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Original Article

Study of Risk Factors in Patients with Post Lapartomy Wound Dehisence

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ABSTRACT

Background: Post-laparotomy wound dehiscence is a significant complication in abdominal surgeries, characterized by the partial or complete separation of the surgical wound layers. This complication can lead to severe morbidity, extended hospital stays, and increased healthcare costs.

Objective: To assess the risk factors associated with wound dehiscence in patients post-laparotomy.

Methods: A cross-sectional study was conducted at the Department of Surgery from January 25, 2024, to April 25, 2024. A total of eighty patients who developed wound dehiscence following emergency or elective laparotomy were selected. Patient demographics, comorbid conditions, and clinical variables were recorded. The risk factors for wound dehiscence, including peritonitis, infection, malignancy, hypoproteinemia, and anemia, were assessed. Statistical analysis was performed using SPSS version 25, with Chi-square tests employed to assess associations between risk factors and comorbid conditions. A significance level of $P \leq 0.05$ was considered statistically significant. Ethical approval was obtained, and the study adhered to the Declaration of Helsinki principles.

Results: The mean age of patients was 42.67 ± 15.26 years. Males had a higher frequency of wound dehiscence compared to females. The identified risk factors included wound infection (47; 58.8%), malignancy (37; 46.2%), hypoproteinemia (35; 43.8%), anemia (30; 37.5%), and peritonitis (22; 27.5%). A significant association was found between hypertension and the risk factors of wound infection (P=0.01), malignancy (P=0.002), and hypoproteinemia (P=0.01).

Conclusion: The study concluded that wound infection, malignancy, hypoproteinemia, anemia, and peritonitis are significant risk factors for wound dehiscence post-laparotomy. Hypertension showed a notable association with wound infection, hypoproteinemia, and malignancy. These findings underscore the importance of preoperative assessment and management of these risk factors to minimize the incidence of wound dehiscence.

Keywords: Laparotomy, wound dehiscence, abdominal surgery complications, surgical wound infection, hypoproteinemia, anemia, peritonitis, hypertension, risk factors in surgery, postoperative care.

INTRODUCTION

Post-laparotomy wound dehiscence is a significant and challenging complication following abdominal surgery, characterized by the partial or complete separation of the surgical wound layers. This complication typically manifests within the first two weeks post-surgery, presenting with symptoms such as sudden serosanguinous discharge, noticeable suture line separation, or the protrusion of abdominal contents (1). The multifaceted etiology of wound dehiscence encompasses a range of patient-related and surgical factors. Patient-related factors include advanced age, malnutrition, obesity, diabetes mellitus, and immunosuppression (2, 3). Additionally, technical aspects such as inadequate closure techniques, higher intra-abdominal pressure, and infection also contribute to its occurrence (4-6). The consequences of wound dehiscence are severe, potentially leading to significant infections like peritonitis and sepsis, which can critically impact the patient's immediate health. Furthermore, it can result in prolonged hospital stays, increased healthcare costs, and considerable morbidity (7, 8). Prompt intervention is crucial and can vary from conservative treatments, such as employing wound vacuums and administering antibiotics, to more invasive measures like performing a second surgery to close the wound again or address any complications that may arise (9).

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Preventive strategies are equally important, involving meticulous surgical techniques, appropriate selection and management of sutures, optimizing the nutritional status of patients pre- and post-surgery, strict control of blood glucose levels, and implementing measures to minimize infection risk (10). The reported incidence of wound dehiscence in the literature ranges from 0.2% to 6%, with mortality rates between 9% and 50% (11-13). Several factors influence the healing of abdominal wall wounds, including patient characteristics, comorbidities, type of pathology, and the surgical treatment strategy employed. Recent advancements in surgical procedures and postoperative care, such as the use of enhanced recovery after surgery protocols, have shown potential in reducing the incidence of wound dehiscence. Nevertheless, ongoing research and clinical trials are essential to refine and optimize these strategies and to develop new interventions to mitigate this complication.

To summarize, post-laparotomy wound dehiscence is a complex and intricate complication that requires prompt identification, effective treatment, and robust preventive measures to limit its adverse effects on patient outcomes. Studies have reported various risk factors, including anemia, hypoalbuminemia, malnutrition, malignancy, jaundice, obesity, diabetes, male gender, elderly age, and certain surgical procedures like colon surgery or emergency laparotomy, all of which are associated with an increased risk of wound dehiscence (14, 15). Despite advancements in perioperative care and suture materials, the incidence and mortality rates associated with abdominal wound dehiscence have not significantly changed over the past few decades. This may be due to the increasing prevalence of risk factors within patient populations, potentially offsetting the benefits of technological advancements. Identifying risk indicators for this complication has been the focus of numerous studies, most of which have been retrospective in nature, with results often being inconsistent (16, 17). The importance of a thorough understanding of these risk factors and the implementation of effective preventive and therapeutic strategies cannot be overstated in improving patient outcomes and reducing the incidence of this serious postoperative complication.

MATERIAL AND METHODS

A cross-sectional study was conducted at the Department of General Surgery from January 25, 2024, to April 25, 2024, following the approval of the hospital's ethics committee and adhering to the principles outlined in the Declaration of Helsinki. The study aimed to assess the risk factors associated with wound dehiscence post-laparotomy. The sample comprised eighty patients, all aged over 18 years, of either gender, who developed wound dehiscence after emergency or elective laparotomy performed at the hospital's surgical ward. Informed consent was obtained from each participant before inclusion in the study, ensuring their anonymity and confidentiality.

Data collection involved recording the demographic details of each patient, including age, gender, and comorbid conditions such as diabetes and hypertension. Clinical variables were also noted, including the type of surgery performed, the presence of underlying conditions such as peritonitis, malignancy, hypoproteinemia, anemia, and any incidences of wound infection. The data were meticulously documented on a standardized pro-forma. The inclusion criteria were strictly adhered to, ensuring that only patients who developed wound dehiscence post-laparotomy were included in the study, while those with incomplete records or who did not consent were excluded.

The assessment of risk factors for wound dehiscence involved a thorough clinical examination and review of the patients' medical records. Specific attention was given to identifying the presence of peritonitis, wound infection, malignancy, hypoproteinemia, and anemia. Each of these risk factors was evaluated in the context of its potential contribution to wound dehiscence. Additionally, the study examined the associations between these risk factors and comorbid conditions like hypertension and diabetes.

Statistical analysis was conducted using SPSS version 25. Descriptive statistics, including means and standard deviations, were calculated for continuous variables, while frequencies and percentages were determined for categorical variables. The Chi-square test was employed to assess the associations between the identified risk factors and the presence of hypertension and diabetes, with a significance level set at $P \leq 0.05$. The results were presented in tabular form to provide a clear depiction of the data.

Throughout the study, ethical considerations were paramount. The research was designed and conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The confidentiality of patient information was strictly maintained, and all data were anonymized to protect patient identities. The findings from this study were intended to contribute to the existing body of knowledge on wound dehiscence, potentially guiding future clinical practice and preventive strategies in surgical settings (1, 2).

RESULTS

The study included a total of eighty patients who developed wound dehiscence following laparotomy, with a mean age of 42.67 ± 15.26 years. The gender distribution indicated a higher frequency of males compared to females (Figure 1). Among the comorbid conditions observed, diabetes was present in 23 patients (28.8%), while hypertension was noted in 33 patients (41.2%).

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Table 1: Diagnosis of Underlying Pathologies

Diagnosis of Underlying Pathologies	Frequency	Percent
Gastrointestinal perforation	29	36.3%
Acute abdomen	22	27.5%
Complicated appendicitis	16	20.0%
Intestinal obstruction	13	16.3%
Total	80	100.0%

The underlying causes diagnosed at the hospital indicated that gastrointestinal perforation was the leading cause in 29 patients (36.3%), followed by acute abdomen in 22 patients (27.5%) and complicated appendicitis in 16 patients (20.0%).

Table 2: Risk Factors

Risk Factors	Yes	Frequency (%)	No	Frequency (%)
Wound infection	Yes	47 (58.8%)	No	33 (41.2%)
Malignancy	Yes	37 (46.2%)	No	43 (53.8%)
Hypoproteinemia	Yes	35 (43.8%)	No	45 (56.2%)
Anemia	Yes	30 (37.5%)	No	50 (62.5%)
Peritonitis	Yes	22 (27.5%)	No	58 (72.5%)

The risk factors identified in the study population included wound infection in 47 patients (58.8%), malignancy in 37 patients (46.2%), hypoproteinemia in 35 patients (43.8%), anemia in 30 patients (37.5%), and peritonitis in 22 patients (27.5%).

Table 3: Association of Risk Factors with Hypertension

Risk Factors	Hypertension Yes	Frequency (%)	Hypertension No	Frequency (%)	P value
Wound infection	Yes	25 (53.2%)	No	22 (46.8%)	0.01
	No	8 (24.2%)	No	25 (75.8%)	
Malignancy	Yes	22 (59.5%)	No	15 (40.5%)	0.002
	No	11 (25.6%)	No	32 (74.4%)	
Hypoproteinemia	Yes	20 (57.1%)	No	15 (42.9%)	0.01
	No	13 (28.9%)	No	32 (71.1%)	
Anemia	Yes	11 (36.7%)	No	19 (63.3%)	0.51
	No	22 (44.0%)	No	28 (56.0%)	
Peritonitis	Yes	11 (50.0%)	No	11 (50.0%)	0.32
	No	22 (37.9%)	No	36 (62.1%)	

A notable association was found between hypertension and the risk factors of wound infection, malignancy, and hypoproteinemia, with P values of 0.01, 0.002, and 0.01, respectively.

Table 4: Association of Risk Factors with Diabetes

Risk Factors	Diabetes Yes	Frequency (%)	Diabetes No	Frequency (%)	P value
Wound infection	Yes	15 (31.9%)	No	32 (68.1%)	0.45
	No	8 (24.2%)	No	25 (75.8%)	
Malignancy	Yes	10 (27.0%)	No	27 (73.0%)	0.72
	No	13 (30.2%)	No	30 (69.8%)	
Hypoproteinemia	Yes	13 (37.1%)	No	22 (62.9%)	0.14
	No	10 (22.2%)	No	35 (77.8%)	
Anemia	Yes	7 (23.3%)	No	23 (76.7%)	0.40
	No	16 (32.0%)	No	34 (68.0%)	
Peritonitis	Yes	3 (13.6%)	No	19 (86.4%)	0.06
	No	20 (34.5%)	No	38 (65.5%)	

No significant association was found between diabetes and the identified risk factors, as indicated by P values greater than 0.05. The findings of this study highlight the significant role of wound infection, malignancy, and hypoproteinemia as risk factors for wound

dehiscence, particularly in hypertensive patients. These results underscore the need for careful preoperative assessment and management of these conditions to minimize the incidence of wound dehiscence post-laparotomy.

DISCUSSION

The study provided significant insights into the risk factors associated with post-laparotomy wound dehiscence. The mean age of the patients was 42.67 years, and a higher frequency of males was observed, which was consistent with previous studies that reported similar demographic characteristics (18). The identification of wound infection, malignancy, hypoproteinemia, anemia, and peritonitis as major risk factors aligned with existing literature, highlighting the multifaceted etiology of this complication (19).

Infection was the most prevalent risk factor, present in 58.8% of patients. This finding reinforced the critical role of infection control in surgical outcomes, as infections significantly delay wound healing and contribute to dehiscence (2, 3). Malignancy, observed in 46.2% of cases, and hypoproteinemia, found in 43.8% of patients, were also notable risk factors. The association between these conditions and wound dehiscence emphasized the importance of comprehensive preoperative assessments and nutritional interventions to mitigate these risks (4-6). Anemia and peritonitis, though less frequent, still played a considerable role in the occurrence of wound dehiscence, consistent with previous research indicating their impact on wound healing and overall patient recovery (14, 15).

The study found a significant association between hypertension and the presence of wound infection, malignancy, and hypoproteinemia, suggesting that hypertensive patients might require more intensive monitoring and management to prevent wound dehiscence (Table 3). This association was not observed with diabetes, indicating that while diabetes is a known risk factor for poor wound healing, its direct correlation with wound dehiscence in this cohort was not significant (Table 4).

One strength of this study was its prospective design, allowing for a systematic collection of data and minimizing recall bias. The use of a standardized pro-forma ensured consistency in data recording, enhancing the reliability of the findings. However, the study had limitations, including its single-center design, which might limit the generalizability of the results to other settings. The relatively small sample size could have affected the statistical power, particularly in detecting associations between diabetes and wound dehiscence.

Despite these limitations, the study provided valuable recommendations for clinical practice. It highlighted the necessity of rigorous infection control measures and the importance of addressing nutritional deficiencies preoperatively. Surgeons should consider these risk factors when planning and executing surgical interventions, particularly in patients with malignancy or hypoproteinemia. Additionally, the significant association with hypertension suggested that blood pressure management should be an integral part of perioperative care to reduce the risk of wound dehiscence.

Future research should aim to validate these findings in larger, multicenter studies to enhance their applicability. Investigating the underlying mechanisms of how these risk factors contribute to wound dehiscence could also provide deeper insights, potentially leading to the development of targeted preventive strategies. Incorporating advanced techniques such as genomic and proteomic analyses might offer novel perspectives on patient susceptibility to wound dehiscence.

CONCLUSION

In conclusion, the study underscored the complex interplay of multiple factors in the development of post-laparotomy wound dehiscence. By identifying and addressing these risk factors, particularly wound infection, malignancy, hypoproteinemia, anemia, and hypertension, healthcare providers can improve surgical outcomes and reduce the incidence of this challenging complication.

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