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Original Article

Risk Stratification for Prediction of Abdominal Wound Dehiscence in Patients Undergoing Emergency Laparotomy: An Observational Study from Pakistan

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ABSTRACT

Background: Abdominal wound dehiscence (AWD) is a severe postoperative complication following emergency laparotomy, associated with significant morbidity, prolonged hospitalization, and increased mortality, particularly in resource-limited settings where patients often present late with advanced disease. Objective: To determine the frequency of AWD and identify perioperative factors associated with its occurrence in patients undergoing emergency midline laparotomy at a tertiary care center in Pakistan. Methods: A prospective observational cohort study was conducted from March 2023 to March 2024, including 112 adult patients undergoing emergency laparotomy. Demographic, clinical, operative, and postoperative variables were recorded using a structured proforma. AWD was assessed during hospitalization and follow-up up to 6 weeks. Statistical analysis was performed using SPSS version 23.0, with associations evaluated using appropriate parametric and non-parametric tests at a significance level of $p < 0.05$. Results: AWD occurred in 17 patients (15.2%). Hypertension (46.2% vs 11.1%, $p = 0.010$) and diabetes mellitus (50.0% vs 13.9%, $p = 0.048$) were significantly associated with AWD. Postoperative complications demonstrated stronger associations, including deep surgical site infection (80.0% vs 1.1%, $p < 0.001$), ileus (71.4% vs 11.4%, $p < 0.001$), pneumonia (33.3% vs 11.0%, $p = 0.010$), and cough (60.0% vs 10.8%, $p < 0.001$). Length of hospital stay >10 days and return to the operating room were also significantly associated. Conclusion: AWD remains a common complication after emergency laparotomy and is strongly associated with postoperative complications, particularly deep infection and ileus, highlighting the importance of early detection and aggressive postoperative management to improve outcomes. Keywords: Abdominal wound dehiscence, emergency laparotomy, surgical site infection, postoperative complications, risk factors, Pakistan.

INTRODUCTION

Abdominal wound dehiscence (AWD) is one of the most serious complications following abdominal surgery and is characterized by partial or complete separation of a surgically closed abdominal wound, with or without evisceration of intra-abdominal contents. Although uncommon relative to other postoperative complications, AWD carries disproportionate clinical consequences, including increased pain, delayed recovery, surgical site infection, reoperation, prolonged hospitalization, greater resource utilization, and substantial postoperative mortality. The burden is particularly important in emergency laparotomy, where physiologic derangement, contamination, sepsis, poor nutritional status, and limited time for preoperative optimization may converge to impair wound healing and compromise fascial integrity (1,2).

The occurrence of AWD is multifactorial and is best understood through the interaction of patient-related, disease-related, operative, and postoperative factors. Patient-level characteristics such as advanced age, male sex, malnutrition, anemia, smoking, diabetes mellitus, hypertension, chronic respiratory disease, corticosteroid exposure, and other systemic comorbidities have been implicated in impaired collagen synthesis, reduced tissue oxygenation, microvascular dysfunction, or increased mechanical stress on the abdominal wall. Sarcopenia, for example, has been associated with an increased risk of burst abdomen after emergency midline laparotomy, highlighting the contribution of

compromised baseline tissue quality to wound failure (1). Similarly, hypoalbuminemia has emerged as an important marker of impaired nutritional and inflammatory status and has been linked to wound-related complications after emergency exploratory laparotomy (3). These observations support the view that AWD is not merely a technical failure of abdominal closure, but rather the final manifestation of a broader perioperative vulnerability state.

From a procedural perspective, emergency abdominal operations present a particularly high-risk setting for fascial disruption. Patients frequently present late, often with peritonitis, bowel obstruction, ischemia, perforation, or trauma, and may already have sepsis, fluid imbalance, metabolic derangement, and heavy microbial contamination at the time of surgery. In this context, abdominal wall closure is performed under suboptimal local and systemic conditions, and postoperative complications such as ileus, cough, pneumonia, and intra-abdominal sepsis may further increase intra-abdominal pressure or impair wound healing. Previous studies have reported significant associations between AWD and low serum albumin, drain placement, postoperative infection, emergency surgery, and specific closure-related factors, although the reported strength and consistency of these associations vary across populations and study designs (3,4). Differences in case mix, operative urgency, contamination status, perioperative care, and definitions of dehiscence likely explain part of this heterogeneity.

The available literature consistently indicates that AWD remains clinically relevant despite advances in anesthesia, perioperative resuscitation, suture materials, and surgical technique. Studies from different settings have reported that AWD is more frequent after emergency laparotomy than after elective abdominal surgery, and that wound-related outcomes may also vary according to the method and material used for fascial closure (5,6). Other reports have identified male sex, smoking, hypertension, impaired tissue healing, and postoperative wound complications as important contributors to fascial failure, although the relative contribution of each factor differs among cohorts (7-9). Age has also been variably associated with wound dehiscence, with some studies reporting higher rates in elderly patients, while others suggest that disease severity and operative indication may outweigh chronological age alone (8,10). More recent prospective and retrospective analyses continue to demonstrate that AWD is not fully explained by a single dominant determinant, reinforcing the need for context-specific evidence to guide risk recognition and perioperative vigilance (11,12).

Despite this body of evidence, an important knowledge gap persists in low- and middle-income countries, including Pakistan, where emergency surgical workload is high and patients often present with advanced disease, delayed referral, and limited physiological reserve. Data from South Asian emergency laparotomy populations remain comparatively sparse, and findings from elective surgery cohorts or resource-different settings may not be directly applicable to tertiary public-sector hospitals managing large volumes of contaminated and high-acuity abdominal emergencies. In such settings, identifying the combination of preoperative, intraoperative, and early postoperative factors associated with AWD is clinically important because these factors may help surgeons identify high-risk patients earlier, optimize perioperative care, intensify wound surveillance, and implement preventive strategies tailored to local practice environments.

Within this context, the present study was designed to evaluate abdominal wound dehiscence among adult patients undergoing emergency midline laparotomy at a tertiary care hospital in Karachi, Pakistan. The study focused on the frequency of AWD and on the perioperative factors associated with its occurrence, including patient comorbidities, operative characteristics, and early postoperative complications. We hypothesized that AWD after emergency laparotomy is associated with a definable set of perioperative risk factors, particularly systemic comorbidity, wound infection, and postoperative events that adversely affect tissue healing or increase intra-abdominal pressure, and that identifying these factors would support more rational perioperative risk stratification in this population (13-15).

MATERIALS AND METHODS

This prospective observational cohort study was conducted in the Department of General Surgery, Dr. Ruth K. M. Pfau Civil Hospital, Karachi, Pakistan, over a 12-month period from March 2023 to March 2024. The study was designed to determine the frequency of abdominal wound dehiscence after emergency midline laparotomy and to evaluate perioperative factors associated with its development in adult surgical patients. A prospective design was selected to permit standardized perioperative data collection, active postoperative surveillance, and temporally structured assessment of the primary outcome under routine clinical practice conditions (16).

Adult patients aged 18 to 80 years who underwent emergency laparotomy through a midline abdominal incision under general anesthesia were eligible for inclusion. Patients with a history of previous abdominal surgery through a midline incision were excluded to reduce heterogeneity related to scarred fascial planes and altered wound biology. Patients who died in the immediate postoperative period before outcome assessment, those lost to follow-up during the early postoperative phase, and those who declined participation were also excluded. Eligible patients were identified consecutively at the time of emergency surgical admission in order to minimize selection bias and to reflect the real-world spectrum of emergency laparotomy presenting to a high-volume tertiary public-sector center. Written informed consent was obtained from the patient whenever feasible, and from the attendant or legally authorized representative when the clinical condition precluded direct consent at presentation.

All enrolled patients underwent routine clinical assessment in the emergency room, including detailed history taking, general and systemic examination, and laboratory and radiological evaluation according to the underlying surgical indication. Preoperative data were recorded on a structured study proforma at the time of admission and updated perioperatively and during follow-up. The exposure framework was based on clinically relevant perioperative domains. Patient-related variables included age, sex, body mass index, smoking status, alcohol intake, and comorbid conditions including diabetes mellitus, hypertension, chronic obstructive pulmonary disease, malignancy, corticosteroid use, prior stroke, congestive heart failure, bleeding disorder, and ascites. Disease-related and preoperative variables included indication for surgery, delay in presentation, preoperative hemoglobin, total leukocyte count, serum albumin, serum total bilirubin, blood urea nitrogen, serum creatinine, blood urea nitrogen-to-creatinine ratio, and preoperative antibiotic use. Operative variables included American Society of Anesthesiologists (ASA) class, type of anesthesia, operative indication category, duration of surgery, level of operating surgeon, and method of abdominal closure. Postoperative variables included the occurrence of cough, pneumonia, postoperative ileus, sepsis, acute renal failure, deep venous thrombosis, re-intubation, failure to wean from mechanical ventilation beyond 48 hours, return to the operating room, superficial surgical site infection, deep surgical site infection, length of hospital stay, and final in-hospital outcome (16,17).

Emergency laparotomy was performed through a midline incision under general anesthesia according to departmental practice. Abdominal wall closure was carried out using polypropylene No. 1 suture in either continuous, with or without interlocking, or interrupted fashion with prophylactic retention sutures where clinically indicated. To improve data consistency, operative details were documented immediately after surgery from operative notes and direct communication with the operative team. Surgeon level was categorized according to postgraduate training year or consultant status. Because wound integrity may be influenced by both technical and physiological factors, operative and postoperative observations were recorded prospectively rather than abstracted retrospectively wherever possible.

The primary outcome was abdominal wound dehiscence occurring after index emergency laparotomy during the postoperative follow-up period. For analytic purposes, AWD was considered present when there was clinically evident disruption of the abdominal wound closure involving the

musculoaponeurotic layer, with or without superficial layer separation and with or without protrusion or evisceration of abdominal contents. Wound status was assessed regularly from the first postoperative day until discharge and subsequently during follow-up for up to 6 weeks after surgery. Timing of dehiscence was recorded in postoperative days to permit evaluation of the temporal distribution of the event. Postoperative wound complications were assessed through serial bedside examination during admission and review at follow-up visits after discharge. This prospective surveillance approach was adopted to improve outcome ascertainment and reduce the likelihood of missed postoperative events (18).

To improve reproducibility and reduce information bias, data were collected using a standardized questionnaire-based proforma designed before study initiation and applied uniformly across participants. Quantitative laboratory values were recorded from hospital investigations performed as part of standard care. Clinical complications were documented from daily progress notes, nursing observations, operative records, and direct patient assessment. The same predefined data collection framework was used throughout the study period to maintain consistency across cases. Data were reviewed for completeness and internal consistency before entry into the statistical dataset, and the final database was cross-checked against source records to minimize transcription errors.

Potential confounding was addressed at both the design and analysis stages. Restriction was applied through eligibility criteria, particularly exclusion of prior midline laparotomy, to reduce variation in baseline wound characteristics. Consecutive recruitment was used to limit selection bias. During analysis, clinically relevant perioperative variables were examined in relation to the primary outcome, and stratified assessment was undertaken for important covariates where appropriate. Particular attention was given to distinguishing baseline comorbidity from postoperative events, recognizing that some postoperative complications may function as intermediate or associated clinical factors rather than purely preoperative predictors. This analytical approach was intended to support cautious clinical interpretation of perioperative associations while reducing overstatement of causal inference (19,20).

The sample size was 112 patients, calculated before study initiation using the sample size calculator developed by Dr. Lin Naing and M. Ayub Sadiq, School of Dental Sciences, Universiti Sains Malaysia. The calculated sample was deemed sufficient to estimate the occurrence of AWD in the target emergency laparotomy population and to allow exploratory assessment of associated perioperative factors within the study period. Consecutive recruitment continued until the target sample size was achieved.

Statistical analysis was performed using IBM SPSS Statistics version 23.0. Quantitative variables, including age, body mass index, serum albumin, hemoglobin, total bilirubin, total leukocyte count, blood urea nitrogen, creatinine, duration of surgery, and length of hospital stay, were summarized using mean and standard deviation when normally distributed. Categorical variables were summarized as frequencies and percentages.

The Shapiro-Wilk test was used to assess normality of continuous variables. For comparison between patients who developed AWD and those who did not, the independent-samples t test was used for normally distributed continuous variables and the Mann-Whitney U test for non-normally distributed variables. Categorical variables were compared using the chi-square test, with exact testing applied where cell counts were small. Associations were interpreted using a two-sided significance threshold of $p < 0.05$ and a 95% confidence level. Stratified analyses were performed for variables considered potential confounders on clinical grounds. All analyses were based on recorded available data captured through prospective follow-up during the study period (21).

The study protocol was approved by the institutional review board of Dr. Ruth K. M. Pfau Civil Hospital, Karachi, prior to patient enrollment. The study was conducted in accordance with institutional ethical standards and the principles governing research involving human participants. Participation was

voluntary, confidentiality of patient information was maintained throughout data handling and analysis, and no identifying personal information was included in the final dataset used for analysis.

RESULTS

The baseline demographic and comorbidity profile of the study population is summarized in Table 1. Out of 112 patients, 82 (73.2%) were male and 30 (26.8%) were female. Abdominal wound dehiscence (AWD) occurred in 11 males (13.4%) and 6 females (20.0%), showing no statistically significant association with gender ($p = 0.390$; OR 0.62, 95% CI 0.20–1.87). Hypertension was present in 13 patients (11.6%), among whom 6 (46.2%) developed AWD, compared to 11 out of 99 (11.1%) without hypertension.

This represents a significantly increased risk (OR 6.94, 95% CI 1.95–24.6; $p = 0.010$). Similarly, diabetes mellitus, although present in only 4 patients (3.6%), showed a strong association with AWD, with 2 patients (50.0%) developing dehiscence compared to 13.9% in non-diabetics (OR 5.00, 95% CI 0.62–40.2; $p = 0.048$). Smoking was reported in 19 patients (17.0%), with AWD occurring in 4 (21.1%) compared to 13 (14.0%) among non-smokers, though this was not statistically significant ($p = 0.434$). COPD was identified in 5 patients (4.5%), with 2 (40.0%) developing AWD versus 14.0% in those without COPD, again without statistical significance ($p = 0.114$).

Operative and perioperative factors are detailed in Table 2. The majority of surgeries were performed for inflammatory conditions (77 patients, 68.8%), followed by trauma (28 patients, 25.0%) and obstruction (7 patients, 6.3%). AWD occurred in 9 inflammatory cases (11.7%), 3 traumatic cases (10.7%), and notably 5 obstructive cases (71.4%).

Although the obstructive group demonstrated a markedly higher proportion, the overall association did not reach statistical significance ($p = 0.737$), likely due to the small sample size in this subgroup. With respect to physiological status, 62 patients (55.4%) were classified as ASA III–IV, among whom 10 (16.1%) developed AWD compared to 7 (14.0%) in ASA I–II patients (OR 1.18, 95% CI 0.40–3.44; $p = 0.429$), indicating no significant association.

Regarding surgical expertise, most procedures were performed by PGY3–4 residents (101 patients, 90.2%), with 16 AWD cases (15.8%), compared to 1 case (20.0%) among PGY1–2 and none among consultants; however, this difference was not statistically significant ($p = 0.553$).

Postoperative factors demonstrated the strongest associations with AWD, as shown in Table 3. Pneumonia occurred in 21 patients (18.8%), of whom 7 (33.3%) developed AWD compared to 10 out of 91 patients (11.0%) without pneumonia (OR 3.70, 95% CI 1.25–10.9; $p = 0.010$). Cough was present in 10 patients (8.9%), with a markedly higher AWD rate of 60.0% (6/10) compared to 10.8% (11/102) in those without cough (OR 8.73, 95% CI 2.17–35.1; $p < 0.001$).

Sepsis was observed in 24 patients (21.4%), with AWD occurring in 8 (33.3%) compared to 9 (10.2%) among non-septic patients (OR 3.85, 95% CI 1.33–11.1; $p = 0.050$). Postoperative ileus, although present in only 7 patients (6.3%), showed a very strong association, with 5 (71.4%) developing AWD versus 11.4% in those without ileus (OR 22.5, 95% CI 4.07–124.3; $p < 0.001$).

Deep surgical site infection (SSI) emerged as the most significant factor, affecting 20 patients (17.9%), among whom 16 (80.0%) developed AWD compared to only 1 case (1.1%) among those without deep SSI (OR 256, 95% CI 28.5–2298; $p < 0.001$).

In contrast, superficial SSI was observed in 34 patients (30.3%), but AWD occurred in only 1 (2.9%) of these cases compared to 20.5% (16/78) in those without superficial SSI, suggesting an inverse association (OR 0.10, 95% CI 0.01–0.78; $p = 0.020$). Return to the operating room was required in 11 patients (9.8%), with 6 (54.5%) developing AWD compared to 10.9% (11/101) in those not requiring reoperation (OR 9.56, 95% CI 2.54–36.0; $p = 0.001$).

Table 1. Baseline demographic characteristics and comorbidities associated with abdominal wound dehiscence (n = 112)

Variable	Total (n)	AWD (n)	AWD (%)	OR (95% CI)	p-value
Gender					
Male	82	11	13.4	0.62 (0.20–1.87)	0.390
Female	30	6	20.0	Reference	
Hypertension					
Yes	13	6	46.2	6.94 (1.95–24.6)	0.010
No	99	11	11.1	Reference	
Diabetes Mellitus					
Yes	4	2	50.0	5.00 (0.62–40.2)	0.048
No	108	15	13.9	Reference	
Smoking					
Yes	19	4	21.1	1.67 (0.47–5.94)	0.434
No	93	13	14.0	Reference	
COPD					
Yes	5	2	40.0	4.00 (0.57–27.9)	0.114
No	107	15	14.0	Reference	

Table 2. Operative and perioperative factors associated with abdominal wound dehiscence

Variable	Total (n)	AWD (n)	AWD (%)	OR (95% CI)	p-value
Indication for surgery					
Traumatic	28	3	10.7	Reference	
Inflammatory	77	9	11.7	1.11 (0.27–4.46)	0.737
Obstructive	7	5	71.4	20.0 (3.29–121.4)	
ASA Class					
I–II	50	7	14.0	Reference	
III–IV	62	10	16.1	1.18 (0.40–3.44)	0.429
Surgeon Level					
PGY1–2	5	1	20.0	Reference	
PGY3–4	101	16	15.8	0.75 (0.07–7.47)	0.553
Consultant	6	0	0	—	

Postoperative complications demonstrated the strongest associations with AWD, as shown in Table 3. Patients who developed AWD had significantly higher rates of postoperative ileus ($p < 0.001$), pneumonia ($p = 0.010$), sepsis ($p = 0.050$), deep surgical site infection ($p < 0.001$), and superficial surgical site infection

(p = 0.020). Return to the operating room was also significantly associated with AWD (p = 0.001). The presence of deep surgical site infection showed the strongest association, with 80% (16/20) of patients with deep SSI developing AWD. Similarly, postoperative ileus was observed in 29.4% of AWD cases vs 1.9% of non-AWD cases, indicating a markedly increased risk. Length of hospital stay was significantly prolonged among patients with AWD, with the majority (88.2%) staying more than 10 days compared to 11.8% in the non-AWD group (p < 0.001).

Table 3. Postoperative factors associated with abdominal wound dehiscence

Variable	Total (n)	AWD (n)	AWD (%)	OR (95% CI)	p-value
Pneumonia					
Yes	21	7	33.3	3.70 (1.25–10.9)	0.010
No	91	10	11.0	Reference	
Cough					
Yes	10	6	60.0	8.73 (2.17–35.1)	<0.001
No	102	11	10.8	Reference	
Sepsis					
Yes	24	8	33.3	3.85 (1.33–11.1)	0.050
No	88	9	10.2	Reference	
Ileus					
Yes	7	5	71.4	22.5 (4.07–124.3)	<0.001
No	105	12	11.4	Reference	
Deep SSI					
Yes	20	16	80.0	256 (28.5–2298)	<0.001
No	92	1	1.1	Reference	
Superficial SSI					
Yes	34	1	2.9	0.10 (0.01–0.78)	0.020
No	78	16	20.5	Reference	
Return to OT					
Yes	11	6	54.5	9.56 (2.54–36.0)	0.001
No	101	11	10.9	Reference	
Length of Stay					
≤10 days	86	2	2.3	Reference	
>10 days	26	15	57.7	56.0 (11.4–275.3)	<0.001

Length of hospital stay was significantly prolonged among AWD patients, with 15 out of 26 patients (57.7%) who stayed more than 10 days developing AWD compared to only 2 out of 86 patients (2.3%) with shorter stays (OR 56.0, 95% CI 11.4–275.3; p < 0.001). These findings collectively indicate that

postoperative complications, particularly deep SSI, ileus, respiratory complications, and need for reoperation, are strongly associated with the occurrence of abdominal wound dehiscence in this cohort.

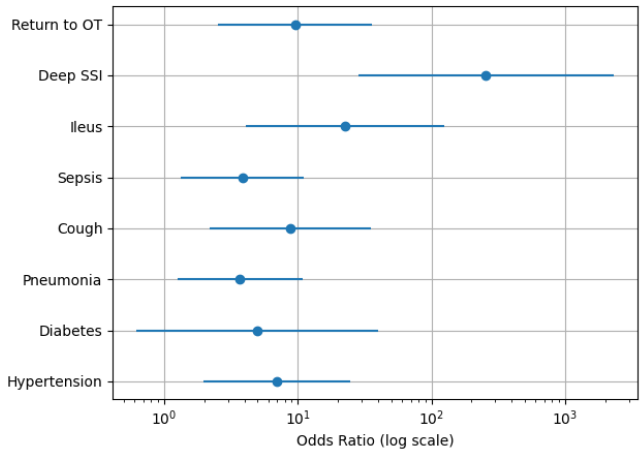

Figure 1 Relative Strength Of Association Between Perioperative Factors And Abdominal Wound Dehiscence

The figure demonstrates a clear gradient in the strength of association between perioperative factors and abdominal wound dehiscence on a logarithmic scale, highlighting a marked disparity between baseline comorbidities and postoperative complications. Deep surgical site infection exhibits the most pronounced effect (OR 256; 95% CI 28.5–2298), far exceeding all other variables, indicating an exponential increase in risk compared to patients without deep SSI. Similarly, postoperative ileus (OR 22.5; 95% CI 4.07–124.3) and return to the operating room (OR 9.56; 95% CI 2.54–36.0) demonstrate strong associations, while respiratory factors such as cough (OR 8.73; 95% CI 2.17–35.1) and pneumonia (OR 3.70; 95% CI 1.25–10.9) show moderate but clinically meaningful effects. In contrast, pre-existing comorbidities such as hypertension (OR 6.94; 95% CI 1.95–24.6) and diabetes mellitus (OR 5.00; 95% CI 0.62–40.2) display comparatively lower and wider confidence intervals, suggesting less consistent predictive strength. The logarithmic dispersion of confidence intervals further reveals substantial variability and uncertainty in estimates for rarer exposures, particularly diabetes and deep SSI, underscoring the dominant role of postoperative complications over baseline patient factors in driving the risk of abdominal wound dehiscence in this cohort.

DISCUSSION

Abdominal wound dehiscence remains a clinically significant postoperative complication, particularly in emergency surgical settings where physiological reserve is limited and perioperative optimization is often constrained. In the present prospective cohort, the incidence of AWD was 15.2%, which lies within the higher range reported in the literature for emergency laparotomy populations. This relatively elevated rate is consistent with findings from similar resource-limited and high-acuity settings, where delayed presentation, contamination, and systemic compromise are more prevalent (6,13). The predominance of male patients and the higher proportion of AWD observed among males are in line with earlier studies; however, this association did not reach statistical significance in our cohort, suggesting that sex alone may not independently influence the risk when other perioperative variables are considered (2,7).

A key finding of this study is the significant association between metabolic comorbidities—specifically hypertension and diabetes mellitus—and the development of AWD. Hypertensive patients demonstrated a markedly higher rate of dehiscence (46.2% vs 11.1%), while diabetic patients showed a similarly elevated proportion (50.0% vs 13.9%). These findings are biologically plausible, as both conditions are known to impair microvascular perfusion, collagen synthesis, and tissue repair mechanisms, thereby predisposing to wound failure (8,9). However, the wide confidence intervals, particularly for diabetes, reflect the small number of affected patients and suggest that these estimates should be interpreted

cautiously. Nonetheless, these results reinforce the importance of optimizing metabolic control in the perioperative period, even in emergency settings where time constraints limit intervention.

Interestingly, traditional demographic and intraoperative variables such as age, ASA classification, surgeon experience, and indication for surgery were not significantly associated with AWD in this cohort. While previous studies have reported mixed findings regarding age and physiological status (8,10), the absence of significant associations in the present study may be attributable to limited statistical power or the overriding influence of postoperative complications. Notably, although obstructive pathologies demonstrated a high crude rate of AWD (71.4%), this did not achieve statistical significance, likely due to the small sample size within this subgroup. These findings highlight the complexity of AWD etiology and suggest that intraoperative factors alone may not adequately capture the risk profile in emergency laparotomy patients.

The most compelling associations identified in this study were related to postoperative complications, particularly deep surgical site infection, ileus, respiratory complications, and the need for reoperation. Deep SSI emerged as the strongest correlate, with 80% of affected patients developing AWD and an exceptionally high odds ratio. This finding aligns with previous reports emphasizing infection as a critical determinant of fascial integrity, as bacterial contamination and inflammatory processes disrupt collagen deposition and wound healing (11,14). Similarly, postoperative ileus and respiratory complications such as cough and pneumonia were strongly associated with AWD, likely through mechanisms involving increased intra-abdominal pressure and mechanical stress on the wound. These factors are consistent with established pathophysiological models in which repeated strain or impaired healing predisposes to fascial separation (3,8).

The association between return to the operating room and AWD further underscores the interplay between postoperative complications and wound failure. Reoperation may reflect underlying intra-abdominal pathology, persistent infection, or technical complications, all of which can compromise wound healing. Likewise, prolonged hospital stay was strongly associated with AWD; however, this relationship is likely bidirectional, as dehiscence itself contributes to extended hospitalization. These findings emphasize the need to interpret postoperative variables within a temporal and causal framework, recognizing that some factors may act as intermediates rather than independent predictors.

The temporal pattern of AWD observed in this study, with the majority of cases occurring between postoperative days 5 and 7, is consistent with classical descriptions in the literature, where the wound is most vulnerable during the transition from inflammatory to proliferative phases of healing (10,15). This window represents a critical period for clinical vigilance, as early identification of wound complications may allow timely intervention and potentially prevent progression to complete dehiscence.

From a clinical perspective, the findings of this study suggest that while baseline patient characteristics contribute to vulnerability, the immediate postoperative course plays a dominant role in determining the occurrence of AWD. This has important implications for perioperative care, particularly in emergency surgical settings. Enhanced monitoring for early signs of infection, aggressive management of respiratory complications, and strategies to minimize intra-abdominal pressure may be more impactful than focusing solely on preoperative risk stratification. Furthermore, these results support the need for context-specific protocols aimed at infection control and postoperative optimization in high-risk populations.

Despite its strengths as a prospective study with systematic data collection, this study has several limitations. The relatively small sample size and the limited number of AWD events restrict the precision of effect estimates and preclude robust multivariable modeling. As a single-center study conducted in a tertiary care public hospital, the findings may not be generalizable to other settings with different patient populations or healthcare resources. Additionally, while efforts were made to standardize data collection, residual confounding cannot be excluded, particularly for variables that may overlap temporally or

mechanistically with the outcome. Future multicenter studies with larger cohorts and advanced statistical modeling are needed to validate these findings and to develop reliable predictive tools for AWD in emergency laparotomy patients.

CONCLUSION

In this prospective cohort of patients undergoing emergency laparotomy, abdominal wound dehiscence was observed in 15.2% of cases and was significantly associated with metabolic comorbidities such as hypertension and diabetes mellitus, as well as postoperative complications including deep surgical site infection, ileus, respiratory complications, sepsis, and need for reoperation; however, demographic and intraoperative variables did not show significant associations, indicating that postoperative clinical course plays a dominant role in determining wound outcomes, and emphasizing the importance of early detection and aggressive management of complications to reduce the burden of this serious surgical morbidity.

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