

## AN ANALYTICAL STUDY OF ADHESIVE INTESTINAL OBSTRUCTION

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### Abstract

**Background:** Intestinal obstruction accounts for 20% of all surgical emergencies. It is defined as an obstruction in the forward propulsion of the intestine's contents due to dynamic, adynamic or pseudo-obstruction. Adhesions are now the leading cause of intestinal obstruction. Thus, we have performed an analytical study of adhesive intestinal obstruction. **Materials and Methods:** 50 patients admitted to the general surgery wards of Coimbatore Medical College hospital for intestinal obstruction with prior history of surgery were selected. The details of the previous surgeries were recorded as the history of the type of previous surgery, procedure done and postoperative complications were noted, and Intraoperative findings of the current surgery were also noted. These details were then compiled and analysed. **Result:** The mean age group with the highest adhesive intestinal obstruction incidence is 31 to 40 years. Blunt injury abdomen and perforation peritonitis were the most performed index surgeries in these surgeries, forming 52% of the bulk. 90% of the surgeries were performed as open surgeries rather than laparoscopic surgeries. 64% of the study group have had their previous surgery as an emergency procedure. During this admission for adhesive intestinal obstruction, the most common site for obstruction was overwhelmingly the small intestine in about 90% of the cases, and the most common part was the ileum. **Conclusion:** Adhesive intestinal obstruction is more common in open and emergency surgeries, with a mean duration of 1 to 5 years. Trauma, perforation, and gynaecological surgeries are more common causes. The ileum is the most common site for adhesions. Preventive measures can help prevent these obstructions.

## INTRODUCTION

Intestinal obstruction accounts for 20% of all surgical emergencies. It is described as an impediment to the intestine's contents moving forward due to dynamic, adynamic, or pseudo-obstruction. Currently, an intestinal blockage is most commonly caused by adhesions. Adhesions in the abdominal cavity are aberrant fibrous bands that typically connect distinct organs, tissues, or both. When the mesothelial layer's basement membrane is damaged and exposed to the environment, adhesions develop in the parietal or visceral peritoneum. Tissue injury, infection, ischemia, haemorrhage, reactivity to foreign entities, tissue overheating, or exposure to irrigating fluids are all risk factors for post-surgical adhesion formation.<sup>[1-4]</sup>

Mast cell degeneration results from this peritoneal damage, which sets off an inflammatory response that increases vascular permeability and produces

fibrinous exudate. A fibrin matrix is created from this exudate, facilitating tissue repair. While fibrin activity is required for healing, it must be followed by fibrinolytic activity to prevent the formation or persistence of adhesions. The fibrinous adhesions continue if the fibrinolytic activity is inhibited. Ischemia, extensive suturing, omental patches, infections, peritoneal traction, blood clots in the peritoneum, extended procedures, or corn starch powder from surgical supplies inhibit this function and promote adhesion formation.<sup>[1,2]</sup>

Each patient has a different level of adhesion development. The type of surgery performed, its scope, and the emergence of postoperative problems varied. While many patients may not experience clinically noticeable symptoms due to these adhesions, a small number may experience issues that result in morbidity and mortality.<sup>[4,5]</sup> Thus, we have performed an analytical study of adhesive intestinal obstruction.

## MATERIALS AND METHODS

This analytical study was conducted at Coimbatore Medical College hospital from March 2021 to February 2022 on fifty patients admitted to the general surgery wards for intestinal obstruction with prior history of surgery were selected.

### Inclusion Criteria

All patients between the ages of 18–80 years admitted to the general surgery wards of Coimbatore Medical College Hospital with signs and symptoms of intestinal obstruction, patients giving informed written consent, previous history of surgery, and diagnosed as adhesive bowel obstruction were included.

### Exclusion Criteria

Patients not willing to be part of the study, patients with pseudo-obstruction, patients with non-adhesive bowel obstruction, and patients with spontaneous adhesions were excluded.

The details of the previous surgeries were recorded, the history of the type of previous surgery, a procedure was done, and postoperative complications were noted. Intraoperative findings of the current surgery were also noted.

### Data collection

The data such as age, distribution of symptoms (including constipation, abdominal pain, vomiting, and abdominal distension), and type of surgery were collected among all the patients. Also, the details of the previous surgeries were recorded, as the history of the type of previous surgery, procedure done, and postoperative complications were noted. Further, intraoperative findings of the current surgery were noted.

### Statistical Analysis

The data obtained from our study were analysed using IBM SPSS Statistics for Windows, Version 23.0 (Armonk, NY: IBM Corp.). Categorical variables were described as frequency and percentage and compared using the Chi-square test. When the projected cell frequency in 22 tables is less than 5, the Fisher's Exact test is performed to determine the significance of categorical data. The probability value of 0.05 is considered to be significant.

## RESULTS

Of the 50 patients, 33 were males constituting 66% of the study population, and the number of females was 17 constituting 34%.

Of the 50 patients, the maximum was in the 31–40 years group (30%), and the least was above 60 years (6%). The patients seemed to be between 31 to 60 years, constituting 78% of the study population [Table 1].

Abdominal pain and constipation were the most common symptoms in all the patients. The next common symptom was abdominal distension, seen in 47 patients (94%) of the study population. 90% (45 patients) complained of vomiting [Table 2].

Among these 50 patients admitted for intestinal obstruction with a history of previous surgery, the type of surgery performed earlier is for trauma (blunt injury) which is seen in 16 of the patients who form 32% of this group. The 2nd common surgery these patients have undergone earlier is for intestinal perforation, seen in 10 patients forming 20% of the cohort [Figure 1].

Hysterectomy and Lower Segment Caesarean Section have an equal incidence of 12% each. Six patients have previously undergone hysterectomy, and six have undergone a Caesarean section. History of appendectomy is seen in 4 patients, and another four patients have a history of undergoing surgery for malignancy. They constitute 8% of the study population respectively. Cholecystectomy and Sterilisation history is seen in 2 patients, each with them forming 4% respectively of the study population.

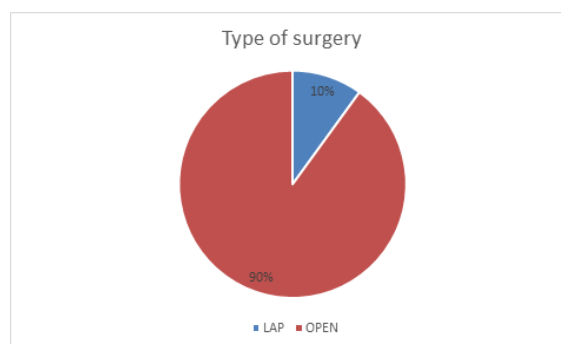


Figure 1: Type of surgery performed

Open surgery is the most common type of surgery performed previously in these patients, with 45 of them undergoing it, constituting 90% of this study cohort.

Most of these patients within the study population have undergone their previous surgery as an emergency rather than an elective procedure. Thirty-two of them, representing 64%, have undergone emergency surgery.

The duration within which the patients have undergone their previous procedure was noted; most had it between 1 to 5 years before the current diagnosis, constituting 74% of this group. Eight of these patients have had their previous surgery within the past year (16%), and the remaining five people had it > 5 years ago (10%).

Complications with previous surgery have been more commonly seen in patients undergoing trauma and perforation surgeries. Surgical Site Infection was the most common complication during the previous surgeries. The most common duration of stay during the previous surgery was 5 to 10 days (21 patients), followed by < 5 days and then > 10 days.

The most common site of obstruction in these patients is in the small intestine, namely the ileum, constituting 56% of the study group (28 patients), followed by the Ileum with Bladder (22%), anterior

abdominal wall (10%), jejunum (8%) and finally large intestine constituting only 2% in this group.

**Table 1: Age Distribution**

Age	Frequency	Percentage
<30	8	16%
31-40	15	30%
41-50	13	26%
51-60	11	22%
>60	3	6%
Total	50	100%

**Table 2: Distribution of symptoms**

Symptoms	Frequency	Percentage
Constipation	50	100%
Vomiting	45	90%
Abdominal Distension	47	94%
Abdominal Pain	50	100%

**Table 3: Type of Previous Surgery – Elective or Emergency**

Previous Surgery	Elective	Emergency
Trauma (Blunt Injury Abdomen)	-	16
Perforation	-	10
Hysterectomy	6	-
LSCS	3	3
Sterilisation	2	-
Cholecystectomy	2	-
Appendicectomy	1	3
Malignancy	4	-
Total	18	32

## DISCUSSION

Twenty percent of all surgical crises are due to intestinal blockage. Intestinal blockage is currently most commonly caused by adhesions. Adhesions are aberrant fibrous bands in the abdominal cavity that typically connect distinct organs, tissues, or both. Tissue trauma, infection, ischemia, haemorrhage, reactivity to foreign entities, tissue overheating, or contact with irrigating fluids are all risk factors for the development of post-surgical adhesions.<sup>[2,6-8]</sup> For gender distribution, there were more male patients than female patients, constituting 66% of the study population, which is similar to Sabitha et al,<sup>[1]</sup> whose study of intestinal obstructions showed male patients outnumber female patients, also similar to Kuremu et al,<sup>[9]</sup> and Oladele et al,<sup>[10]</sup> who found male predominance in their studies.

For age distribution, the highest incidence was seen in patients between 31– 40 years old (30%), followed by 41 – 50 years old (26%), 51 – 60 years old (22%), less than 30 years old (16%) and finally the patients aged 60 years and above making 6% of the study group. The age distribution is similar to Oladele et al,<sup>[10]</sup> whose patients had a mean age of 39 years, and Kuremu et al,<sup>[9]</sup> whose patients' median age range was 30 to 39 years. Sabitha et al,<sup>[1]</sup> study patients also majorly fell within this group of 30 to 60 years old, showing a slight preponderance of more patients in the 51-60 age group.

In this study, abdominal pain and constipation were the most common symptoms, with 100% of the patients presenting with them, followed by

abdominal distention at 94% and vomiting at 90%. This is similar to the studies conducted by Kuremu et al,<sup>[9]</sup> and Sabitha et al.<sup>[1]</sup> Patients in these studies also commonly presented with abdominal pain, vomiting and absolute constipation.

Among these 50 patients admitted for intestinal obstruction with a history of previous surgery, the type of surgery performed earlier most commonly is for trauma (blunt injury) which is seen in 16 of the patients who form 32% of this group. The 2nd common surgery these patients have undergone earlier is for intestinal perforation, which is seen in 10 patients forming 20% of the cohort. Hysterectomy and Lower Segment Caesarean Section have an equal incidence of 12% each. Six patients have previously undergone hysterectomy, and six have undergone a Caesarean section. History of appendicectomy is seen in 4 patients, and another four patients have a history of undergoing surgery for malignancy. They constitute 8% of the study population respectively. Cholecystectomy and Sterilisation history is seen in 2 patients, each with them forming 4% respectively of the study population. These findings are similar to Matter et al., who also found that upper abdominal surgeries, bowel resections, and appendectomy were more commonly causing the development of adhesive bowel obstruction.<sup>[11]</sup>

Most patients had an open surgery rather than a laparoscopic surgery, forming 90% of the study cohort. Most of these patients had emergency surgery in their previous history, forming 64% of the study population. 74% of the obstructions occurred within 1 to 5 years of the previous procedure. 16% occurred within one year, and 10% occurred after five years.

Surgeries for blunt injury, abdomen and perforation formed the causes of intestinal obstruction within one year of the index surgery, similar to Matter et al., in their review, concluded that surgeries on small bowel and colon were present earlier with obstruction with a median duration of 1 year.<sup>[11]</sup>

All the patients had presented within ten years of their index operation, similar to the study by Tamijmarane et al,<sup>[12]</sup> in which most patients had presented within ten years of their first surgery. The patients' most frequent complication was surgical site infection during their index procedure. Sixteen patients, or 32% of the study population, had developed this complication during their index procedure. Other complications include an anastomotic leak and a burst abdomen. Postoperative complications during the index surgery are seen in 25 patients or half the study population. Hence it can be a risk factor for the development of postoperative adhesions. The mean duration of postoperative during previous surgery is 5 to 10 days, which was common among those patients who underwent surgeries for blunt injury abdomen, perforation peritonitis and hysterectomy. Blunt injury abdomen, perforation peritonitis and malignancy surgeries were responsible for postoperative stay longer than ten days indicating the likely development of complications following these procedures.

The small intestine was the most common site of obstruction in these patients accounting for 96% of the study population. The remaining 4% had an obstruction in the large intestine. In the small intestine, ileal obstruction was seen in 56% of the patients, followed by ileum with a bladder in 22%, anterior abdominal wall in 10% and jejunum in 8% of the study population. These findings are similar to Sabitha et al,<sup>[1]</sup> who concluded that small bowel obstruction was more common than large bowel obstruction. The improvement in resuscitative and supportive management, early and aggressive surgical therapy, and enhanced anaesthetic technique are all factors that have contributed to the decrease in overall mortality.

## CONCLUSION

In conclusion, open procedures and those performed in an emergency had a higher incidence of sticky

intestinal blockage following surgery. Developing an adhesive intestinal blockage takes one to five years after the index operation. Surgery for trauma, perforation peritonitis, and gynaecological conditions are more frequently associated with the formation of adhesions and eventual blockage. The small intestine, especially in the ileum, is where adhesion blockage occurs most frequently. As a result, actions can be taken to avoid adhesions after procedures, including these risk factors.

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