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ORIGINAL RESEARCH ARTICLE

Comprehensive Evaluation of Symptoms and Risk Factors in Adhesive Small Bowel Obstruction

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ABSTRACT

Introduction: Adhesive small bowel obstruction (ASBO) is a significant condition often encountered in surgical emergencies, characterized by the blockage of the small intestine due to fibrous bands called adhesions. These adhesions typically form after abdominal surgeries, leading to substantial morbidity, prolonged hospital stays, and increased healthcare costs. Understanding the symptoms and risk factors associated with ASBO is crucial for enhancing patient outcomes and developing effective prevention and management strategies.

Material & Methods: This prospective observational study was conducted at the Department of General Surgery, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, from August 1, 2022, to January 31, 2024. Patients aged 18 years and older with an episode of adhesive small bowel obstruction were included, excluding those with large bowel obstruction, incarcerated hernia, early post-operative small bowel obstruction, inflammatory bowel disease, radiation-induced fibrosis, and peritoneal carcinomatosis. Data were collected through patient histories, clinical examinations, and investigations, and analyzed using SPSS version 23. The sample size was calculated to include 60 patients, accounting for a 10% dropout rate.

Results: The study found that the majority of ASBO patients were between 18-29 years (25.4%) and 45 to 59 years (23.7%), with a predominance of females (55%). Diabetes Mellitus (DM) was the most common past medical condition (30.0%), followed by DM with Tuberculosis (25.0%). Alcohol consumption (36.7%) and combined smoking and alcohol use (31.7%) were also prevalent. Systemic examination revealed that 45.0% had tenderness, while 51.6% were within normal limits. Abdominal pain was a common symptom in both operated (63.3%) and non-operated (35.0%) patients. Significant associations were found for age (adjusted OR 1.79, $p = 0.045$) and tenderness (adjusted OR 0.75, $p = 0.036$).

Conclusion: The study highlighted the demographic and clinical characteristics of ASBO patients, emphasizing the importance of recognizing risk factors such as age, medical history, and lifestyle habits. Identifying these factors can aid in better managing and preventing ASBO, ultimately improving patient care and reducing healthcare burdens. The findings underscore the necessity for targeted interventions and refined surgical techniques to minimize adhesion formation and subsequent bowel obstructions.

Keywords: Adhesive small bowel obstruction, ASBO; abdominal adhesions, surgical emergencies, risk factors, patient outcomes.

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INTRODUCTION

Adhesive small bowel obstruction (ASBO) is a critical condition frequently encountered in surgical emergencies, characterized by the blockage of the small intestine due to abnormal fibrous bands known as adhesions.[1] These adhesions often form after abdominal surgeries and can lead to significant morbidity, prolonged hospital stays, and considerable healthcare costs. A comprehensive evaluation of the symptoms and risk factors associated with ASBO is essential for improving patient outcomes and developing better prevention and management strategies.

In many developed countries, postsurgical adhesions are the leading cause of small bowel obstructions, responsible for the majority of cases. These adhesions form when scar tissue binds together surfaces within the abdominal cavity that are normally separate, causing mechanical blockage of the intestines. The nature of small bowel obstructions can vary widely, presenting either as partial or complete obstructions and as non-strangulated or strangulated forms. Besides surgical adhesions, other causes of small bowel obstructions include malignancies, inflammatory conditions like Crohn's disease, and mechanical issues such as volvulus or intussusception in children.[2-4]

The clinical presentation of ASBO can be quite varied, making diagnosis challenging. Common symptoms include abdominal pain, distension, vomiting, and constipation, which can also be seen in other gastrointestinal conditions.[5] This overlap necessitates careful diagnostic evaluation to distinguish ASBO from other causes of bowel obstruction. Risk factors

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for developing ASBO include the extent of peritoneal injury during surgery, the specific type of surgical procedure, and individual patient factors such as age and underlying health conditions. Surgeries involving the lower abdomen and pelvis are particularly prone to causing adhesions, leading to a higher risk of subsequent bowel obstructions.[5]

Understanding the symptomatology and risk factors of ASBO is crucial for guiding treatment decisions and improving outcomes. Non-operative management, such as nasogastric decompression and fluid and electrolyte correction, is often successful in cases of partial obstruction without signs of complications.[9] However, surgical intervention is required when there is complete obstruction, evidence of strangulation, or when conservative treatment fails. By identifying and addressing the risk factors associated with ASBO, healthcare providers can develop more effective strategies to prevent adhesion formation, refine surgical techniques, and ultimately reduce the incidence and recurrence of this debilitating condition.[6-8]

MATERIAL AND METHODS

This study analyzed patients who presented with adhesive small bowel obstruction (ASBO) and were admitted to the Department of General Surgery at Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, between August 1, 2022, and January 31, 2024. Ethical approval for the study was obtained from the institutional research and ethics committee. This prospective observational study aimed to provide a comprehensive evaluation of the symptoms and risk factors associated with ASBO.

Patients included in the study were those aged 18 years or older with an episode of adhesive small bowel obstruction, irrespective of sex. Exclusion criteria were established to refine the study population and included individuals with large bowel obstruction, incarcerated abdominal wall hernia, early post-operative small bowel obstruction (within one month), inflammatory bowel disease, radiation-induced intestinal fibrosis, and peritoneal carcinomatosis. The total sample size was calculated using the formula $N=z^2\ pq/e^2$, resulting in a required sample size of 57 patients, accounting for a 10% dropout rate. A total of 60 patients were ultimately included in the study.

Data collection involved patient histories, clinical examinations, and investigative findings, which were meticulously recorded in an Excel spreadsheet. This data was subsequently imported into SPSS version 23 for thorough statistical analysis, utilizing various tests and procedures to determine significance and correlations within the dataset. Parameters such as age, demographic characteristics, socioeconomic status, patient complaints, and duration of these complaints were included. Comprehensive general and systematic examinations were conducted, along with basic laboratory investigations and imaging studies, such as contrast-enhanced computed tomography (CECT) of the abdomen.

The study's methodology ensured the validity and reliability of the collected data. Parameters for clinical assessment were selected based on established literature and expert opinion, ensuring their relevance to the study's aims and objectives. A pilot study involving 10% of the total sample size (six participants) was conducted to refine the data collection tool and assess the feasibility of the study. The feedback from the pilot study was used to enhance the clarity and relevance of the parameters, improving the suitability of the questionnaire for capturing pertinent information. The data collected during the study was meticulously documented, tabulated, and subjected to statistical analysis, with the mean age and sex distribution between groups compared using the Chi-square test.

RESULTS

Table 1 shows the age distribution of the study participants presenting with adhesive small bowel obstruction, showing that the majority were between 18 to 29 years (25.4%), followed by 45 to 59 years (23.7%). The age groups 30 to 44 years and 60 to 74 years comprised 18.6 and 20.3% of the participants, respectively, while the 75 to 89 years group represented 10.2%. In terms of sex distribution, 55% of the participants were female, and 45% were male.

Table 2 shows the analysis of the past medical history of the participants presenting with adhesive small bowel obstruction revealed that the most common condition was diabetes mellitus (DM) (30.0%), followed by diabetes mellitus with tuberculosis (25.0%) and hypertension (11.7%). In terms of personal history, the majority of the participants consumed alcohol (36.7%), with a significant proportion being both smokers and alcohol consumers (31.7%).

Table 3 signifies the systemic examination of the study population revealed that tenderness was present in 45.0% of the patients, while 51.6% of the patients were within normal limits (WNL). Regarding symptoms, 63.3% of the operated patients and 35.0% of the non-operated patients reported abdominal pain. Additionally, 20.0% of the patients experienced abdominal pain with vomiting, and 35.0% had abdominal pain with loose stools.

Table 4 shows the distribution of past medical histories among the study participants, showing that

Table 1: Age and gender distribution of the patients

Age group	*Frequency (%)*
18–29	15 (25.4%)
30–44	11 (18.6%)
45–59	14 (23.7%)
60–74	12 (20.3%)
75–89	6 (10.2%)
Sex	Frequency
Male	33 (45.0%)
Female	27 (55.0%)

Table 2: Past medical history of the participants presenting with Adhesive Small Bowel Obstruction

Category	*Frequency (%)*
Past Medical History	
Chronic kidney disease (CKD)	7 (11.7%)
Diabetes mellitus (DM)	18 (30.0%)
Diabetes mellitus (DM) with tuberculosis (TB)	15 (25.0%)
Past history of laparoscopic cholecystectomy	1(1.66%)
Hypertension	7 (11.7%)
Hypertension and diabetes mellitus (DM)	11(18.3%)
Nil	1(1.66%)
Grand Total	60 (100.0%)
Personal History	
No	2 (3.4%)
Alcohol	22 (36.7%)
Smoker	17 (28.3%)
Smoker + Alcohol	19 (31.7%)
Grand Total	60 (100.0%)

the most common condition was Diabetes Mellitus (DM), present in 13.33% of the total patients. This was followed by Diabetes Mellitus with Tuberculosis (DM + TB) at 11.67% and hypertension at 5.83%. A smaller proportion of patients had a history of Chronic Kidney Disease (CKD) or no significant past history, both at 5.83 and 0.83%, respectively.

Table 5 represents the intercept, unadjusted odds ratios (OR), adjusted odds ratios (OR) with 95% confidence intervals (CI), *p-values*, and the number of observations for various variables. Age showed a significant association with an adjusted OR of 1.79 (95% CI: 0.97, 3.27) and a p-value of 0.045. Sex (Male) and high systolic blood pressure (SBP) did not show significant associations, with p-values of 0.49 and 0.189, respectively. The presence of tenderness was significantly associated with the outcome, with an adjusted OR of 0.75 (95% CI: 0.41, 1.37) and a *p-value* of 0.036.

DISCUSSION

This study found that the age distribution of the study participants presenting with Adhesive Small Bowel Obstruction showed that the majority were between 18-29 years (25.4%), followed by 45 to 59 years (23.7%). The age groups 30 to 44 years and 60 to 74 years comprised 18.6 and 20.3% of the participants, respectively, while the 75 to 89 years group represented 10.2%. In terms of sex distribution, 55% of the participants were female, and 45% were male. In contrast, a study by Fevang *et al*.,[4] (2004) found that the majority of ASBO patients were aged between 40 to 60 years, with a mean age of 52 years, indicating a slightly older demographic than in our study. The sex distribution in both studies showed a higher percentage of female patients, aligning with our finding of 55% female participants.

This study found that the analysis of the past medical history of the participants presenting with adhesive small bowel obstruction revealed that the most common condition was DM (30.0%), followed by diabetes mellitus with tuberculosis (25.0%) and hypertension (11.7%). In terms of personal history, the majority of the participants consumed alcohol (36.7%), with a significant proportion being both smokers and alcohol consumers (31.7%). This is consistent with the findings of Okabayashi *et al*.[3] (2014),

Table 3: Systemic examination of the study population

Category	*Operated (Yes)*	*Not Operated (No)*	*Total*	*Percentage*	*p-value*
Systemic Examination Findings					
Abdomen distended			1	1.7%	
Abdomen soft to touch			1	1.7%	
Tenderness present			27	45.0%	
WNL			31	51.6%	
Distribution of Symptoms					
Abdominal Pain	38 (63.3%)	21 (35.0%)	59 (98.3%)		0.987
Abdominal pain + Vomiting	8 (13.3%)	4 (6.7%)	12 (20.0%)		0.444
Abdominal Pain + Loose stools	10 (16.7%)	11 (18.3%)	21 (35.0%)		0.833
Abdominal Pain + Loose stools + Vomiting	1 (1.7%)	0	1 (1.7%)		0.400

Table 4: Distribution of past medical histories among the study participants

Past History	*Not operated (No)*	*Operated (Yes)*	*Total (%)*
Chronic Kidney Disease (CKD)	6	1	5.83
Diabetes Mellitus (DM)	9	9	13.33
Diabetes Mellitus + Tuberculosis (DM + TB)	8	7	11.67
History of Laparoscopic Cholecystectomy	1	0	0.83
Hypertension	4	3	5.83
Hypertension + Diabetes Mellitus (DM)	6	5	9.17
No Significant Past History	1	0	0.83

Table 5: Intercept, unadjusted odds ratios (OR), adjusted odds ratios (OR) with 95% confidence intervals (CI), p-values, and the number of observations for various variables

Variable	*Intercept*	*Unadjusted OR*	*Adjusted OR (95% CI)*	*p-value*	*Observations*
Age	0.74	2.0	1.79 (0.97, 3.27)	0.045	60
Sex (Male)	0.32	0.67	1.22 (0.66, 2.23)	0.49	60
SBP (High)	0.10	0.61	1.23 (0.67, 2.25)	0.189	60
Tenderness (Present)	0.37	0.58	0.75 (0.41, 1.37)	0.036	60

who reported that metabolic disorders like DM were prevalent in 28% of ASBO cases, supporting our results. The prevalence of alcohol consumption (36.7%) in our study aligns with their finding of lifestyle factors being significant contributors.

This study found that the systemic examination of the study population revealed that tenderness was present in 45.0% of the patients, while 51.6% of the patients were within normal limits (WNL). Regarding symptoms, 63.3% of the operated patients and 35.0% of the non-operated patients reported abdominal pain. Additionally, 20.0% of the patients experienced abdominal pain with vomiting, and 35.0% had abdominal pain with loose stools. Similarly, Strik *et al*.[7] (2016) found that abdominal tenderness was reported in 48% of their ASBO patients, showing comparable results. The prevalence of symptoms such as abdominal pain in operated and non-operated patients was also consistent with their findings, highlighting the common clinical presentations.

This study found that the distribution of past medical histories among the study participants showed that the most common condition was diabetes mellitus (DM), present in 13.33% of the total patients. This was followed by Diabetes Mellitus with Tuberculosis (DM + TB) at 11.67% and hypertension at 5.83%. A smaller proportion of patients had a history of chronic kidney disease (CKD) or no significant past history, both at 5.83 and 0.83%, respectively. This is in line with Barmparas *et al*.[5] (2010), who reported DM in 12% of their ASBO patients, indicating similar risk factors across different populations. The prevalence of hypertension and CKD was also comparable between the two studies.

This study found that age showed a significant association with an adjusted OR of 1.79 (95% CI: 0.97, 3.27) and a *p-value* of 0.045. Sex (Male) and high systolic blood pressure (SBP) did not show significant associations, with p-values of 0.49 and 0.189, respectively. The presence of tenderness was significantly associated with the outcome, with an adjusted OR of 0.75 (95% CI: 0.41, 1.37) and a p-value of 0.036. Our study is consistent with the findings of Tanaka *et al*.[10] (2014), who reported an OR of 1.85 for age in predicting ASBO outcomes. The lack of significant association for sex and high SBP in both studies further validates our findings. However, the association of tenderness in our study (OR 0.75) was slightly different from their reported OR of 0.8, indicating minor variations in clinical presentations.

CONCLUSION

The study on patients who presented with Adhesive Small Bowel Obstruction (ASBO) revealed that the majority were between 18 to 29 years (25.4%) and 45 to 59 years (23.7%), with 55% being female. DM was the most common past medical condition (30.0%), followed by DM with tuberculosis (25.0%). Alcohol consumption (36.7%) and combined smoking and alcohol use (31.7%) were prevalent. Systemic examination showed that 45.0% had tenderness, and 51.6% were within normal limits. Abdominal pain was common in both operated (63.3%) and non-operated (35.0%) patients. Odds ratio analysis indicated significant associations for age (adjusted OR 1.79, $p = 0.045$) and tenderness (adjusted OR 0.75, $p = 0.036$).

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