

DOI: 10.36648/2254-6758.8.4.130

# A Study of Clinical Profile and Surgical Management of Dynamic Intestinal Obstruction in a Tertiary Care Hospital in Karnataka, India

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## Abstract

**Background:** Bowel obstruction is one of the most common intra-abdominal problems faced by general surgeons. This study is designed to assess epidemiology, clinical presentation, diagnostic modalities of dynamic (mechanical) intestinal obstruction and the outcome of surgical management of the same.

**Methods:** After ethical committee approval and informed consent, a total of 48 patients who presented to Yenepoya Medical College Hospital, Mangalore, Karnataka with dynamic intestinal obstruction were selected. All surgically managed cases of dynamic obstruction above the age group of 18 years were included. Patients less than 18 years of age and those managed conservatively were excluded.

**Results:** It was found that the mean age at presentation was 48.54 years with females (52.1%) being more commonly affected. Pain (100%) was the most consistent symptom, and tenderness (91.7%) the commonest sign noted, with Contrast CT abdomen being diagnostic in 100% of cases. Total Leukocyte count or CRP was not found to be reliable indicators to predict patient outcome. CEA had a significant correlation with a diagnosis of malignant obstruction. Emergency diversion colostomy or ileostomy (35.4%) was the commonest surgical procedure performed followed by adhesiolysis (16%). Malignancy (41.7%) was the commonest cause followed by Adhesions (14.6%) and Obstructed Hernia (14.6%).

**Conclusions:** Abdominal pain with tenderness on examination was the most common presentation. Total Leukocyte Count and CRP were found to be unreliable as severity indicators, whereas CECT Abdomen was conclusive in all cases. Malignant obstruction was the leading cause in this study. The initial surgical management commonly involved a diversion procedure, with good outcome.

**Keywords:** Obstruction; Adhesions; Colostomy; Hernia; Carcinoma

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**Citation:** Syam D, Badekila H, Francis J (2020) A Study of Clinical Profile and Surgical Management of Dynamic Intestinal Obstruction in a Tertiary Care Hospital in Karnataka, India. J Univer Surg. Vol.8 No.4:4

**Received:** August 01, 2020; **Accepted:** August 25, 2020; **Published:** September 01, 2020

## Introduction

In a history spread over 300 years of bowel surgery, Alexis Littre, a French Physician and Anatomist was the first to suggest the possibility of performing a colostomy for an obstruction of the colon in his 1710 treatise *Diverses observations anatomiques* [1]. The trends in causes of mechanical obstruction have changed over time, over geographical regions and depending on cultural

dietary norms and habits. A mechanical or dynamic intestinal obstruction is defined as a physical blockage of the intestinal lumen that can be intrinsic or extrinsic to the wall of the intestine or secondary to intraluminal contents. This study is designed to assess epidemiology, clinical presentation and diagnostic modalities of dynamic intestinal obstruction and to assess the outcome of surgical management of the same [2].

## Research Methodology

A total of 48 patients of dynamic intestinal obstruction were studied from November 2017 to June 2019 in Yenepoya Medical College Hospital, Mangalore, Karnataka.

### Inclusion criteria

- Patients coming to the hospital with features suggestive of acute intestinal obstruction who underwent surgical management.
- Age group above 18 years.
- Written informed consent.

### Exclusion criteria

- Patients with functional/pseudo obstruction were excluded.
- Cases managed conservatively.

All patients with features of intestinal obstruction were evaluated; and epidemiological and clinical data were collected. After a focused diagnostic work up and stabilization, patients were taken up for surgery. A two month follow up was done post procedure in the department of General Surgery, following which the patient's data was collected with the help of Department of Oncology up to 1 year.

## Results

### Epidemiology

It was found that the mean age at presentation was 48.54 years with a standard deviation of 15.809. Majority of cases were within the range of ages 31-50 years. 52.1% patients were females, affected by intestinal obstruction (Figures 1 and 2).

### Cause of obstruction

Malignancy was found to be the commonest cause of intestinal obstruction (41.7%). Among the benign causes, both Adhesions and Obstructed hernias were found to be equally prevalent (14.6%); Sigmoid Volvulus caused 10.4% of cases. Other causes of obstruction included- Ileal stricture, Ileo-ileal Intussusception, Ileo-colic Intussusception, Crohn's inflammatory stricture, Ileo-ileal knotting and Meckel's diverticulitis causing small bowel obstruction with a frequency of 1 each, contributing to 18% of the cases (Table 1).

Malignancy was the commonest cause of obstruction in the age above 50 years. It was also the commonest cause in 31-50 years, closely followed by adhesive obstruction (Table 2).

Commonest cause in both males and females was malignant obstruction, with 12 out of 20 cases reported in females. Adhesive obstruction was seen mostly in males, when compared to obstructed hernia which was noted more in females (Table 3).

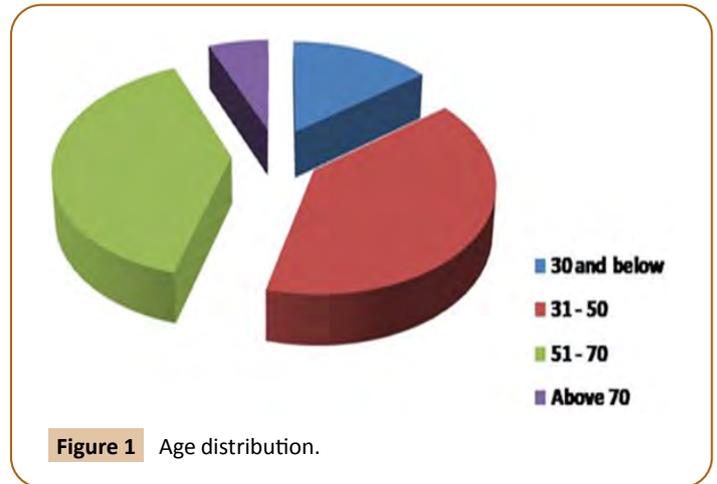


Figure 1 Age distribution.

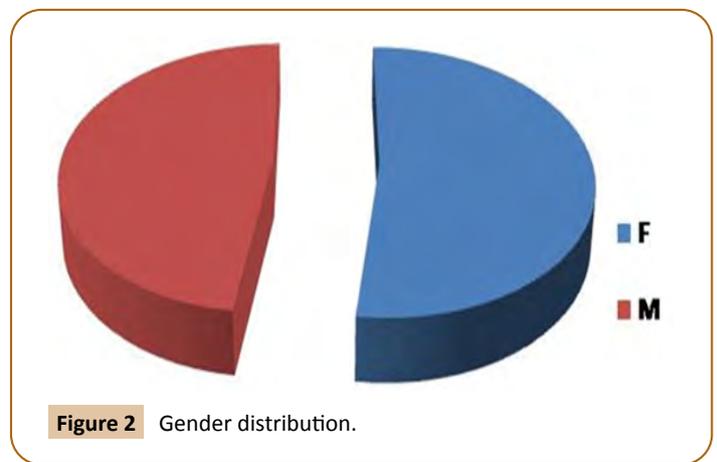


Figure 2 Gender distribution.

Table 1 Cause of dynamic obstruction.

Diagnosis	Number of Cases	Percentage
Carcinoma	20	41.7
Volvulus	5	10.4
Adhesions	7	14.6
Hernia	7	14.6
Others	9	18.8
<b>Total</b>	<b>48</b>	<b>100</b>

Table 2 Relationship of age group to cause of obstruction.

Diagnosis	Carcinoma	Volvulus	Adhesions	Hernia	Others	
Age (years)	<30	3	1	0	0	3
	31-50	7	2	6	1	3
	51-70	9	2	0	5	3
	>70	1	0	1	1	0
<b>Total</b>	<b>20</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>9</b>	

Table 3 Relationship of gender to cause of obstruction.

Diagnosis	Carcinoma	Volvulus	Adhesions	Hernia	Others	
Gender	Female	12	2	3	5	3
	Male	8	3	4	2	6
<b>Total</b>	<b>20</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>9</b>	

### Symptomatology of intestinal obstruction

It was observed that Pain was a consistent symptom in all cases,

closely followed by Distension of the abdomen (89.6%). Other symptoms included Constipation (85.4%), Diarrhoea (16.7%) and Vomiting (54.2%) at the time of presentation to the hospital. About 85.4% gave history of constipation, whereas 16.7% had diarrhoea. About 54.2% cases had vomiting at the time of presentation to our hospital.

Tenderness and a distended abdomen were noted in 91.7% and 87.5% respectively, which corresponded to the history of pain and abdominal distension. Clinically detectable free fluid was present in only 35% of patients. Exaggerated bowel sound was not a demonstrable sign, since it was not found in 77.1% of patients with intestinal obstruction (Figures 3 and 4).

### Correlation between blood investigations

Statistical analysis revealed that Total Count was not a reliable blood investigation, and was found to be normal in most cases. However, CRP, a marker of acute inflammation, was raised in 60% of malignant conditions and 71.4% of benign causes of obstruction. CEA, a known tumour marker of colo-rectal malignancy, was found to be elevated in 80% of malignant intestinal obstruction (Table 4).

### Role of radiological investigations

An Erect X-ray abdomen performed in the ER was the primary assessment tool, which pointed towards intestinal obstruction. The classical sign of multiple air fluid levels was seen in all 48 cases. A very specific diagnosis of Sigmoid Volvulus was made in significant number of cases with the help of the Coffee Bean sign, which was demonstrable in 4 out of 5 cases. Ultrasound abdomen could detect dilated bowel loop- whether small or large bowel, and identify obstructive lesions such as malignancy or stricture in 88.8% of cases. CECT abdomen was found to be the investigation of choice to detect the exact cause of obstruction with an accuracy of 100% in this study (Table 5).

### Operative intervention

Majority of patients (35.4%) underwent an emergency diversion procedure, like colostomy or ileostomy to relieve obstruction. Adhesiolysis was performed in 16% of cases which corresponds to the cases in which adhesions formed the cause of obstruction.

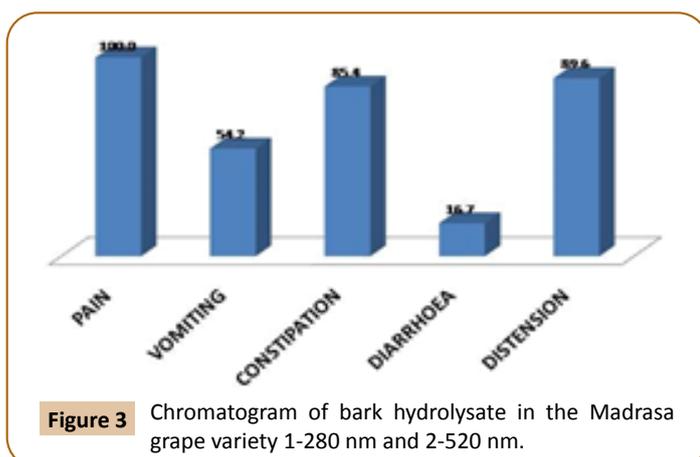


Figure 3 Chromatogram of bark hydrolysate in the Madrasa grape variety 1-280 nm and 2-520 nm.

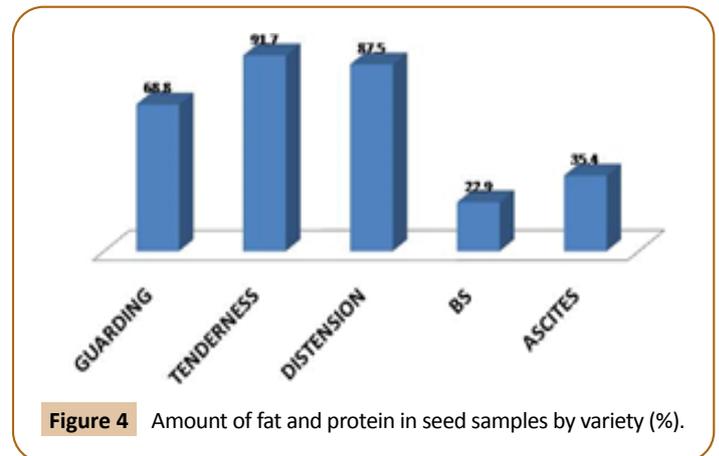


Figure 4 Amount of fat and protein in seed samples by variety (%).

Resection- anastomosis with or without a covering stoma formed the next common procedure performed in 22.9% cases (Figures 5 and 6).

### Post-operative complications

The commonest complication was wound infection, with no complication in nearly 80% of the cases (Table 6).

### Follow up

Out of 17 patients who underwent an initial diversion procedure, 11 underwent resection-anastomosis of the obstructed bowel as a definitive surgical procedure subsequently. 8 cases were malignant, and the patients were followed up by an Oncologist with chemotherapy. All of them responded well except one patient who was lost to follow up. 3 patients with benign stricture underwent reversal of stoma after 6 weeks and had an uneventful post-operative period. Six patients who underwent only a diversion procedure were found to have advanced malignancy at presentation and no further surgical interventions were performed on the same.

### Discussion

In a study by Tiwari et al. in 2017, Maharashtra, 15% of the total patients belonged to age groups 18-28 and 29-39 each, while the maximum representation was from age group 51-61 i.e., 15 (25%). In the same study, 65% were males. Another study done in Calcutta showed an increased male preponderance with most in the age group of 40-50 years. In our study, majority of cases were within 31-50 years of age with a female preponderance [3].

In a study conducted by Souvik et al. in 2010 in East India, the commonest cause of obstruction was obstructed hernia (35.96%), followed by malignancy and post-operative adhesions. In another study conducted by Tabrez et al. 20% patients suffered from Malignancy, 10% from Obstructed Hernias, 10% from Meckel's Diverticulum, 6.6% patients suffered from Adhesions whereas, Tuberculosis and Volvulus caused 3.3%. In our study Malignancy was found to be the commonest cause of intestinal obstruction. Among benign causes, both adhesions and obstructed hernias were found to be equally prevalent [4].

On comparing the distribution of causes across age groups it was noted that malignancy was seen commonly in the elderly-consistent with general population data. Our study identified a

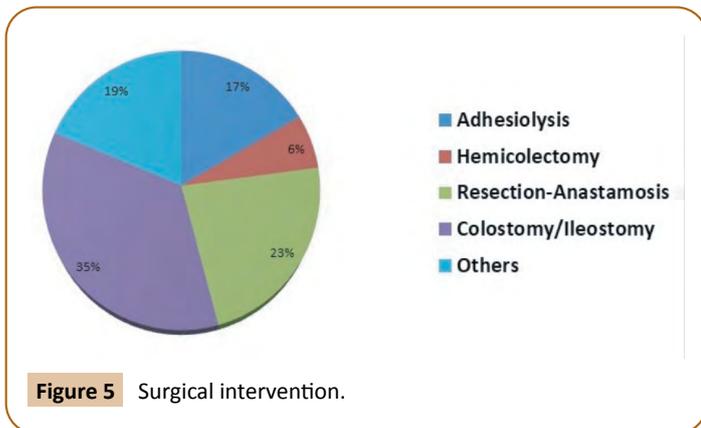
**Table 4** Laboratory investigations.

Blood Investigation	Malignant (20)	Percentage	Benign (28)	Percentage	P-Value	Inference
Total Count (TC)	13	65	15	53.5	0.922	Not significant
C-Reactive Protein (CRP)	12	60	20	71.4	0.01	Significant
Carcino Embryonic Antigen (CEA)	16	80	2	7.14	0	Highly Significant

**Table 5** Radiological investigations.

Investigations	Percentage	Conclusion
<b>X-ray Abdomen</b>	Air fluid levels	100
	Coffee bean sign in Volvulus	90
<b>Ultrasound Abdomen</b>	Dilated bowel loops	100
	Free fluid in abdomen	20
	Growth/Stricture	88.8
<b>CECT Abdomen</b>	Transition point	59
	Cause of obstruction	100

Effect X-ray abdomen could detect all cases of intestinal obstruction.  
Commonest finding in USG abdomen was dilated bowel loops. Growth/Stricture could be seen in 88% of cases with obstruction.  
CECT abdomen detected the cause of obstruction in all cases.



**Table 6** Post-operative complications.

Complications	Number of Cases	Percentage
Wound infection	9	18.7
Burst abdomen	0	0
EC Fistula	0	0
SIOMA Complication	1	2.08
Death	0	0
None	38	79.1

Statistical analysis revealed that Total Count is not a reliable blood investigation, and is found to be normal in most cases. However, CRP, a marker of acute inflammation, was raised in 60% of malignant conditions and 71.4% of benign causes of obstruction. CEA, a known tumour marker of colo-rectal malignancy, was found to be elevated in 80% of malignant intestinal obstruction [3].

Erect X-ray of the abdomen showing multiple air fluid levels followed by confirmation with CECT abdomen can be considered the diagnostic tool for intestinal obstruction as per our study, which is consistent with various studies [6].

Depending on the commonest cause, the surgical procedure undertaken has been different in various studies. In a study by Souvik et al. commonest cause was adhesions, but the commonest surgery performed was Resection-Anastomosis, followed by adhesiolysis. In a study by Souvik et al. Strangulated Hernia was the commonest etiology, managed both by Resction-Anastomosis and Hernioplasty in some cases. Resection-Anastomosis has been the commonest surgery performed in Tabrez et al. study as well. In our study, the commonest cause was a Malignant Obstruction, which required an emergency diversion colostomy/ileostomy [7].

The commonest complication has been wound infection, which may be explained by the urgent nature of the procedure along with the high risk of contamination in a setting of obstruction (Class 3 and 4 wounds with higher rate of infection). Most patients presented with advanced malignancy which in itself is an immune compromised state, contributing to reduced wound healing and increased wound infection. Mortality rate in this study is nil, compared to other studies.



**Figure 6** Intra operative pictures (From left to right) - Wilkie's syndrome/SMA syndrome causing duodena obstruction, Sigmoid Volvulus, Crohn's ileal stricture.

higher incidence of malignant obstruction in women compared to men.

Pain and Tenderness were more consistent observations in our study, whereas in a study by Tiwari et al. (90%) patients presented with Distension, with the other common symptoms being Constipation. In a study by Chandak et al. in Wradha, Tenderness and Guarding followed by absent bowel sounds (in 50%) were the common signs [5].

## Conclusion

Our study concluded that Malignancy was the commonest cause of Dynamic Intestinal Obstruction- presenting with pain as the commonest symptom, with a tender abdomen on clinical examination. Erect X-ray abdomen showing multiple air fluid levels

followed by a CECT abdomen helped in confirming diagnosis in all cases. Majority of the cases were surgically managed by creating a diversion colostomy and on follow-up patients recovered well with minimal complications. However, a larger study is needed to draw a definitive conclusion as the number of cases in our study is limited.

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