International Journal of Research in Medical Sciences
Deepika et al. Int J Res Med Sci. 2026 Jul;14(7):xxx-xxx
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20261874

Original Research Article

Risk factors for abdominal wound dehiscence after emergency laparotomy

Deepika, Vatshalya Singh*, Priyanka Srivastava, Ammarul Haque

Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India

Received: 18 March 2026
Revised: 11 June 2026
Accepted: 12 June 2026

***Correspondence:**
Dr. Vatshalya Singh,
E-mail: vatshalyasingh.vs@gmail.com

ABSTRACT

Background: Abdominal wound dehiscence (AWD) is a serious postoperative complication following emergency laparotomy and is associated with substantial morbidity and mortality. This study was performed to determine the incidence of AWD and to identify significant preoperative, intraoperative and postoperative risk factors.
Methods: A retrospective observational study was conducted on 300 adult patients undergoing emergency open laparotomy at a tertiary care teaching hospital. Demographic, clinical and laboratory parameters were recorded. Categorical variables were analysed using Chi-square or Fisher's exact test and continuous variables using independent t-test. Variables with $p<0.10$ on univariate analysis were entered into multivariate logistic regression. A $p<0.05$ was considered statistically significant.
Results: The overall incidence of AWD was 7.0% (21/300). On univariate analysis, surgical site infection (OR 6.9; 95% CI 3.1–15.2; $p<0.001$), hypoalbuminemia (OR 5.1; 95% CI 2.4–10.7; $p=0.002$), peritonitis (OR 4.2; 95% CI 2.0–8.9; $p=0.004$), anemia (OR 3.1; 95% CI 1.4–6.7; $p=0.01$), operative duration >3 hours (OR 2.6; 95% CI 1.2–5.6; $p=0.02$) and postoperative sepsis (OR 3.0; 95% CI 1.3–6.9; $p=0.01$) were significantly associated with AWD. Multivariate analysis identified surgical site infection (adjusted OR 5.8; 95% CI 2.6–12.9; $p<0.001$), hypoalbuminemia (adjusted OR 4.2; 95% CI 1.9–9.1; $p=0.001$) and peritonitis (adjusted OR 3.6; 95% CI 1.6–8.0; $p=0.003$) as independent predictors.
Conclusions: Infective and nutritional factors are major determinants of abdominal wound dehiscence following emergency laparotomy. Early identification and optimization of these risk factors may reduce postoperative morbidity and mortality.

Keywords: Abdominal wound dehiscence, Emergency laparotomy, Surgical site infection, Hypoalbuminemia, Peritonitis, Risk factors

INTRODUCTION

Abdominal wound dehiscence (AWD), commonly known as burst abdomen, is a serious postoperative complication characterized by partial or complete separation of the abdominal fascial layers after surgical closure. It typically occurs during the early postoperative period and is associated with substantial morbidity, prolonged hospitalization, increased healthcare costs, need for reoperation, and higher mortality rates. Despite significant advances in surgical techniques, suture materials, perioperative care, and infection control measures, AWD remains a major challenge in abdominal surgery, particularly following emergency laparotomy.[1]

The reported incidence of abdominal wound dehiscence varies considerably across different populations and healthcare settings. Previous studies reported that AWD continues to be an important postoperative complication associated with multiple patient- and surgery-related risk factors.[1] Similarly, some studies demonstrated that wound dehiscence and subsequent incisional hernia contribute significantly to postoperative morbidity and adversely affect patient outcomes.[2] Similar studies also identified

AWD as a frequent complication following laparotomy, emphasizing the importance of recognizing associated risk factors and implementing preventive strategies.[3]

Wound healing is a complex biological process involving inflammation, collagen synthesis, angiogenesis, fibroblast proliferation, and tissue remodeling. Any disruption in these processes can impair wound integrity and predispose patients to fascial separation. Several studies have identified factors such as surgical site infection, malnutrition, hypoalbuminemia, anemia, intra-abdominal sepsis, and emergency surgery as important contributors to impaired wound healing and subsequent wound dehiscence.[4-8] Among these, surgical site infection has consistently emerged as one of the strongest predictors of wound failure. Similar studies demonstrated a significant association between postoperative wound infection and adverse surgical outcomes following abdominal surgery.[4] Likewise, some studies highlighted the role of poor nutritional status and hypoalbuminemia in increasing the risk of postoperative wound complications.[5]

Emergency laparotomy patients are particularly vulnerable to AWD because they frequently present with generalized peritonitis, bowel perforation, intestinal obstruction, trauma, or other life-threatening conditions requiring urgent surgical intervention. Teklemariam et al reported that intra-abdominal contamination and postoperative infection significantly increase the likelihood of wound dehiscence.[6] Similarly, Chiang et al found that emergency abdominal surgery performed in the presence of severe intra-abdominal sepsis was associated with a higher incidence of fascial disruption and poorer postoperative outcomes.[7] More recently, Parsa et al reaffirmed the importance of infection-related and nutritional factors in the development of abdominal wound dehiscence following emergency laparotomy.[8]

The significance of these risk factors has been recognized for several decades. Penninckx et al identified wound infection and poor nutritional status as major determinants of abdominal wound dehiscence in gastrointestinal surgery.[9] Sorensen further emphasized the detrimental effects of malnutrition on wound healing and postoperative recovery.[10] In addition, van Ramshorst et al developed and validated a predictive model demonstrating that emergency surgery, infection, and nutritional compromise are among the most important predictors of AWD.[11]

Although several studies have evaluated abdominal wound dehiscence, variations in patient characteristics, disease profiles, and healthcare resources necessitate region-specific data. Limited information is available regarding the incidence and determinants of AWD among patients undergoing emergency laparotomy in eastern India. Therefore, the present study was undertaken to determine the incidence of abdominal wound dehiscence and to identify significant risk factors associated with its occurrence among patients undergoing emergency laparotomy at Patna Medical College and Hospital, Patna, Bihar, India.

METHODS

Study design and setting

This retrospective observational study was conducted in the Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India. The study period extended from October 2025 to January 2026.

Ethical approval

Approval was obtained from the Institutional Ethics Committee of Patna Medical College and Hospital (IEC No. PMC/11/25, approved on 09 September 2025). Patient confidentiality was maintained throughout the study.

Study population

Records of 300 adult patients aged 18 years or older who underwent emergency open laparotomy during the study period were reviewed. Patients undergoing elective surgery, laparoscopic procedures without conversion, open abdomen management, relaparotomy and those who died within 48 hours of surgery were excluded (Figure 1).

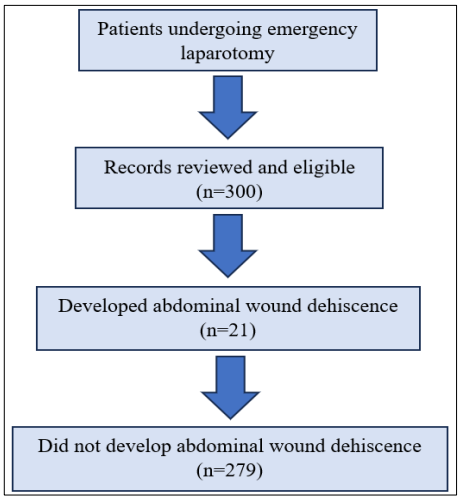

Figure 1: Patient inclusion and outcomes.

Data collection

Information regarding age, sex, comorbidities, indication for surgery, hemoglobin level, serum albumin level, operative duration, wound classification, postoperative complications and outcomes was extracted from hospital records.

Outcome measure

The primary outcome was occurrence of abdominal wound dehiscence within 30 postoperative days.

Statistical analysis

Data were analyzed using standard statistical software. Categorical variables were compared using Chi-square or Fisher's exact test. Continuous variables were analyzed using independent t-test. Odds ratios with 95% confidence intervals were calculated. Variables with $p<0.10$ on univariate analysis were entered into multivariate logistic regression. Statistical significance was considered at $p<0.05$.

RESULTS

A total of 300 patients who underwent emergency laparotomy during the study period were included in the analysis. Among them, 21 patients developed AWD, yielding an overall incidence of 7.0%, while 279 patients (93.0%) did not develop AWD.

Baseline demographic and clinical characteristics

The demographic and clinical characteristics of patients with and without AWD are presented in Table 1. Male patients constituted a higher proportion of the AWD group (15/21 (71.4%)) compared to the non-AWD group (165/279 (59.1%)); however, this difference was not statistically significant (p=0.24).

Patients who developed AWD had significantly lower mean hemoglobin levels than those who did not develop AWD (10.2±1.3 g/dl versus 12.3±1.4 g/dl, p=0.01). Similarly, the mean serum albumin level was significantly lower in the AWD group (2.7±0.4 g/dl) compared to the non-AWD group (3.6±0.5 g/dl, p=0.002), indicating a strong association between poor nutritional status and wound dehiscence.

Univariate analysis of risk factors

The association between potential risk factors and AWD was evaluated using univariate analysis (Table 2). Surgical site infection (SSI) demonstrated the strongest association with AWD, with an odds ratio (OR) of 6.9 (95% CI: 3.1–15.2; p<0.001). Patients who developed SSI were nearly seven times more likely to experience wound dehiscence compared to those without infection. Hypoalbuminemia was also significantly associated with AWD (OR 5.1; 95% CI: 2.4–10.7; p=0.002). Patients with low serum albumin levels had more than five times higher odds of developing wound dehiscence than patients with normal albumin levels.

Peritonitis was another significant predictor, increasing the likelihood of AWD by more than fourfold (OR 4.2; 95% CI: 2.0–8.9; p=0.004). Anemia was associated with a threefold increase in risk (OR 3.1; 95% CI: 1.4–6.7; p=0.01). Likewise, operative duration exceeding three hours was significantly associated with AWD (OR 2.6; 95% CI: 1.2–5.6; p=0.02). Postoperative sepsis also demonstrated a significant association with wound dehiscence (OR 3.0; 95% CI: 1.3–6.9; p=0.01).

Postoperative outcomes

Patients who developed AWD experienced significantly worse postoperative outcomes than those without AWD (Table 3). Reoperation was required in 12 patients (57.1%) in the AWD group compared to only 18 patients (6.5%) in the non-AWD group (p<0.001).

Table 1: Baseline demographic and clinical characteristics (n=300).

Variable	AWD (n=21)	No AWD (n=279)	P value
Male sex	15 (71.4%)	165 (59.1%)	0.24
Mean haemo-globin (g/dl)	10.2±1.3	12.3±1.4	0.01*
Mean serum albumin (g/dl)	2.7±0.4	3.6±0.5	0.002*

*Statistically significant (p<0.05)

Table 2: Univariate analysis of risk factors for abdominal wound dehiscence.

Risk factor	Odds ratio (OR)	95% confidence interval	P value
Surgical site infection	6.9	3.1–15.2	<0.001 *
Hypoalbuminemia	5.1	2.4–10.7	0.002*
Peritonitis	4.2	2.0–8.9	0.004*
Anemia	3.1	1.4–6.7	0.01*
Operative duration >3 hours	2.6	1.2–5.6	0.02*
Postoperative sepsis	3.0	1.3–6.9	0.01*

*Statistically significant (p<0.05)

Table 3: Postoperative outcomes.

Outcome	AWD (n=21)	No AWD (n=279)	P value
Reoperation	12 (57.1%)	18 (6.5%)	<0.001*
Mean hospital stays (days)	18±6	9±4	<0.001*
In-hospital mortality	6 (28.6%)	14 (5.0%)	<0.001*

*Statistically significant (p<0.05)

The mean duration of hospital stay was significantly longer among patients with AWD (18±6 days) compared with those without AWD (9±4 days) (p<0.001), indicating a substantial increase in healthcare utilization and recovery time.

In-hospital mortality was also significantly higher in patients who developed AWD, occurring in 6 patients

(28.6%), compared with 14 patients (5.0%) among those without AWD (p<0.001).

Multivariate logistic regression analysis

Variables showing significance on univariate analysis were entered into a multivariate logistic regression model to identify independent predictors of AWD (Table 4). Surgical site infection remained the strongest independent predictor of AWD (adjusted OR 5.8; 95% CI: 2.6–12.9; p<0.001) (Figure 2).

Hypoalbuminemia also remained independently associated with AWD (adjusted OR 4.2; 95% CI: 1.9–9.1; p=0.001), highlighting the importance of nutritional status in postoperative wound healing. Peritonitis retained statistical significance as an independent predictor (adjusted OR 3.6; 95% CI: 1.6–8.0; p=0.003).

Table 4: Multivariate logistic regression analysis.

Variable	Adjusted OR	95% confidence interval	P value
Surgical site infection	5.8	2.6–12.9	<0.001*
Hypoalbumi-nemia	4.2	1.9–9.1	0.001*
Peritonitis	3.6	1.6–8.0	0.003*

*Statistically significant (p<0.05)

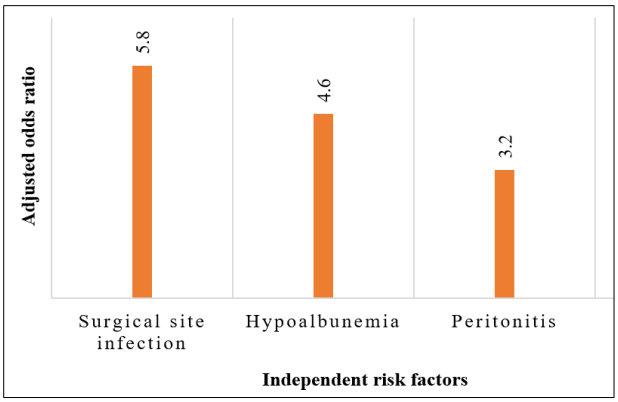

Figure 2: Independent predictors of abdominal wound dehiscence identified by multivariate logistic regression analysis.

These findings indicate that surgical site infection, hypoalbuminemia, and peritonitis are the principal independent determinants of abdominal wound dehiscence following emergency laparotomy.

DISCUSSION

The incidence of AWD in the present study was 7.0%, which is comparable to rates reported by previous studies who identified AWD as a significant postoperative complication associated with increased morbidity and prolonged hospitalization.[1-3]

Surgical site infection (SSI) emerged as the strongest independent predictor of AWD in our study (adjusted OR 5.8, p<0.001).[4,5] Infection impairs collagen synthesis and wound strength, predisposing patients to wound failure. Hypoalbuminemia was another significant independent risk factor (adjusted OR 4.2, p=0.001).[6,7] Low serum albumin reflects protein depletion and impaired tissue repair, increasing the risk of postoperative complications.

The presence of peritonitis was also independently associated with AWD (adjusted OR 3.6, p=0.003). Similar results were reported in previous studies who found that intra-abdominal sepsis and contaminated surgical fields significantly increased the likelihood of wound dehiscence.[8,9] The inflammatory response associated with peritonitis compromises tissue healing and promotes postoperative infection. Although anemia and postoperative sepsis were significant on univariate analysis, they did not retain significance on multivariate analysis. Comparable observations have been reported in previous studies suggesting that these factors may contribute indirectly through impaired tissue oxygenation, increased surgical stress, and infectious complications.[10-12] Our findings are further supported by the classical work of Penninckx et al, who identified infection and poor nutritional status as major determinants of AWD.[13] Similarly, Sorensen emphasized the role of malnutrition in impaired wound healing.[14] van Ramshorst et al developed a predictive model highlighting emergency surgery, infection, and nutritional compromise as key risk factors.[15]

Overall, the present study confirms that SSI, hypoalbuminemia, and peritonitis are the principal predictors of AWD following emergency laparotomy. Early identification and optimization of these modifiable factors may significantly reduce postoperative morbidity and improve surgical outcomes.

CONCLUSION

AWD following emergency laparotomy is strongly associated with surgical site infection, hypoalbuminemia and peritonitis. Early recognition and correction of these modifiable risk factors may improve surgical outcomes and reduce mortality.

ACKNOWLEDGEMENTS

Authors would like to thank the surgical team and hospital staff for their support in data collection and patient management.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Aksamija G, Mulabdic A, Rasic I, Aksamija L. Evaluation of Risk Factors of Surgical Wound Dehiscence in Adults After Laparotomy. Med Arch. 2016;70(5):369-72.
2. Walming S, Angenete E, Block M, Bock D, Gessler B, Haglind E. Retrospective review of risk factors for surgical wound dehiscence and incisional hernia. BMC Surg. 2017;17(1):19.
3. Verma S, Patil SM, Bhardwaj A. Study of risk factors in post-laparotomy wound dehiscence. Int Surg J. 2018;5(7):2513-7.
4. Alkaaki A, Al-Radi OO, Khoja A, Alnawawi A, Alnawawi A, Maghrabi A, et al. M. Surgical site infection following abdominal surgery: a prospective cohort study. Can J Surg. 2019;62(2):111-7.
5. Samartsev VA, Gavrilov VA, Kuznetsova MV, Kuznetsova MP. Risk factors of abdominal wound dehiscence in abdominal surgery. Khirurgiia (Mosk). 2020;(10):68-72.
6. Teklemariam BT, Biyana CF, Asfaw SA. Determinants of postoperative abdominal wound dehiscence among patients operated in a tertiary hospital. Ethiop J Health Sci. 2022;32(4):739-46.
7. Chiang YHF, Lee YW, Lam F, Liaom CC, Chang CC, Lin CS. Risk factors and outcomes of abdominal wound dehiscence after emergency laparotomy. World J Surg. 2022;46(5):1123-31.
8. Parsa H, Maghsoudi LH, Mohammadzadeh A, Hosseini M. Outcomes and risk factors of abdominal wound dehiscence following emergency laparotomy. Ann Med Surg (Lond). 2024;89:104896.
9. Penninckx FM, Poelmans SV, Kerremans RP, Beckers JP. Abdominal wound dehiscence in gastroenterological surgery. Ann Surg. 1979;189(3):345-52.
10. Sorensen LT. Wound healing and infection in surgery: the clinical impact of smoking and malnutrition. Surg Clin North Am. 2012;92(1):1-15.
11. van Ramshorst GH, Nieuwenhuizen J, Hop WCJ, Arends P, Boom J, Jeekel J, et al. Abdominal wound dehiscence in adults: development and validation of a risk model. World J Surg. 2010;34(1):20-7.

Cite this article as: Deepika, Singh V, Srivastava P, Haque A. Risk factors for abdominal wound dehiscence after emergency laparotomy. Int J Res Med Sci 2026;14:xxx-xx.