh ³⁰	Present study
18-20	10%	12%	4%	9%	10%	2%
21-30	10%	12%	5%	11%	16%	8%
31-40	18%	13%	13%	15%	18%	19%
41-50	16%	13%	18%	24%	15%	18%
51-60	15%	16%	14%	13%	10%	29%
61-70	16%	9%	28%	20%	20%	19%
71-80	6%	4%	11%	8%	5%	5%

Graph:11 Comparison of Age Incidence in Different Studies

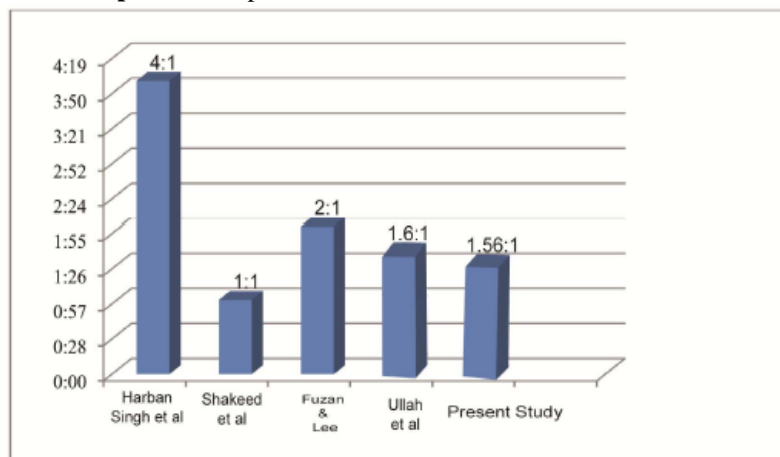


5.2 Sex Distribution:

The study included 61 male patients and 39 female patients with male to female ratio being 1.56:1. Males were more commonly affected as compared to females. Male predominance in this study may be because large number of our patients had obstructed or strangulated hernia, and in our country males as compared to females suffer more from inguinal hernias. Budharaja et al³⁴ and Harban Singh et al³⁰ reported ratio of 4:1 and shakeed³⁵ found equal incidence. Fuzan³⁶ and Lee³⁷ reported 2:1 male to female ratio. The present study is similar to study conducted by Ullah et al³⁸ who reported ratio of 1.6:1. **Table-Table 12** : Comparison of sex incidence in various studies

STUDIES	MALE:FEMALE RATIO
Harban Singh et al ³⁰	4:1
Shakeed et al ³⁵	1:1
Fuzan ³⁶ and Lee ³⁷	2:1
Ullah et al ³⁸	1.6:1
Present study	1.56:1

Graph 12: Comparison of Sex Incidence in Various Studies



5.3 Etiology of Intestinal Obstruction:

Etiology of intestinal obstruction varies in different geographical locations. In the present study small bowel obstruction contributed to 73% and large bowel obstruction 27%. This is comparable with reports of Ojo EO et al³⁹ where small bowel obstruction constituted to 77% and large bowel obstruction 22%. Michel⁴⁰ and Becker⁴¹ studies reported that small bowel obstruction constituted to 80% and large bowel obstruction 20%. The most common etiological factor in the present study was obstructed hernia (39%) followed by adhesions (36%). Other causes are neoplasms (8%), TB abdomen (8%), volvulus (5%), meckel's diverticulum (2%), intussusceptions (1%) and mesenteric ischemia (1%).

Table-13 : Comparison of Etiology of Intestinal Obstruction in Various Studies

Author	Year published	Total cases	Most common cause	Second common cause	Others
GJ Cole ³²	1965	436	Hernia (35%)	Intussusception (12%)	Adhesions & bands(10%), Tumours(9%), Volvulus(3%), TB(3%)
Ramachandran CS ³¹	1982	417	Volvulus (26.6%)	Adhesions (23%)	Hernias(13.6%), Tumours(9%), TB(8%), Intussusception(7%)
Jahangir Khan ²⁹ Sarwar	2005	100	Adhesions & bands (49%)	Hernias(34%)	Intussusception (6%) Volvulus (5%), Tumours (3%), TB (1%)
Markogiannakis ⁴²	2007	150	Adhesions & bands (64%)	Hernias (14%)	Tumours (13%) Volvulus(0.6%)
Arshad M Malik ⁴³	2010	229	Adhesions & bands (46%)	TB (24%)	Hernias (23%) Mesenteric ischemia (10%), Volvulus (4%), Tumours (2%)
Souvik Adhikari ²⁸	2010	367	Hernias (35%)	Tumours (16%)	Adhesions(15%), TB(14%), Volvulus (6%)
Kapan M ⁴⁴	2012	148	Adhesions (48.6%)	Tumours (20.9%)	Sigmoid volvulus (15.5%), Hernias (5.4%)
Ojo EO ³⁹	2014	217	Adhesions (51.6%)	Tumors(18%)	Hernias (12.9%), Volvulus (10.17%)
Deshmukh SN ²⁶	2016	50	Hernias (50%)	Adhesions (30%)	Tumours (8%) Volvulus (6%), TB(2%), Meckel's diverticulum (1%), Intussusception. (1%)
Present study	2016-2017	100	Hernias (39%)	Adhesions & bands(36%)	Tumours (8%), TB(8%) Volvulus (5%), Meckel's diverticulum (2%), Intussusception (1%), Mesenteric ischemia (1%)

5.3.1 Obstructed hernia:

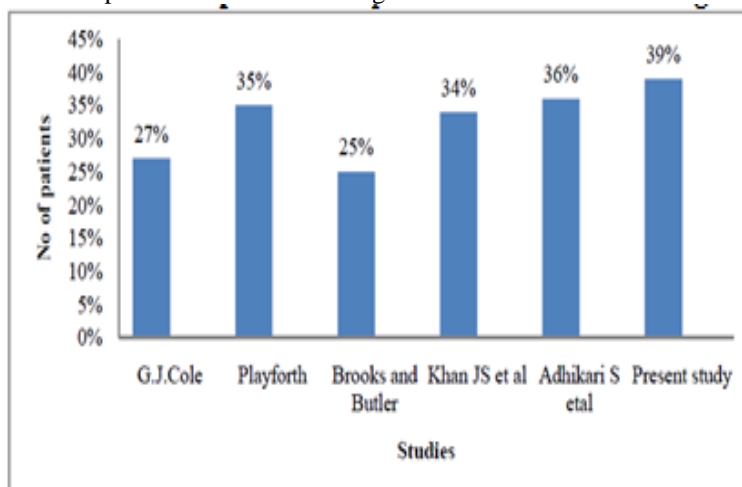
In the present study obstructed hernia is the common cause of intestinal obstruction accounting for 39%. Among obstructed hernias, 29 cases are due to obstructed inguinal hernia, 5 cases are due to obstructed incisional hernia, 2 cases due to obstructed umbilical hernia, 2 cases due to obstructed femoral hernia and 1 case due to internal hernia. Among previous studies, Jahangir sarwar khan²⁹ and Souvik Adhikari²⁸ showed similar

incidence i.e, 34% and 36%. Budharaja³⁴ studies revealed the etiology for acute intestinal obstruction secondary to obstructed hernia accounted for 33%. In his study, the incidence of gangrene was upto 22%. Ramchandran³¹ reported 38.6% of incidence of strangulated small bowel obstruction with 21.4% of obstructed hernia in adults.

Table -14 : Comparison of Hernia Causing Intestinal Obstruction in Various Studies

Studies	Incidence
G.J.Cole ³²	27%
Playforth ³³	35%
Brooks and Butler ⁴⁵	25%
Khan JS et al ²⁹	34%
Adhikari S et al ²⁸	36%
Present study	39%

Graph-13: Comparison of Hernia Causing Intestinal Obstruction in Various Studies



5.3.2 Adhesions and Bands:

A total of 36% of cases attributed to adhesions and bands in the present study. Among adhesions and bands 52.7% are due to postoperative adhesions and 30.5% due to inflammatory adhesions and 16.6% due to congenital bands.

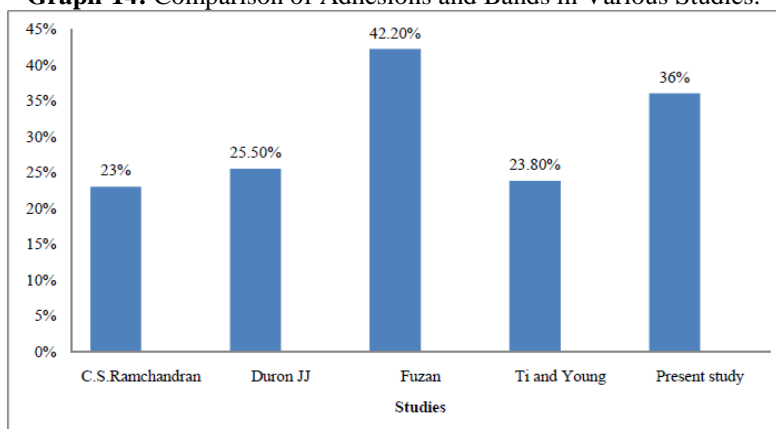
Fuzan³⁶ et al found that the adhesions contributed upto 42.2% for intestinal obstruction. Ti and Young⁴⁶ reported that postoperative adhesions and bands contributed upto 23.8% as cause of intestinal obstruction in 62 cases with only postoperative adhesions in 52 cases (19.2%).

Jain and Prasad⁴⁷ found that the adhesions contributed upto 25.5% for intestinal obstruction. Similar incidence was also reported by Duron JJ⁴⁸. A study series by Gill and Eggleston²⁷ of 147 cases showed that 6.8% of small intestinal obstruction is due to bands.

Table-15 : Comparison of Adhesions and Bands Causing Intestinal Obstruction in Different Studies

Studies	Incidence
Gill and Eggleston ²⁷	15%
C.S.Ramchandran ³¹	23%
Duron JJ ⁴⁸	25.5%
Fuzan ³⁶	42.2%
Ti and Young ⁴⁶	23.8%
Present study	36%

Graph-14: Comparison of Adhesions and Bands in Various Studies.



5.3.3 Malignancy:

Malignancy constituted 8% of cases of intestinal obstruction in the present study. Out of 8 cases, 2 cases are due to recto-sigmoid growth, 2 cases due to growth in rectum, 2 cases due to descending colon growth, 1 case due to ileocaecal growth and 1 case due to ascending colon growth.

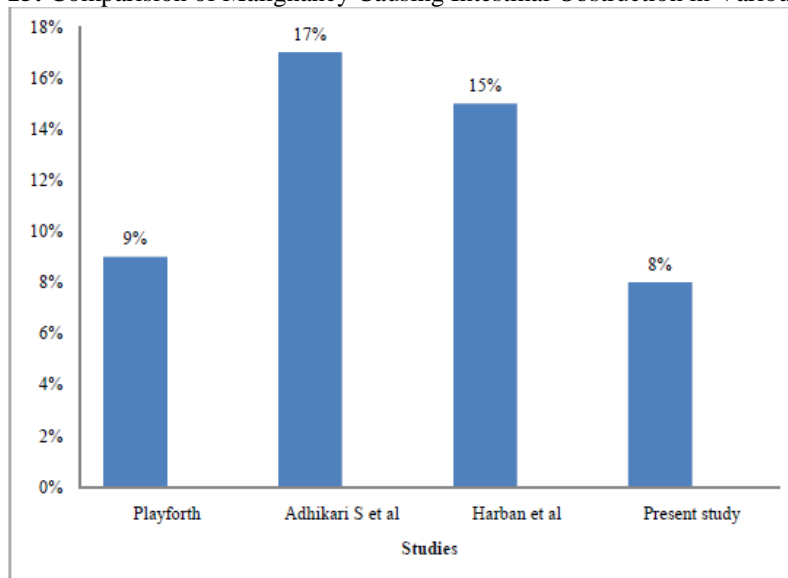
Ramchandran³¹ in his study found that the sigmoid colon cancer accounted for 6.6% of intestinal obstruction. Thompson⁴⁹ in his series recorded the incidence of obstructing carcinoma of right colon equals 26% and left colon 69%.

Harban et al³⁰ reported an incidence of 15% of large bowel obstruction due to malignancy. Fuzan³⁶ revealed the cause of malignant large bowel obstruction of which ascending colon constituted 3.38% and sigmoid colon constituted upto 27%.

Table-16 : Comparison of Malignancy Causing Intestinal Obstruction in Various Studies

Studies	Incidence
Playforth ³³	9%
Adhikari S et al ²⁸	17%
Harban et al ³⁰	15%
Present study	8%

Graph-15: Comparison of Malignancy Causing Intestinal Obstruction in Various Studies



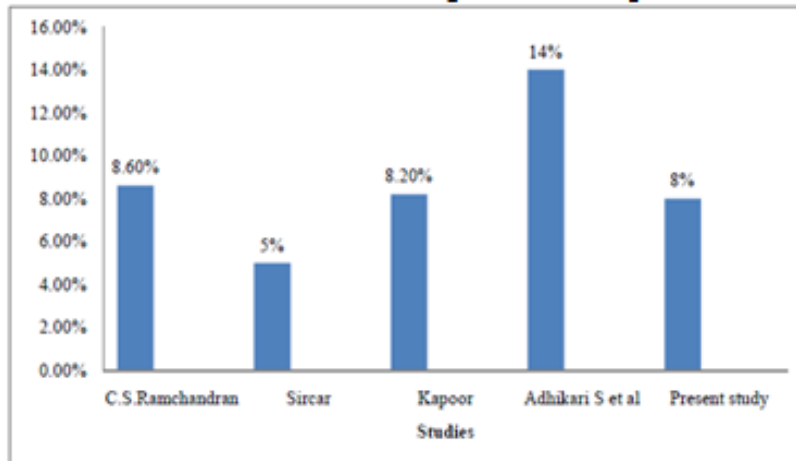
5.3.4 Tuberculosis:

The present study accounted for 8% of tubercular stricture as a cause for intestinal obstruction. It is similar to studies done previously. Kapoor et al⁵⁰ in series managed 109 cases of abdominal tuberculosis out of which 9 cases (8.2%) were purely had acute intestinal obstruction. Sircar⁵¹ series reported to have 5% of cases of abdominal tuberculosis presents with acute intestinal obstruction. Ismail et al⁵² in their study of 75 cases, found tuberculosis in 36% patients, as the main cause of dynamic intestinal obstruction followed by carcinoma of large gut and postoperative adhesions.

Table-17 : Comparison of Intestinal Tuberculosis Causing Intestinal Obstruction in Different Studies

Studies	Incidence
C.S.Ramchandran ³¹	8.6%
Sircar ⁵¹	5%
Kapoor ⁵¹	8.2%
Adhikari S et al ²⁸	14%
Present study	8%

Graph-16: Comparison of Tuberculosis in Different Studies



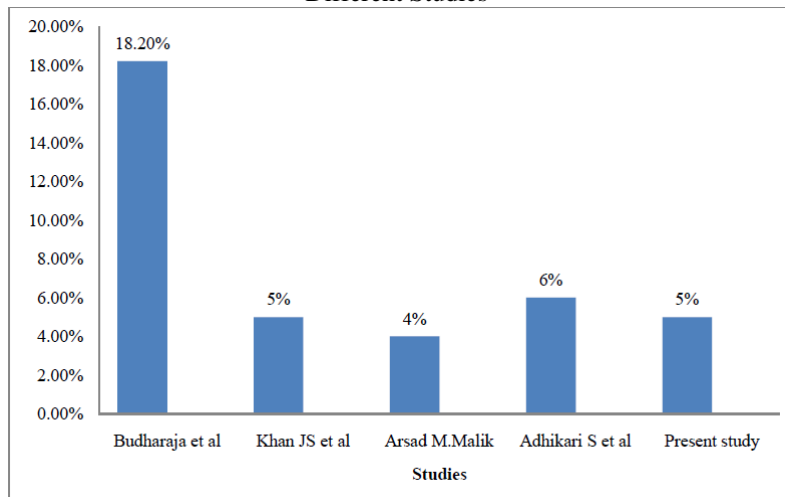
5.3.5 Volvulus:

In the present study, intestinal obstruction related to volvulus constituted for 5%. All of these 5 cases are sigmoid volvulus. Incidence in the present study is similar to studies done by Jahangir sarwar khan²⁹ (5%) and Souvik Adhikari²⁸ (6%). Ramchandran et al³¹ in his study quoted that the volvulus is the second commonest cause of small bowel obstruction which accounted for nearly 24%. Gill²⁷ reported that incidence of volvulus was 25%. A study conducted by Sankaran⁵³ reported 24 cases of volvulus in South india among which sigmoid volvulus accounted for 50% of cases.

Table-18 : Comparison of Volvulus Causing Intestinal Obstruction in Different Studies

Studies	Incidence
Budharaja et al ³⁴	18.2%
Khan JS et al ²⁹	5%
Arshad M.Malik ⁴³	4%
Adhikari S et al ²⁸	6%
Present study	5%

Graph -17: Comparison of Volvulus Causing Intestinal Obstruction in Different Studies



5.3.6 Meckels diverticulum:

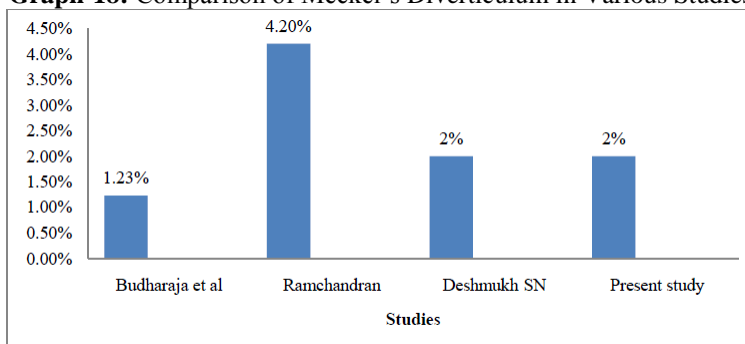
In our study of 100 cases of intestinal obstruction, Meckel’s diverticulum constituted for 2 % of cases. It is comparable to study conducted by Deshmukh SN and Maske AN²⁶ in 50 cases, where incidence of meckel’s diverticulum was 2%.

Budharaja³⁴ reported to have incidence of 1.23% of Meckel’s diverticulum causing intestinal obstruction. Ramchandran³¹ in his series stated that 4.2% of acute intestinal obstruction was due to Meckel’s diverticulum.

Table-19 : Comparison of Meckel’s Diverticulum Causing Intestinal Obstruction in Various Studies

Studies	Incidence
Budharaja et al ³⁴	1.23%
Ramchandran ³¹	4.2%
Deshmukh SN and Maske AN ²⁶	2%
Present study	2%

Graph-18: Comparison of Meckel’s Diverticulum in Various Studies



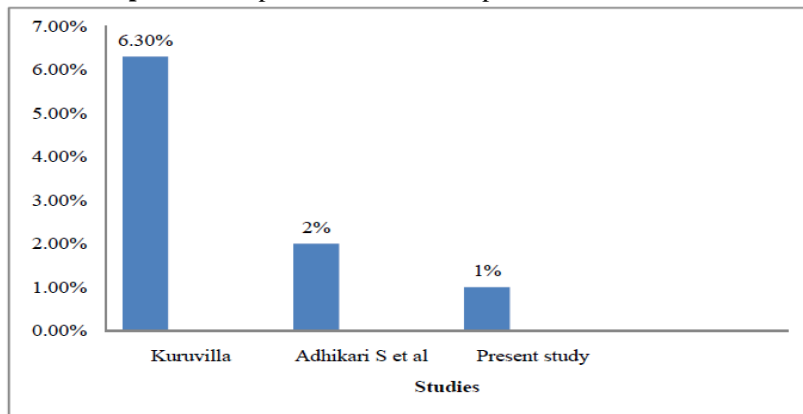
5.3.7 Intussusception:

In the present study of 100 cases of intestinal obstruction, intussusception accounted for 1% which is similar to study done by Adhikari S et al²⁸ (2%). Ti46 revealed in his study of 261 patients the incidence of intussusception accounted for 6.3% of intestinal obstruction. In this 17 cases, 3 were adults. Kuruvilla⁵⁴ in his series found that the incidence of intussusception was 6.3%

Table -20 : Comparison of Intussusception in Different Studies

Studies	Incidence
Kuruvilla ⁵⁴	6.3%
Adhikari S et al ²⁸	2%
Present study	1%

Graph 19: Comparison of intussusception in various studies



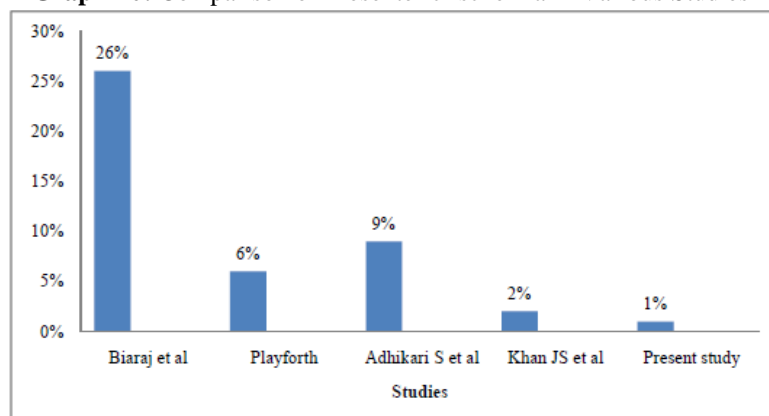
5.3.8 Mesenteric ischemia:

Mesenteric ischemia accounts for 1% of total intestinal obstruction in the present study which is similar to study done by Jahangir Sarwar Khan²⁹.

Table -21 : Comparison of Mesenteric Ischemia in Various Studies

Studies	Incidence
Biaraj et al ⁵⁵	26%
Playforth ³³	6%
Adhikari S et al ²⁸	9%
Khan JS et al ²⁹	2%
Present study	1%

Graph-20: Comparison of Mesenteric Ischemia in Various Studies



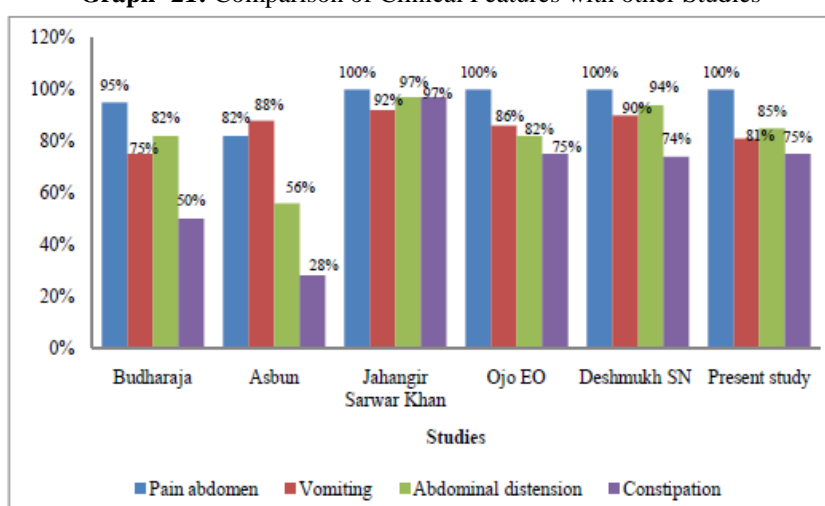
5.3.9 Clinical features:

In the present study of 100 cases of intestinal obstruction, the most common presenting symptom was pain abdomen (100%) followed by distension of abdomen (85%), vomiting (81%) and constipation (75%). Pain abdomen was present in 100% of cases in the present study which was comparable with Jahangir Sarwar Khan²⁹ study group. 81% of cases presented with vomiting which was comparable with Asbun⁵⁶ studies. Budharaja³⁴ in his study reported that symptoms in order of frequency were pain abdomen(95%), followed by distension of abdomen(82%), vomiting(75%) and constipation(50%).

Table-22 : Comparison of Clinical Features with other Studies

Studies	Pain abdomen	Vomiting	Abdominal distension	Constipation
Budharaja ³⁴	95%	75%	82%	50%
Asbun ⁵⁶	82%	88%	56%	28%
Jahangir Sarwar Khan ²⁹	100%	92%	97%	97%
Ojo EO et al ³⁹	100%	86%	82%	75%
Deshmukh SN ²⁸	100%	90%	94%	74%
Present study	100%	81%	85%	75%

Graph- 21: Comparison of Clinical Features with other Studies



5.3.10 Surgical management:

The surgical management in the present study included release of adhesions, release of band, resection and anastomosis, release of constricting ring and hernia repair, resection and ileostomy, colostomy, right hemicolectomy, volvulus derotation and meckel's diverticulectomy. Adhesiolysis was done in 20 cases which include postoperative adhesions and inflammatory adhesions. Release of bands was done in 6 cases. Anatomical hernia repair with resection and anastomosis was done in 9 cases of which 4 cases were strangulated inguinal hernia, 3 cases were strangulated incisional hernia, 1 case of strangulated femoral hernia and 1 case of internal hernia. Only hernia repair was done in 30 cases.

Resection and end to end ileo-ileal anastomosis was done in 7 cases which includes 1 case of mesenteric ischemia, 3 cases of stricture and 3 cases of adhesive obstruction with gangrenous ileum. Resection and jejunio-ileal anastomosis was done in one case of TB stricture and 2 cases of gangrenous small bowel. Ileostomy was done in 2 cases. Resection and ileo-transverse anastomosis was done in ileocaecal growth and TB abdomen. Colostomy was done in 7 cases which includes malignancies and sigmoid volvulus. Resection and colo-colic anastomosis was done in sigmoid volvulus and stricture colon. Volvulus derotation was done in one case of volvulus. Right hemicolectomy was done in Ascending colon growth and ileocolic intussusceptions. Meckel's diverticulectomy in 2 cases.

5.3.11 Complications:

Postoperative complications are commonly noted in obstruction patients. In the present study of 100 cases of intestinal obstruction, wound infection noted in 11 cases, deaths in 8 cases, respiratory infection in 3 cases, prolonged ileus in 4 cases and enterocutaneous fistula in 2 cases.

In the present study, wound infection was the most common post operative complication similar to what was seen in the study done by Jain et al⁵⁷ Deaths occurred due to septicaemia in mesenteric ischemia, strangulated hernia, those who presented late with sepsis and other comorbidities.

5.3.12 Mortality:

Out of 100 cases, 8 died following surgery for intestinal obstruction. The causes of death were

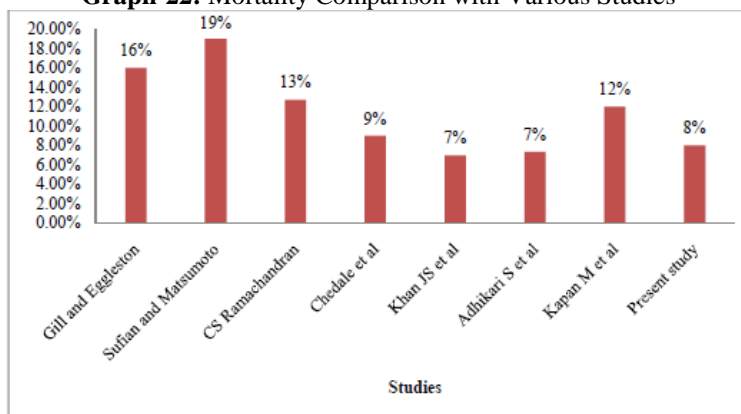
1. Septicemia
2. Multiorgan failure
3. ARDS due to respiratory tract infection

In the present study, mortality rate was 8% which is comparable to studies reported by Khan JS et al²⁹(7%) and Adhikari et al²⁸(7.35%). Mortality rate is much less when compared to study done by C.S.Ramachandran³¹.

Table -23 : Comparison of mortality with various studies

Study group	No of cases	Mortality
Gill and Eggleston ²⁷	147	16%
Sufian Matsumoto ⁵⁸	171	19%
CS Ramachandran ³¹	417	12.7%
Chedale et al ⁵⁹	300	9%
Khan JS et al ²⁹	100	7%
Adhikari S et al ²⁸	367	7.35%
Kapan M et al ⁴⁴	148	12.8%
Present study	100	8%

Graph-22: Mortality Comparison with Various Studies



Out of 8 deaths, 3 cases were strangulated hernias, remaining 5 cases were gangrenous sigmoid volvulus, TB stricture colon, Descending colon carcinoma, rectal growth and adhesive obstruction. Mortality was more in patients who develop strangulation and gangrene of bowel, elderly age group, those who presented late to hospital and in those having preexisting diseases like COPD, respiratory tract infection and diabetes mellitus which led to septicemia and death.

The decrease in overall mortality is due to better understanding of patho-physiology of obstruction, improvement in resuscitative and supportive management, early and aggressive surgical therapy in combination with improved technique in anaesthesia

VI. Summary

Clinical study of 100 cases of intestinal obstruction was done at S.V.R.R.G.G. Hospital, Tirupati between August 2016 and November 2017.

- In our study, intestinal obstruction is more common in the age group of 51- 60 years with male predominance.
- Small bowel obstruction is more common than large bowel obstruction.
- The most common cause of intestinal obstruction in our study was obstructed hernia, as the study was conducted among the rural population, who presented late due to lack of awareness.

- The second common cause was adhesions and bands(36%) followed by Tumours(8%), TB abdomen(8%), Volvulus(5%), Meckel's diverticulum (2%), Intussusception(1%) and Mesenteric ischemia(1%).
- Malignant obstruction was common in large bowel than small bowel.
- Mode of presentation differs at different levels of intestinal obstruction. Abdominal pain was the most common symptom in our study followed by distension, vomiting and constipation.
- Intravenous fluids and electrolytes, gastrointestinal aspiration, antibiotics and then appropriate surgery are still the main stay of treatment.
- The common post operative complication in our study was wound infection and mortality rate was 8%.
- 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

VII. Conclusion

Obstructed hernias are the common cause of intestinal obstruction in our study due to lack of awareness among rural population followed by adhesions and bands with pain abdomen as the most common presenting symptom.

Majority of patients with intestinal obstruction needs surgical relief of obstruction. Clinical, radiological and operative findings put together can bring about the best and accurate diagnosis of intestinal obstruction. Plain x ray is the single most important diagnostic tool for intestinal obstruction. Early recognition and aggressive treatment is needed to prevent gangrenous changes. Prognosis was poor in elderly patients. The most common cause of morbidity and mortality was septicemia, 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 septicemia.

References

- [1]. Nobie B. small bowel obstruction. <http://emedicine.medscape.com/article/774140-overview>.
- [2]. Scott G, Houghton, Antonio Ramos De la Medina, Michael G. Sarr, Maingot's Abdominal Operation, eleventh ed. McGraw Hill, 2007; 479-508.
- [3]. Jones RS. Intestinal obstruction. In: Sabiston DC, Jr. editor. Text book of surgery – The biological basis of modern surgical practice 13th edn. 1986. W.B. Saunders Company, 905-13.
- [4]. Owen H. Wangenstein. Historical aspect of the management of the acute intestinal obstruction. *Surgery* 1969; 63: 363-383.
- [5]. Kloiber H. Die. Roentgen diagnose Des Ileus Ohne Koutrastmittel. *Arch F Klin Chir* 1919; 112-13.
- [6]. Oschner A. X-ray diagnosis of ileus – value of Roentgenogram in simple and strangulated obstruction. *Surg. Gynaecol. Obstet.* 1933; 56: 719.
- [7]. Miller G, Boman J, Shrier I et al. Natural history of patients with adhesive small bowel obstruction. *Br J Surg* 2000; 87: 1240–1247.
- [8]. Akgun y. Mesosigmoidoplasty as a definitive operation in treatment of acute sigmoid volvulus. *Dis Colon Rectum* 1990; 39: 579-81. 72
- [9]. Doanhouse JL, Kelly EC. Intussusception in the adult. *AJS* 1950; 79: 673- 77.
- [10]. Adesunkanmi AR, Agbakwuru EA. Changing pattern of acute intestinal obstruction in tropical African population. *E Afr Med J* 1996; 73(11): 727-31.
- [11]. Chatterjee H, Somasekar SN, Ravishankar N, Madhu CP, Sidesh G, Vasantakumar SB. Adult intussusception. *IJS* 2000; 62(3): 210-12.
- [12]. Lopez-Kostner F, Hool GR, Lavery IC. Management and causes of acute large bowel obstruction. *Surg Clin North Am* 1997; 77(6): 1265-90.
- [13]. Rai S, Chandra SS, Smile SR. A study of risk strangulation and obstruction in groin hernias. *Aust NZJ Surg* 1998; 68 (9): 650-54.
- [14]. Decker GAG. Lee McGregor's Synopsis of Surgical Anatomy. 12th ed, Reprint 1999; 22-61.
- [15]. Richard L Drake, Wayne Vogl A, Adam WM Mitchell. Abdomen. 2nd ed. Chapter 4. In: Gray's Anatomy for students. Philadelphia: Churchill Livingstone Elsevier; 2010. p. 300.
- [16]. Russel RCG. Intestinal obstruction. Chapter 69, Bailey and Love's Short Practice of Surgery, 25th ed, Arnold Publishers 2008; PP 1188-1203.
- [17]. Baig MK, Wexner SD. Postoperative ileus: A review. *Dis Colon Rectum* 2004; 47: 516–526 [PubMed: 14978625] 73
- [18]. Soo Y Kim, Jon B Morris. Small bowel obstruction. 6th ed. Chapter 68. In: Shackel Ford's Surgery of the alimentary tract, Charles J Yeo, ed. Philadelphia: Saunders Elsevier; 2007. pp. 1025-33.
- [19]. Vanderwolk WE, Synder CA, Figg DM. Caecal-Colic adult intussusceptions as a cause of intestinal obstruction in central Africa. *World Jr. Surg* 1996; 20(3): 341-44.
- [20]. Gleeson JA. The small intestine. *Radiology and Imaging*. David Sutton, 6th ed, 2: 1998; 863-890.
- [21]. Young WS, Engelbrecht HC, Stroker A. A plain film analysis in sigmoid volvulus. *Clin Radiol* 1978; 29: 553.
- [22]. Assalia A, Schein M, Kopelman D, et al: Therapeutic effect of oral Gastrografin in adhesive, partial small-bowel obstruction: A prospective randomized trial. *Surgery* 1994; 115: 433-437.
- [23]. Okada T, Yoshida H, Iwai J et al. Pulsed Doppler sonography for the diagnosis of strangulation in small bowel obstruction. *J Pediatr Surg* 2001; 36: 430–435.
- [24]. Maglente DDT, Gage SN, Harmon BH, et al: Obstruction of the small intestine: Accuracy and role of CT in diagnosis. *Radiology* 1993; 186: 61-64.
- [25]. Pujari. Sigmoid volvulus. Recent advances in Surgery. Roshanlal Gupta Vol. 4, PP 124-132. 74
- [26]. Deshmukh SN, Maske AN. Pattern of dynamic intestinal obstruction in adults at tertiary care centre. *IJS* 2016 May; 3(2): 492-496.
- [27]. Gill SS, Eggleston FC. Acute intestinal Obstruction. *Arch Surg* 1965; 91: 389- 92
- [28]. Souvik Adhikari, Mohammed Zahid Hossein, Amitabha Das, Nilenjan Mitra, Udipta Ray. Etiology and outcome of acute intestinal obstruction: A review of 367 patients in Eastern India. *The Saudi Journal of Gastroenterology* 2010; 16(4): 285-7.

- [29]. Jahangir Sarwar Khan, Junaid Alam, Hamid Hassan, Mohammed Iqbal. Pattern of intestinal obstruction a hospital based study. Pakistan Armed Forces Medical Journal 2007 Dec 4.
- [30]. Harban Singh et al. Acute intestinal obstruction: A review of 504 cases. JIMA.1973; 60 (12): 455-460.
- [31]. Ramachandran CS. Acute intestinal obstruction: 15 years experience. IJS 1982 Oct-Nov; 672-679.
- [32]. Cole GJ. A review of 436 cases of intestinal obstruction in Ibanan. Gut 1965; 6:151-162.
- [33]. Playforth RH et al. Mechanical small bowel obstruction and plea for the earlier surgical intervention. Ann Surg 1970; 171: 783-788. 75
- [34]. Budharaja et al. Acute intestinal obstruction in Pondicherry. IJS 1976 March;38 (3): 111.
- [35]. Sufian, Sharkeed et al. Intestinal obstruction. Am J Surg 1975; 130 (1).
- [36]. Fuzan M, Kaymake E, Harmancioglu O, Astarcioglu K. Principal causes of mechanical bowel obstruction in surgically treated adults in Western Turkey. BJS 1991; 78: 202-03.
- [37]. Lee SH, Ong ETL. Changing pattern of intestinal obstruction in Malayasia – a review of 100 consecutive cases. BJS 1991; 78:181-182.
- [38]. Ullah S, Khan M, Mumtaz N, Naseer A. Intestinal obstruction: A spectrum of causes. J Postgrad Med Inst 2009;23:186-92.
- [39]. Ojo E.O, C.H Ihezue, A.Z Sule, O.B Ismaila, A.M Dauda, A.A Adejumo (2014). Aetiology, clinical pattern and outcome of adult intestinal obstruction in jos, north central Nigeria. Afr J Med Med Sci. Sep;43(1): 29–36.
- [40]. Michel ML Jr, Knapp L. Davidson A. Acute intestinal Obstruction; Comparative studies of small intestinal and colic obstruction. Surg 1950; 28:90- 110.
- [41]. Becker WF. Acute obstruction of colon – An analysis of 205 cases. Surg. Gynaec. Obsetet.1953.96: 677-682.
- [42]. Markogiannakis H, Messaris E, Dardamanis D, spectrum of mechanical Intestinal Obstruction: A study at Lahore Garrison. Pak Armed Forces al. 76 Acute mechanical bowel obstruction:clinical presentation, etiology, management &outcome World J Gastroenterol 2007;13(3): 432-7.
- [43]. Malik AM, Shah M, Pathan R, Sufi K. Pattern and acute intestinal obstruction: Is there a change in the underlying etiology? Saudi J Gastroenterol 2010;16:272-4.
- [44]. Kapan M, Onder A, Polat S, Aliosmanoglu I, Arikanoglu Z, Taskesen F, Girgin S. Mechanical bowel obstruction and related risk factors on morbidity and mortality. Journal of Current surgery. 2012; 2(2):55–61.
- [45]. Brooks VLH, Butler A. Acute intestinal obstruction in Jamaica. Surg Gynaec Obstet 1996; 122: 261 264.
- [46]. Ti TK, Young NK. The pattern of intestinal obstruction in Malaysia. BJS 1976; 63: 963-5.
- [47]. Jain BL, Prasad N. Intestinal obstruction. IJS 1963; 25:635.
- [48]. Duron JJ, Silva NJ, Montcel ST, Berger A, Muscari F, Hennet H, et al. Adhesive postoperative small bowel obstruction: incidence and risk factors of recurrence after surgical treatment: a multicenter prospective study. Ann Surg. 2006;244(5):750-7.
- [49]. Thompson RW, James BD, Mark MD. Obstructing adenocarcinoma of right side of the colon. Arch Surg. 1968;96:100-3.
- [50]. Kappor VK, Gupta S, et al. Acute tubercular abdomen. IJS 1991; 53:71. 77
- [51]. Sircar S, Taneja VA, Kanasara U. Clinical presentation of abdominal tuberculosis - A prospective study. IMA. 1996;94(9):342-4.
- [52]. Ismail, Khan M, Shah A, Ali N. Pattern of dynamic intestinal obstruction in adults. J Postgrad Med Ins 2005; 19: 157-61.
- [53]. Sankaran V. Volvulus in South India. IJS 1962: 784-90.
- [54]. Kuruvilla MJ, Challengi CR, Rajagopal AK, Rakas JS. Major causes of intestinal obstruction in Libya. BJS. 1987;74:314-5.
- [55]. Biarj Tiddle et al. Complications and death after surgical treatment of small bowel obstruction. Ann Surg 1999; 231 (4): 297-306.
- [56]. Asbun HJ, Perpinello C, et al. Small bowel obstruction and its management. Int surg 1989;74:2-27.
- [57]. Jain BK, Arora H, Srivastava UK, Mohanty D, Garg PK. Insight into the management of non-traumatic perforation of the small intestine. J Infect Dev Ctries 2010;4:650-4.
- [58]. Sufian S, Matsumoto T. Intestinal obstruction. Am J Surg 1975; 130: PP 9- 14.
- [59]. Chedale WG et al. Acute bowel obstruction Ann Surg 1998; 54: 565.

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