

## Causes of mechanical intestinal obstruction – A cross sectional study

Shawana Asad, Hina Rafaqat, Mir Jalal-ud-din, Sher Ali Khan, Bilawal Gul, Danish Zafar

### Abstract:

**Background and Objectives:** Intestinal obstruction remains one of the commonest causes of acute abdomen worldwide. The causes and patterns of intestinal obstruction varies from one place to another. This study was conducted to determine the frequency of different causes of mechanical intestinal obstruction presenting to a tertiary care facility.

**Material and Methods:** This cross-sectional study was carried out in the Department of General Surgery of Ayub Teaching Hospital Abbottabad from February 2021 to December 2021. The study population included patients diagnosed with mechanical intestinal obstruction of either gender and age from 15 years to 70 years on the basis on non-probability consecutive sampling. The data was collected through a structured pro forma and analysed using SPSS-22. **Results:** Mean age of the patients was  $38.69 \pm 12.72$  years. Mean duration of complaints was  $35.14 \pm 31.355$  days. 115 (50.9%) of the patients were male and 111 (49.1%) were female. 80 (35.4%) had adhesions, 34 (15.0%) had volvulus, 37 (16.4%) had hernia, 19 (8.4%) patients had malignancy.

**Conclusion:** Adhesions and tuberculosis are leading causes of intestinal obstruction.

**Keywords:** Mechanical intestinal obstruction, malignancy, adhesion, hernia, volvulus

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### Ayub Teaching Hospital, Abbottabad

S Asad  
H Rafaqat  
D Zaffar

### Women Medical College, DHQ Teaching Hospital, Abbottabad

MJ uddin  
SA Khan

### Institute of Kidney diseases, Peshawar

B Gul

### Correspondence:

Dr Danish Zafar,  
Associate Professor,  
Department of  
Ophthalmology,  
Ayub Teaching Hospital,  
Abbottabad  
Cell No: +92 315-9119555  
email: deezafar.dz@gmail.  
com

### Introduction:

Acute intestinal obstruction can either be mechanical or functional obstruction of the small or large intestines.<sup>1</sup> The obstruction occurs when the lumen of the bowel becomes either partially or completely blocked. Obstruction frequently causes abdominal pain, nausea, vomiting, constipation-to-obstipation, and distention.<sup>2,3</sup>

The small bowel is involved in approximately 80% of cases of mechanical intestinal obstruction.<sup>4</sup> Mechanical small bowel obstruction is caused by intraluminal or extraluminal mechanical compression. In developed countries, adhesion is the most common cause, followed by hernias, malignancies, and various other infectious and inflammatory disorders.<sup>5</sup> However, in undeveloped countries, hernia is still the most common etiology of intestinal obstruction and post-operative adhesions increase annually.<sup>6</sup> It

is estimated that at least two-thirds of patients with previous abdominal surgery have adhesions. less common but still prevalent extrinsic causes are inguinal and umbilical hernias. Other causes of small bowel obstruction include intrinsic disease, which can create an insidious onset of bowel wall thickening. The bowel wall slowly becomes compromised, forming a stricture. Crohn's disease is another common cause of benign stricture seen in the adult population.<sup>7</sup>

Intraluminal causes for small bowel obstruction are less common. This process occurs when there is an ingested foreign body that causes impaction within the lumen of the bowel or navigates to the ileocecal valve and is unable to pass, forming a barrier to the large intestine. However, it is noted that most foreign bodies that pass through the pyloric sphincter will be able to pass through the rest of the gastrointestinal

Table 1: Hernia prevalence according to age groups

Age group	Hernia		Total	P- value
	Yes	No		
15 - 30 years	18 (8.0%)	53 (23.5%)	71 (31.4%)	0.009
31 - 45 years	9 (4.0%)	90 (39.8%)	99(43.8%)	
46 - 60 years	6 (2.7%)	39 (17.3%)	45 (19.9%)	
Above 60 years	4 (1.8%)	7 (3.1%)	11 (4.9%)	
Total	37 (16.4%)	189 (83.6%)	226 (100.0%)	

Table 2: Prevalence of volvulus according to age groups

Age group	Volvulus		Total	P- value
	Yes	No		
15 - 30 years	17 (7.5%)	54 (23.9%)	71 (31.4%)	0.062
31 - 45 years	9 (4.0%)	90 (39.8%)	99(43.8%)	
46 - 60 years	6 (2.7%)	39 (17.3%)	45 (19.9%)	
Above 60 years	2 (2.9%)	9 (4.0%)	11 (4.9%)	
Total	34 (15.0%)	192 (85.0%)	226 (100.0%)	

Table 3: Frequency of intestinal Tuberculosis according to age groups

Age group	Intestinal Tuberculosis		Total	P- value
	Yes	No		
15 - 30 years	15 (6.6%)	56 (24.8%)	71 (31.4%)	0.566
31 - 45 years	15 (6.6%)	84 (37.2%)	99(43.8%)	
46 - 60 years	11 (4.9%)	34 (15.0%)	45 (19.9%)	
Above 60 years	2 (2.9%)	9 (4.0%)	11 (4.9%)	
Total	43 (19.0%)	183 (81.0%)	226 (100.0%)	

Table 4: Frequency of adhesions according to age groups

Age group	Adhesion		Total	P- value
	Yes	No		
15 - 30 years	27 (11.9%)	44 (19.5%)	71 (31.4%)	0.310
31 - 45 years	39 (17.3%)	60 (26.5%)	99(43.8%)	
46 - 60 years	11 (4.9%)	34 (15.0%)	45 (19.9%)	
Above 60 years	3 (1.3%)	8 (3.5%)	11 (4.9%)	
Total	80 (35.4%)	146 (64.6%)	226 (100.0%)	

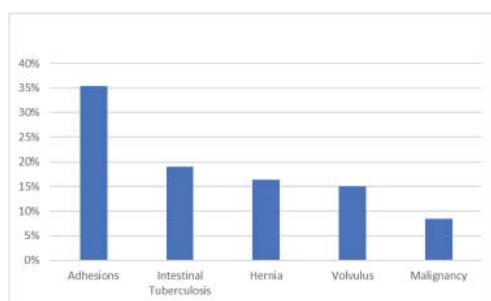


Figure 1. Frequency of causes of Intestinal Obstruction

tract. LBOs are less common and compromise only 10% to 15% of all intestinal obstructions. The most common cause of all LBOs is adenocarcinoma, followed by diverticulitis and volvulus. Colonic obstruction is most commonly seen in the sigmoid colon.<sup>8</sup>

The exact cause of intestinal obstruction can influence the prognosis of patient; There is paucity of data on this subject in this local population henceforth, a study needs to be investigated to clarify the trend towards etiology of the intestinal obstruction and make diagnosis more specifically to certain patients, leading to a better prognosis. Results of this study will provide the real picture of these factors in our local population and pave the way for further research in this aspect.

**Material and Methods:**

This was a hospital based cross-sectional study conducted in the Department of Surgery, Ayub Teaching Hospital, Abbottabad from February to December 2021. A total of 226 patients of either gender and age from 15 to 70 years were included in the study. All patients who were diagnosed with intestinal obstruction in the OPD, emergency and referrals from other units were included in the study and those who have non mechanical intestinal obstruction and who responded to conservative treatment were excluded. A detailed explanation about the participation in the study was given to the patient and a written informed consent was obtained explaining the benefits of the study. Patients were evaluated by detailed history, clinical examination and basic demographics like age, gender and duration of complaints. Physical examination was done for hernia assessment. Ultrasound was performed to assess volvulus. Laparotomy was performed and biopsy was taken where required for histopathological confirmation. Data regarding causative factors (adhesion, intestinal tuberculosis, volvulus, hernia and malignancy) was noted as per operational definition on specially designed proforma. Data was analysed with statistical analysis program (SPSS-version-22).

### Results:

A total of 226 patients were selected to determine the frequency of factors leading to mechanical intestinal obstruction presenting to this tertiary care facility. Mean age of the patients was  $38.69 \pm 12.720$  ranging from (15 to 70 years) and mean duration of complain was  $35.14 \pm 31.355$  ranging from (2 to 120 days), there were 115 (50.9%) males and 111 (49.1%) females. 170 (75.2%) presented with less than 1-month duration of pain, 37 (16.4%) had 1 to 2 months' duration and 19 (8.4%) had 3 to 4 months' duration of complaints. 80 (35.4%) patients had adhesions, 43 (19.0%) had intestinal tuberculosis, 34 (15.0%) had volvulus, 37 (16.4%) had hernia and 19 (8.4%) had malignancy (Figure 1). Patients found with malignancy below 1-month duration were 4 (1.8%), 1 to 2 months duration were 10 (4.4%) and 3 to 4 months duration were 5 (2.2%) while remaining 207 had no malignancy as this finding is statistically significant at  $p=0.000$ , out of total 226 patients. Frequency of risk factors according to age distribution is shown in tables 1,2 and 3.

### Discussion:

Intestinal obstruction was an important surgical problem in past and it continues to be an important and potentially fatal cause in future. Adhesions and tuberculosis are the important and major causes of intestinal obstruction in Pakistan. Tuberculosis is still prevalent all over the world, although its incidence is falling globally but in underdeveloped and developing third world, the disease persists due to overcrowding and malnutrition.<sup>9</sup> Results of this study also show that main causes for intestinal obstruction were adhesions and intestinal tuberculosis.

This study shows that age range of the patients was 15 to 70 years which is almost similar to the study conducted by Asad S et al,<sup>10</sup> 71 (31.4%) were in age group of 15 to 30 years, 99 (43.8%) from 31 to 45 years, 45 (19.9%) were from 46 to 60 years and 11 (4.9%) were above 60 years. Frequency of adhesions in our patients was 35.4%, this is comparable to study conducted by Ahmad R et al (28%),<sup>11</sup> Mohamed AY et al (45%)<sup>12</sup> and Asad et al 36%.<sup>10</sup> Increasing role of adhe-

sions needs steps to be taken during surgery to help prevent adhesion formation. In an autopsy study of 752 cadavers, adhesions were found in 67% in those that had previous abdominal surgery.<sup>13</sup> Another detailed study on intestinal obstruction reported 12 (10.4%) of 115 patients who had undergone first-time laparotomies had adhesions. They further noticed that of the 210 patients who previously had surgery, 195 (93%) were found at laparotomy to have intra-abdominal adhesions that were because of their previous surgery.<sup>14</sup> These both figures do not match our figures because we did not divide patients in groups of first-time laparotomy and re-laparotomy and this is the limitation of our study.

Incidence of intestinal obstruction due to tuberculosis ranges from 12-60%.<sup>15</sup> In India, 3 - 20 % of the intestinal obstructions are due to various forms of tuberculosis.<sup>16</sup> In our study the frequency of intestinal tuberculosis in patients was 19.0% ( $n=43$ ) and this falls in same range as that in India that is 3-20%, as both are underdeveloped and poor countries. Our results for intestinal tuberculosis are also similar to previous study conducted in same region by Asad S et al.<sup>10</sup>

Volvulus is another important cause for acute large bowel obstruction (colonic). 15% of our intestinal obstruction cases were due to volvulus. Colonic volvulus is endemic in Africa, South America, Russia, Eastern Europe Middle East, India and Brazil. Incidence in these regions is 13 to 42%.<sup>17</sup>

Hernia contributed 16.4% of intestinal obstruction in our patients which is comparable to study conducted by Bankole et al,<sup>18</sup> there results show that hernia caused intestinal obstruction in 15.2% of the cases.

This study shows the frequency of malignancy in patients was 8.4% ( $n=19$ ). Malignancy can be primary or metastatic which obstructs the intestinal tract. The results of our study regarding malignancy are almost similar to the study conducted by Asad S et al.<sup>10</sup> The overall incidence of tumoral intestinal obstruction is 3%.<sup>17</sup>

This difference in results can be due to different geographical distribution and different dietary habits.

### Conclusion:

The results of our study concluded that the adhesions and tuberculosis are top most frequent causes of mechanical intestinal obstruction in our region. Although some patients can be treated conservatively, but majority requires immediate surgical intervention. Steps should be taken to prevent adhesion formation during surgery like gentle handling of tissues, using starch-free and latex-free gloves, not allowing tissues to dry out, and shortening of surgery time. Similarly, tuberculosis control programs should also be more activated.

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### Role and contribution of authors:

Shawana Asad, collected the data, references and did the initial writeup.

Hina Rafaqat, collected the data and helped in introduction writing.

Mir Jalal-ud-din, helped in the collection of references and discussion writing.

Sher Ali Khan, collected the data, references and helped in interpretation of data.

Bilawal Gul, collected the data and helped in result writing.

Danish Zafar, collected the references and helped in introduction and discussion writing.

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