

Original Article

Unveiling the complexity of Recurrent Small Bowel Obstruction — A Tertiary Care Experience from Kashmir Valley

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Abstract

Background : Recurrent small bowel obstruction is a common surgical affliction emerging as an aftermath of postoperative adhesion formation. This study was aimed at finding the etiology, contributing factors leading to recurrent small bowel obstruction and seeking, in its essence, the model of best possible management.

Materials and Methods : Prospective and retrospective analysis of 297 patients of small bowel obstruction was done in a tertiary care institute over a period of ten years from May, 2012 to April, 2022.

Results : Recurrent small bowel obstruction was seen in 83 (27.9%) cases. There was no statistically significant difference in the recurrence of obstruction between the cases managed conservatively and those operated for the same indication. However, the patients managed conservatively (NOM group) were re-admitted sooner than patients who were surgically treated (OM group). Within the conservative Non-operatively Managed (NOM) group, 20% of cases were readmitted within 1 year, 35% within 1 to 5 years and 45% after 5 years. In the Operatively Managed (OM) group, 15% of cases were readmitted within 1 year, 25% within 1 to 5 years and 60% after 5 years. The number of prior episodes of obstruction turned out to be a significant predictive factor (p 0.028), as a harbinger of recurrence. Patients having only 1 episode of obstruction had 17% recurrence rate, cases with 2 to 3 episodes of obstruction had recurrence rate of 50%. Notably, for patients with more than 3 episodes of obstruction, the recurrence rate rose to 75%. The number of previous laparotomies was significantly associated with the increase in recurrence of small bowel obstruction (p -value 0.030).

Conclusion : Postoperative small bowel obstruction is a common surgical entity with prohibitively high recurrence rates. The number of prior episodes of recurrence is a significant predictive factor. The higher the number of prior episodes, the more the chances of recurrence. The number of previous laparotomies is significantly associated with the increase in recurrence of small bowel obstruction.

Key words : Small Bowel Obstruction, Adhesions, Recurrent Small Bowel Obstruction, Laparotomy, Recurrence Rate.

Small bowel obstruction is a common surgical condition encountered in general surgical practice. It accounts for one in every five patients of acute surgical admissions¹. Bowel obstruction is defined by the lack of aboard transit of intestinal contents, regardless of etiology². It can be partial or complete and dynamic or adynamic. Small and large bowel obstruction may occur separately or may present simultaneously in metabolic, electrolyte abnormalities or some neurological diseases. The etiology of small bowel obstruction can be secondary to causes present within the lumen (intra-luminal), or within the wall of intestines (intra-mural) or outside

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Received on : 25/06/2024

Accepted on : 05/03/2025

Editor's Comment :

- Postoperative small bowel obstruction is a common condition with high risk of recurrence.
- The likelihood of recurrence increases significantly with number of prior episodes and previous laparotomies.
- Early identification of high risk patients may help to guide management strategies.

the wall of intestine (extrinsic). Intra-abdominal adhesions related to prior abdomen surgery account for 75% of cases of small bowel obstruction³. Other causes may be hernias, tumors, enterocoliths, foreign bodies and bezoars. Malignant tumors commonly metastatic account for approximately 20% cases of small bowel obstruction⁴. Patients commonly present with peri-umbilical abdominal pain that waxes and wanes over 1 to 3 minutes intervals. Other symptoms may be vomiting, abdominal distention and/or constipation. In the instances of strangulation, the nature of pain may progress from being colicky to persistent bothering with further increase in depth as well as severity. The patient may be febrile and develop hypotension, tachycardia, and/or oliguria consequent upon massive fluid sequestration. Plain

How to cite this article : Unveiling the complexity of Recurrent Small Bowel Obstruction — A Tertiary Care Experience from Kashmir Valley. Hassan Y, Malik AA, Wagay BA, Bhat GA, Rashid OB. *J Indian Med Assoc* 2025; **123(9)**: 30-3.

radiography of abdomen in standing and supine positions is the earliest investigation to confirm or lead towards the diagnosis of the obstruction of small bowel. The plain erect radiographic findings include triad of dilated small bowel loops (>3cm in diameter), multiple air-fluid levels and paucity of air in the colon, sensitivity ranges 70% to 80%⁵. Computed tomography is 80% to 90% sensitive and 70% to 90% specific in the detection of small bowel obstruction⁵. Clinically stable patients with their first episode of obstruction are managed by conservative Non-operative Management (NOM). Operative Management (OM) strategies appear best for those experiencing the second episode. Neither NOM nor OM yields acceptable outcomes in patients experiencing third or later episodes⁶.

MATERIALS AND METHODS

The study was conducted in the Department of General and Minimal Invasive Surgery, SKIMS, India, over a period of ten years from May, 2012 to April, 2022. This retrospective-prospective observational study was carried out after clearance from institutional Ethical committee. The retrospective analysis was carried out from May, 2012 to May, 2019 and the prospective study was done from June, 2019 to April, 2022.

The records of all patients in the retrospective group were collected from the Medical Records Department (MRD) and analyzed for relevant data including admission notes, radiology reports and operative notes. The analysis of the prospective group was also performed as per the same proforma.

Detailed history and thorough general physical and systemic examination were recorded in each patient at the time of admission. Serial clinical examination including abdominal girth and digital rectal examination and any sign of strangulation was strictly monitored and documented.

All the patients were subjected to baseline investigation including complete blood count (CBC), Kidney and Liver Function Tests (KFT, LFT), serum electrolytes with lactate, chest radiograph, standing and supine radiographs of abdomen. Special investigations including abdominal ultrasonography, computed tomography scan of abdomen and/or oral contrast study was done in most of the cases to confirm the diagnosis. Patients who underwent surgical intervention (OM) were given pre-operative antibiotics (2nd or 3rd generation cephalosporin and tinidazole) as a standard protocol. These patients were subsequently put under care in the postoperative

ward for 24-48 hours. All the patients were attached to our out-patient department for follow-up after discharge.

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc, Chicago, Illinois, USA). We used Student's paired T-test for comparing continuous variables as frequencies and percentages.

RESULTS

A total of 297 patients aged between 15 to 75 years with mechanical small bowel obstruction were analyzed over a period of 10 years. Out of 297 patients studied there were 166 (56%) males and 131 (44%) females. The mean age of males was 43.56±9.58 years and that of females was 41.84±10.43 years.

71.3% (212) of our patients were managed conservatively (NOM group) while 28.62% (85) patients needed surgical interventions (OM group). History of recurrent obstruction was found in 27.9% (83) patients. There was no statistically significant difference in the rates of recurrent obstruction between the two groups ie, NOM versus OM groups.

54.2% of patients had a history of previous operative interventions. Out of them 29.2% had a history of gynecological operations followed by appendectomy (26%), colonic surgery(15.5%), Cholecystectomy and other biliary surgeries(4.3%), Hernia surgery(2.5%). 22.4% had underwent laparotomy for trauma, firearm injury and gut perforations.

The average time of presentation since previous surgery was 18 months. Most of the patients developed obstruction within one year of previous abdominal surgery (42.2%). In 32.29% developed obstruction between 1 to 5 years and 25.47% after 5 years of previous surgery. However, the patients managed conservatively (NOM group) were readmitted much earlier than the patients who were surgically managed (OM)(Table 1).

Factors predicting the recurrence of small bowel obstruction were also studied. The number of prior episodes of recurrence scored to be a significant predictive factor ($p = 0.041$). Of the 53 patients who had experienced a single prior episode, recurrence occurred

Table 1 — Re-admission Rates

Management Group	< 1 year		1-5 Years		> 5 Years	
	No	percentage	No	percentage	No	percentage
Conservative	12	20%	21	35%	28	45%
Operative	3	15%	5	25%	14	60%
Total	15	20%	26	32%	42	48%

in 9 patients (17%). Among the 26 patients with 2 to 3 previous episodes, 13 experienced recurrence (50%). 4 patients with more than three prior episodes recurrence was observed in 75 percent of patients.

Postoperative adhesive small bowel obstruction recurred more frequently than other etiologies ($p = 0.042$). Of the 168 patients with adhesion obstruction, recurrence was seen in 58 patients (35.9%). The number of previous laparotomies also was significantly associated with recurrence ($p = 0.030$) (Table 2).

Recurrence was studied with respect to the type of previous surgery and operative findings. However, no statistically significant difference was found with respect to the type of previous surgery or operative findings (Table 3).

Among the 38(44.7%) patients who underwent adhesiolysis, recurrence was observed in 13(34.2%) cases. Of the 27(31.7%) patients who underwent resection anastomosis, 5(18.5%) experienced recurrence. Among 4(4.7%) patients who had undergone enterotomy, recurrence occurred in 1 patient (25%). 5 (5.8%) patients with hernia surgery had recurrence rate of 20%.

DISCUSSION

While the diagnosis of small bowel obstruction can be straight forward, management is a challenging task for any surgeon, more so profoundly in recurrent cases in Accident Emergency (AE) settings. Any type of abdominal surgery can result in the genesis of post-operative intraperitoneal adhesions or bands that may lead to recurrent small bowel obstruction. Adhesions are an unavoidable, unfavorable aftermath of any abdominal surgery. Intra-abdominal adhesions are responsible for 49% to 80% cases small bowel obstruction, making it the most common causative factor⁷⁻¹². Despite advances in preoperative recognition of small bowel obstruction, better operative facilities like newer energy sources and better postoperative care, the morbidity and mortality associated with recurrent small bowel obstruction is still prohibitively very high. The present study was done to analyze the incidence, etiology, contributive risk factors and management of recurrent small bowel obstruction in our tertiary care institute.

A total of 297 patients were included in our study. Males outnumbered the females with male female ratio of 1.27. The results are comparable with the study done by Adhikari S and others¹³.

In our study, recurrent obstruction was seen in 83

Table 2 — Previous Laparotomies

No of previous laparotomies	Number	Recurrence	Percentage	p-value
1	118	30	25.4	0.03
2	34	17	50	
>2	16	11	68.7	
Total	168	58	35.9	

Table 3 — Operative Finding

Operative finding		Number	Recurrence	p- value
Peritoneal contamination	Present	23	10 (43.5%)	0.305
	Absent	62	17 (27.4%)	
Perforation	Present	17	8 (47.0%)	0.495
	Absent	68	20 (29.4%)	
Perforation operation delay :	<24 hours	4	1 (25.0%)	0.599
	1- 2 days	6	2 (33.3%)	
	> 2 days	7	5 (71.4%)	

(27.9%) cases. There was no statistically significant difference in the recurrence of obstruction between the cases managed conservatively, NOM group (29%) and those managed surgically, OM group (22.9%). However, the patients managed conservatively (NOM group) were readmitted sooner than patients who were treated by operative means (OM group). In the conservative NOM group 20% of cases were readmitted within 1 year, 35% within 1 to 5 years and 35% after 5 years. In the operatively managed OM group, 15% of cases were readmitted within 1 year, 25% within 1 to 5 years and 60% after 5 years. G Miller, *et al*¹⁴ in a study of 410 patients found a recurrence rate of 34% in the conservative group and 32% in the surgically treated group. They found that non operatively managed patients were readmitted sooner than surgically treated cases (median 0.7 v 2 years).

54.2% of our patients had a history of previous operative interventions. Out of them 29.2% had history of gynecological operations followed by appendectomy (26%), exploratory laparotomies (22.4%), colon surgery (15.5%), hepatobiliary surgery (4.3%) and hernia surgery (2.5%). The study done by G Miller, *et al* found 24 percent of their patients had previous colorectal surgery (24 per cent), followed by gynecological surgery (22 per cent), herniorrhaphy (15 per cent) and appendectomy (14 per cent)¹⁴.

Factors predicting the recurrence of small bowel obstruction were studied. The number of prior episodes of recurrence came out to be a significant factor ($p=0.028$). The greater the number of prior episodes, the more the chances of recurrence. Patients who had only 1 episode of obstruction, the recurrence rate was 17%, cases with 2 to 3 episodes of obstruction, the recurrence rate was 50%. Notably, for patients with

more than 3 episodes of obstruction, the recurrence rate rose to 75%. Our findings are comparable with the study done by G Miller and others¹⁴.

The number of previous laparotomies was significantly associated with increase in recurrence of small bowel obstruction ($p=0.030$). Of 168 cases of adhesion obstruction, 118 (70.2%) had undergone only one laparotomy previously, while 34 (20.2%) cases had undergone laparotomy previously twice and 16 (9.6%) had undergone laparotomy more than two times previously. In 25.4% of patients with previous one laparotomy recurred, 50% of patients with previous two laparotomies recurred and 68.7% of cases with more than three laparotomies recurred. Miller and others¹⁴ in their study of 410 cases found that 43% of cases presented with obstruction after one laparotomy, 28% after two previous laparotomies, 11% after three, 9% after four or more and 9% of cases had undergone no previous abdominal surgery. Bjørg-Tilde Svanes Fevang¹⁵ in a study of 443 cases found that 17% of cases had no previous abdominal surgery, 60% had one previous laparotomy, 17% two and 6% had three or more previous laparotomies and they found that repeated surgery for acute small bowel obstruction not only portended an increased risk of readmission for acute small bowel obstruction, but also an increased risk of needing small bowel resection and having complications if operation was at all required.

Postoperative adhesive small bowel obstruction recurred more than other etiologies ($p=0.042$). Of 168 cases of postoperative adhesion, 58 (35.9%) cases recurred. Of the total 85 operated patients, recurrence was seen in 22 (25.9%) of cases and regarding the type of previous surgery, 34.2% cases of adhesiolysis recurred, 18.5% cases of resection anastomosis recurred, 25% cases of enterotomy recurred, 20% cases of hernia repair recurred and of all the other procedures, 18.2% recurred. Barkan H and others¹⁶, found recurrent small bowel adhesion obstruction in 53% after initial episodes and in 85% or more in second or later episodes and much more rapid after third and later episodes. Recurrence was seen in 43.5% of patients with peritoneal contamination found previously on laparotomy, 47% of patients with perforation previously and 71% of cases with perforation operation delay of more than 2 days.

CONCLUSION

Postoperative small bowel obstruction places itself as one of the most waxing and common surgical entities with prohibitively high recurrence rates. The

propensity for recurrence escalates in direct correlation with the number of prior episodes, with the history of previous laparotomies serving as a notably reliable predictive factor. We advocate for additional studies aimed at unraveling this perplexing issue, not only to alleviate the strain on the overstretched healthcare system, particularly in underdeveloped nations, but also to mitigate the prospect of recurrent suffering for affected patients.

Conflict of interest : None

Ethical Issue : None

Source of funding : None

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