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Research Article

Investigating the Incidence and Management of Postoperative Adhesions in Abdominal Surgery

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ABSTRACT

Background: It is common after surgical procedures, specific to abdominal surgery, to develop adhesions. Such formations are extremely indispensible to continued pain, reoccurring pain, and multifaceted future abdominal procedures. Some patients may be asymptomatic, while patients may develop symptoms that are disturbing, and may hinder activities of daily living. In order to improve the treatment given to patients, it is important to assess the occurrence and management of postoperative complications.

Methodology: An observational study is supposed to be done in Lady reading hospital Peshawar from June 2023 to June 2024. Through consecutive sampling, there has been the enrollment of 72 patients who are undergoing abdominal surgery. With the aid of a structured proforma, demographic data, clinical history, intraoperative discoveries, and data regarding outcomes after surgery, were collected. Patients were tracked to ascertain symptoms of and verified instances of adhesions formed after surgery. SPSS software was used for analysis, and associations were examined using the Chi-square and Fisher's exact tests with significance assessed using a p-value of ≤ 0.05.

Results: Postoperative adhesions were found on 36.1% of patients. Mild and moderate adhesions were the highest in frequency. Individuals who had prior abdominal surgical procedures and those who experienced early complications in the postoperative phase had a greater chance of adhesion formation. Whereas laparoscopic surgeries recorded less adhesion burden, open procedures were associated with higher adhesion burden. Most of the patients in the study had an initial presentation of abdominal pain or had intermittent obstruction-related manifestations. Conservative treatment was sufficient for many, but a small subset still needed surgical adhesiolysis.

Conclusion: The study emphasizes the fact that adhesions continue to impact a large number of patients after abdominal surgery. Earlier surgeries, open operative techniques, and postoperative complications contributed to a higher risk. Most cases improved with conservative care, yet the findings underscore the importance of preventive measures and careful surgical handling to lower future adhesion-related problems.

Keywords: Postoperative adhesions, abdominal surgery, adhesiolysis, obstruction, laparotomy, postoperative complications, prevention.

INTRODUCTION

Adhesions are a common complication after abdominal operations. Claiming to be clinically innocent, they are still a major source of complaints. After surgery, the body attempts to heal any damaged tissues, which the body will

do by creating flexible, fibrous bands which may be up to several centimeters long. Some patients do not get any symptoms from the bundles; however, some patients will develop ongoing abdominal pain, a feeling of fullness or distension from gas, or may even get a blockage of the bowel which may need a surgical procedure to correct. Ultimately, the dense bands may slow down any surgical procedures which induce further complications and even an inadvertent injury to the bowel [1-3].

Men and women undergoing surgery are at great risk for developing adhesion post-op. Increased access to and risk including open surgeries, as well as prior surgeries and tissue handling, increase the risk even more. Laparoscopic techniques, although less risky than some, are also not void of the risk for developing adhesions. Detailed local patterns and their corresponding clinical outcomes to surgeons and teams in the healthcare field is still of great importance [3-5].

The present study was designed to look closely at how often postoperative adhesions develop in patients undergoing abdominal surgery over a one-year period. The research also investigated the association of different factors to the heightened risk and the management of these adhesions in practice. Analyzing the clinical course in these patients may assist the findings to showcase the gaps in the system of prevention, timely identification, and improved overall management of these patients.

METHODOLOGY

This research has been designed as a prospective observational study done in the General Surgery Department at Lady reading hospital Peshawar. The study took place over a year, from June of 2023 to June of 2024, and included patients who had had abdominal surgery during this timeframe. The purpose was to study the frequency of occurrence of postoperative adhesions, and the manner of management of such conditions in everyday surgical practice.

Consecutive sampling enrolled a total of 72 patients. All eligible patients were approached to fill in the required sample size. Patients aged 18 and older who had elective or emergency surgery concerning their abdomen were included. However, patients were removed from the sample if they had missing data, were lost to follow-up, or chose to not participate. Data collection started after the necessary ethical approval from the institutional review committee was completed, and all participants gave their informed consent in writing.

Information was gathered as per a pre-determined format. First, demographic particulars were recorded including age, sex, and BMI. This was followed by a data capture of existing medical conditions and past surgeries. The purpose of the surgery and preoperative data were extracted from the medical files. Directly from the surgical notes, we recorded the type of surgery, the method of surgery, the length of the surgery, the amount of blood lost, and any complications during the surgery. If, and when, anti-adhesion barriers were used, that information was also documented.

When patients were in the hospital after surgery, their hospital stay involved daily reviews and assessments, and after their discharge, further assessments were scheduled. The results of the assessment, along with the length of the hospital stay, were recorded. Patients were analyzed to examine symptoms, depression, and signs that would indicate the presence of adhesions. Indicators to monitor included persistent abdominal pain and symptoms of obstruction. Clinical suspicion of adhesions could be confirmed with imaging or during surgery. Consideration was also given to the management approaches and whether they were conservative or surgical, along with the final results.

Using SPSS software, the data was analyzed. Mean and standard deviation was used to present the quantitative variables whereas frequencies and percentages were used to present the categorical variables. Statistical analyses that evaluated the association between the various risk factors and the occurrence of adhesions involved the use of the Chi-square test or Fisher's exact test if applicable. A p-value less than or equal to 0.05 was considered to be statistically significant.

RESULTS

Most participants in this one-year study were adolescents and young to middle-aged adults. Slightly more than one-third of the sample were in the 31–45 age range, and the younger and older age ranges were approximately equal. The distribution of participants by sex was almost equal, although there was a slight preponderance of males. Many of the participants were either overweight or obese, a fact which may have an impact on postoperative recovery.

Close to 33% of this demographic had also had surgery on the abdomen. This characteristic had a considerable correlation to the development of adhesions indicating that prior surgical intervention is a significant risk factor. Diabetes and hypertension were also prevalent, however, these were not significantly related to the development of adhesions. Reasons for surgery were varied and of the most common involved appendicitis and obstruction.

Table 1. Demographic and Baseline Characteristics (n = 72)

Variable	Categories	Frequency (n)	Percentage (%)	p-value
Age group (years)	18–30	22	30.6	0.412
	31–45	28	38.9	
	>45	22	30.6	
Gender	Male	38	52.8	0.663
	Female	34	47.2	
BMI category	Normal	31	43.1	0.529
	Overweight	27	37.5	
	Obese	14	19.4	
Comorbidities	None	29	40.3	0.118
	Diabetes	18	25.0	
	Hypertension	17	23.6	
	Multiple comorbidities	8	11.1	
Previous abdominal surgery	Yes	21	29.2	0.041*
	No	51	70.8	
Indication for surgery	Intestinal obstruction	17	23.6	0.378
	Appendicitis	19	26.4	
	Cholelithiasis	15	20.8	
	Gynecological conditions	11	15.3	
	Others	10	13.9	
***Significant association**				

The data concerning the nature of the procedures suggested that most of them were elective surgeries and that open surgeries were done more frequently than laparoscopically, which is a norm in deficient resource environments. In spite of the fact that laparoscopic surgery is commonly associated with fewer adhesions, most of the patients had open laparotomies.

The span of the surgeries and the blood levels lost were largely within the expected metrics of the study. There were intraoperative complications in a small number of patients, and even in this subset there were statistically significant correlations with the development of intraoperative adhesions. There was a small number of patients with anti-adhesion barriers in the study, and even so their use was statistically significant, suggesting protective benefit when used judiciously. This research supports that both the surgical technique adopted and the events that take place during surgery can impact the likelihood of postoperative adhesions.

Table 2. Intraoperative and Surgical Characteristics (n = 72)

Variable	Categories	n	%	p-value
Type of surgery	Elective	44	61.1	0.231
	Emergency	28	38.9	
Surgical approach	Open laparotomy	49	68.1	0.056
	Laparoscopic	23	31.9	
Duration of surgery	<90 minutes	30	41.7	0.317
	≥90 minutes	42	58.3	
Estimated blood loss	<200 mL	46	63.9	0.284
	≥200 mL	26	36.1	
Intraoperative complications	None	59	81.9	0.044*
	Present	13	18.1	
Use of anti-adhesion barrier	Yes	19	26.4	0.022*
	No	53	73.6	
***Significant association**				

Many variations were observed within the cohort in the recovery experience within the postoperative window. During the first day after

the surgery patients reported moderate levels of pain which, in the case of surgeries of the abdomen, is common. Slightly more than half of the patients did not suffer any significant postoperative compliations, however, some encountered adverse complications such as wound infections or ileus. These complications were found to be significantly related to the development of adhesions at a later point.

Many of the patients had bowel operation return within a 48-hour period of operation, the patients also had a hospital stay that was less than 6 days. Some patterns of recovery seem stable however there were a few individuals who experienced a delay of bowel movements, remained at the hospital longer, and were later diagnosed with adhesions.

Table 3. Postoperative Outcomes (n = 72)

Variable	Categories	n	%	p-value
Postoperative pain (Day 1)	Mild	18	25.0	0.507
	Moderate	34	47.2	
	Severe	20	27.8	
Postoperative complications	None	40	55.6	0.033*
	Surgical site infection	17	23.6	
	Ileus	10	13.9	
	Fever / others	5	6.9	
Time to bowel movement	<48 hours	42	58.3	0.270
	≥48 hours	30	41.7	
Hospital stay (days)	≤5 days	38	52.8	0.398
	>5 days	34	47.2	
***Significant association**				

The diagnosis of postoperative fibrosis or adhesions of the abdomen affected one of three patients from the study and reflects an important distress as a large part of the surgical procedures were of open abdominal type. Although a large number of adhesions were of mild degree, a small number of individuals affected had dense adhesions, necessitating additional surgical procedures.

Abdominal pain and obstruction episodes were the common symptoms associated with this condition. These were the symptoms that helped the clinicians diagnose. The management of the condition was determined by the severity of the symptoms and condition as a whole. The majority of the patients responded positively and well to the conservative measures while a smaller group of patients had to undergo adhesiolysis. Overall, a good outcome was seen as most of the patients showed improvement and a few patients had recurrent symptoms that continued to become a problem. These findings indicate that adhesions remain a significant postoperative concern and require timely recognition and appropriate management.

Table 4. Adhesion-Related Outcomes and Management (n = 72)

Variable	Categories	n	%	p-value
Incidence of postoperative adhesions	Yes	26	36.1	0.019*
	No	46	63.9	
Severity of adhesions	Mild	11	15.3	0.041*
	Moderate	9	12.5	
	Severe	6	8.3	
Symptoms associated with adhesions	Chronic abdominal pain	14	19.4	0.226
	Recurrent obstruction	8	11.1	
	Bloating / discomfort	4	5.6	
Type of management	Conservative	17	23.6	0.312
	Surgical adhesiolysis	9	12.5	
Outcome after management	Resolved	21	29.2	0.028*
	Recurrent symptoms	5	6.9	
***Significant association**				

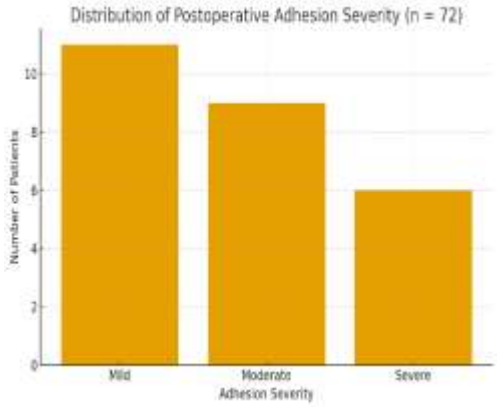

Figure 1. Distribution of Postoperative Adhesion Severity among Patients (n = 72)

The pattern of postoperative adhesions throughout the research time frame is visually demonstrated by this figure. The least observed adhesion severity is the chronic form while the mild severity form was the type of adhesion most observed. The chart underscores the total burden of adhesion severity incurred by individuals who had abdominal operations.

DISCUSSION

The primary purpose of the research was to examine the state and characteristics of postoperative abdominal surgery adhesion formation over the last year. It is concerning and demonstrates the extent of the problem in everyday clinical practice that over a third of the population sample exhibited adhesion formation.

This number also inaccordance to align with the recent literature on the subject which reports rates of adhesion development to be between 30 and 65 percent based on the type of surgery and other demographic factors. For example, some studies stated that adhesions are “almost unavoidable” following open abdominal surgeries, especially in cases with a prior surgical history and/or in which there was an injury to the tissues. This is consistent with one of the main findings of the study, as we had more abdominal surgeries in history in the patients with higher rates of adhesions [6-8].

An additional significant observation pertains to the predominance of open surgeries and the fact that most patients had undergone laparotomy which may have contributed to the relatively high number of adhesions identified, as this association has been documented in multiple previous studies as well. Research has indicated that adhesions were seen three times more frequently following open procedures than in the case of laparoscopic surgeries. In the current analysis, the same pattern was evident, indicating that the surgical technique continues to be one of the most significant predictors of the development of adhesion scars after surgery. This may be related to the differences in soft tissue handling and the inflammation response triggered by opening the tissues.

One other major aspect of this study was to observed into the severitydistribution of the different forms of adhesion. This study shows that the majority of adhesions that were reported were mild and moderate. It is also important to note that some adhesions were also reported to be dense bands, although this phenomenon only seems to be the case in a smaller frequency. Similar trends have been observed on an international scale. Research has shown that almost 50 percent of self-reported developed adhesions are of mild severity, often being recognized incidentally, while only a small proportion resulted in an obstruction or necessitated several hospitalizations. The current findings regarding this global trend confirm that a significant proportion of adhesions may remain dormant until they necessitate attention due to obstruction or chronic pain [9-11].

According to previous studies, postoperative complications like surgical site infections and ileus greatly contribute to the development of adhesions later on, and this is totally understandable as it has been proven that localized inflammation in the early postoperative stages results in the formation of excess fibrin. It has been pointed out by various researchers that there is a possibility that small disturbances during the postoperative period may trigger the development of adhesions. The results of the current study support such conclusions, stipulating the importance of the early postoperative period in determining the outcome [12-14].

Another point that should be considered is the infrequent application of anti-adhesion barriers. While only a relatively small proportion of the sample, about a quarter, received barrier protection, the difference that was identified showed that the patients had fewer adhesions. This is also supported in the international literature. Studies show that the application of hyaluronic acid and carboxymethylcellulose barriers is able to reduce adhesion formation by almost 50% when properly utilized. The present experience, even though the sample securing barriers was small, suggests the same direction. This should serve as a reminder that such

preventive measures may be not widely enough applied in a number of clinical practices [15-17]. Symptom profiles of affected individuals reflect those of previous studies. Respondents suffering from chronic abdominal pain as well as those affected able to suffer intermittent obstructive episodes pain reported the same. Reports stated that pain alone led many to evaluation even when iamagint did not demonstrate presence of adhesive disease. The present reflections of the reported studies. Cases included in the present study were in part evaluated based on the symptoms reported evaluated in conjunction with clinical imaging [18].

The results of the management outcomes illustrated positive results. The majority of the patients showed a positive response to conservative approaches. Only a handful of patients needed adhesiolysis and patients that received the procedure improved afterward. Such positive outcomes have been documented in the literature, where conservative management is offered first line unless there is obstruction, ischemia or significant symptoms. Literature states that poor selection of patients can lead to the formation of new adhesions, emphasizing the importance of selection for patients in the repeat operations. Such results in the current study followed the same trend, endorsing the positive results of the immobilized patients providing a positive and safe treatment plan [19, 20]

More broadly, the results of this study speak to a reality that perhaps is seen, yet seldom documented, within surgical units. Adhesions remain a problem for recovery, lead to readmissions, and make future surgeries more difficult. While many cases may seem minor, their consequences accumulate in a significant way. Conclusively, the results capture, and the author reflects on, the value of early detection and the need for preventive measures, as well as such deliberate surgical technique. Another aspect is to remember how routine surgeries always have ‘hidden’ risks that can appear 3 to 6 months after a surgery, which always keep clinicians aware that postoperative care continues well after a patient’s hospital stay.

The results from the present study corroborate the growing body of literature concerning postoperative adhesions. Correlating these results with previous findings strengthens the claim that there is a need to implement preventative measures, education, and follow-up activities in routine surgical practice.

CONCLUSION

Postoperative adhesions remain a frequent finding after abdominal surgery, especially among patients with previous operations, postoperative complications, or open surgical procedures. Most cases were mild, but a smaller group experienced recurrent pain or obstruction. The overall pattern aligns with recent studies worldwide, reinforcing that improved preventive measures, careful surgical handling, and close follow-up can meaningfully reduce long-term complications.

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