Print ISSN: 2321-6379
Online ISSN: 2321-595X

Original Article

Assessment of Risk Factors in Abdominal Wound Dehiscence Using Rotterdam Risk Index Score in Post-Laparotomy Patients: A Prospective Observational Study

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Abstract

Background: Abdominal wound dehiscence (AWD) is a serious post-operative complication following laparotomy, associated with increased morbidity, reoperation, and prolonged hospitalization. Early identification of high-risk patients using validated scoring systems, such as the Rotterdam Risk Index Score (RRIS) may improve outcomes.

Aim: To evaluate the predictive accuracy of RRIS in determining the risk of AWD following midline laparotomy.

Materials and Methods: This prospective observational study was conducted over 18 months at a tertiary care teaching hospital. Eighty-one adult patients undergoing elective or emergency midline laparotomy were included. RRIS was calculated pre-operatively. Patients were followed for 30 days for the development of AWD. Statistical analysis was performed using the Chi-square test and logistic regression. A $P < 0.05$ was considered significant.

Results: AWD occurred in 9 of 81 patients (11.1%). Significant risk factors included age ≥65 years ($P = 0.033$), emergency surgery ($P = 0.025$), anemia ($P = 0.049$), hypoalbuminemia ($P = 0.038$), operative duration >3 h ($P = 0.015$), and intraoperative blood loss >500 mL ($P = 0.029$). Logistic regression identified hypoalbuminemia (odds ratio [OR] 4.5; $P = 0.021$) and operative duration >3 h (OR 3.8; $P = 0.017$) as independent predictors. Patients with RRIS >7 demonstrated significantly higher AWD rates.

Conclusion: RRIS is a reliable and practical tool for predicting AWD. Optimization of modifiable risk factors, such as nutritional status and operative duration may significantly reduce post-operative morbidity.

Key words: Abdominal wound dehiscence, Laparotomy, Risk stratification, Rotterdam risk index score, Surgical complications

INTRODUCTION

Abdominal wound dehiscence (AWD), commonly termed burst abdomen, represents mechanical failure of fascial closure following abdominal surgery. Despite improvements in suture materials and perioperative care, AWD remains a significant contributor to post-operative morbidity.[1,2]

The etiology is multifactorial, involving patient-related factors, such as advanced age, anemia, hypoalbuminemia, diabetes mellitus, and obesity; intraoperative factors including emergency surgery, prolonged operative time, and blood loss; and post-operative factors, such as infection and increased intra-abdominal pressure.[3-5]

The Rotterdam Risk Index Score (RRIS) was developed as a predictive tool integrating perioperative variables to identify patients at risk for AWD.[6] However, prospective validation in Indian surgical populations remains limited.

Access this article online

www.ijss-sn.com

Month of Submission : 01-2026
Month of Peer Review : 02-2026
Month of Acceptance : 03-2026
Month of Publishing : 03-2026

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Table 1: Baseline characteristics of study population (*n*=81) variable

Variable	Frequency	Percentage
Age ≥65 years	27	33.3
Male	41	50.6
Female	40	49.4
Emergency surgery	20	24.7
Anemia (Hb <10g/dL)	13	16.0
Hypoalbuminemia (<3.5 g/dL)	11	13.6
AWD cases	9	11.1

AWD: Abdominal wound dehiscence, Hb: Hemoglobin

Table 2: Association of clinical variables with abdominal wound dehiscence

Variable	AWD Present (*n*=9)	AWD Absent (*n*=72)	Chi-square	*P*-value
Age ≥65 years	6	21	4.53	0.033
Emergency surgery	5	15	5.02	0.025
Anemia	4	9	3.87	0.049
Hypoalbuminemia	4	7	4.29	0.038
Diabetes mellitus	3	13	2.14	0.144
Surgery >3 h	7	25	5.89	0.015
Blood loss >500	5	9	4.77	0.029

AWD: Abdominal wound dehiscence

This study evaluates the predictive value of RRIS in patients undergoing midline laparotomy in a tertiary care center.

MATERIALS AND METHODS

Study Design

Prospective observational cohort study conducted from August 2023 to January 2025.

Study Setting

Department of General Surgery, Dhanalakshmi Srinivasan Medical College and Hospital, Tamil Nadu, India.

Participants

Eighty-one adult patients undergoing midline laparotomy were included.

Inclusion Criteria

- Age ≥18 years
- Midline laparotomy (elective or emergency)

Exclusion Criteria

- Gynecological or urological surgeries
- Previous laparotomy
- Connective tissue disorders

Data Collection

Clinical and laboratory variables were recorded. RRIS was calculated based on:

- Age ≥65 years
- Emergency surgery
- Anemia (Hb <10 g/dL)
- Hypoalbuminemia (<3.5 g/dL)
- Diabetes mellitus
- Body mass index >30 kg/m²

Outcome Definition

AWD was defined as post-operative fascial separation within 30 days requiring intervention.

Statistical Analysis

Data were analyzed using SPSS version 21.0. Chi-square test and binary logistic regression were applied. $P < 0.05$ considered statistically significant.

RESULTS

Baseline Characteristics (Table 1)

- Total patients: 81.
- Mean RRIS: 6.9 ± 1.1.
- Emergency surgeries: 24.7%.
- Age ≥65 years: 33.3%

Incidence

- AWD incidence: 11.1% (9 patients).

Risk Factor Analysis (Table 2)

Significant associations observed:

- Age ≥65 years ($P = 0.033$)
- Emergency surgery ($P = 0.025$)
- Anemia ($P = 0.049$)
- Hypoalbuminemia ($P = 0.038$)
- Operative duration >3 h ($P = 0.015$)
- Blood loss >500 mL ($P = 0.029$)

Multivariate Analysis

Independent predictors:

- Hypoalbuminemia (odds ratio [OR] 4.5; $P = 0.021$)
- Operative duration >3 h (OR 3.8; $P = 0.017$)

DISCUSSION

The observed AWD incidence of 11.1% aligns with reports from tertiary centers in developing settings.[1,2] Emergency surgery significantly increased the risk, likely due to suboptimal pre-operative optimization.[7]

Hypoalbuminemia emerged as the strongest independent predictor, emphasizing the importance of nutritional assessment in surgical patients.[3,8] Prolonged operative duration independently predicted AWD, possibly reflecting tissue hypoperfusion and increased inflammatory response.[7,9,10]

RRIS effectively stratified patients into risk categories, demonstrating its practical utility in routine surgical assessment.[6]

CONCLUSION

The RRIS is a reliable tool for predicting AWD following laparotomy. Routine incorporation of RRIS into pre-operative protocols may enable early intervention and reduce post-operative morbidity.

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How to cite this article: Aishwarya CV, Gurumoorthy P, Srivasshan M, Fathima FH. Assessment of Risk Factors in Abdominal Wound Dehiscence Using Rotterdam Risk Index Score in Post-Laparotomy Patients: A Prospective Observational Study. Int J Sci Stud 2026;13(12):38-40.

Source of Support: Nil, **Conflicts of Interest:** None declared.