Original Article

Wound Dehiscence in Elective and Emergency Abdominal Surgery: Its Management and Outcome in a Tertiary-Level Hospital

https://doi.org/10.47648/zhswmcj.2026.v0802.06

*Karim R,[1] Nahid TH,[2] Rumi RA,[3] Razy AA,[4] Rokonuzzaman M,[5] Bithy R,[6] Nawshin N[7]

ABSTRACT

Background: Wound dehiscence is described as partial or complete disruption of an abdominal wound closure with or without protrusion and evisceration of abdominal contents. It is a very serious postoperative complication associated with high morbidity and mortality. Several factors have been shown to be linked with wound dehiscence following surgery, including open surgical approach, malnutrition, jaundice, obesity, anemia, smoking habit, insulin-dependent diabetes, immunosuppression, wound contamination, hypoalbuminemia, and prolonged operative time. Postoperative outcome also varies depending on operative technique and timing of surgery, such as early or late intervention, and on the nature of the surgery, as elective or emergency. It was evident that the complication rate after emergency surgery is higher than that of elective surgery. **Objective:** To assess wound dehiscence in elective and emergency abdominal surgery and its management outcome in a tertiary-level hospital. **Method:** This Prospective observational study was carried out in the Department of Surgery, Rajshahi Medical College Hospital, Rajshahi, from 14th September 2020 to 14th September 2021. Ethical approval was obtained from the RMCH ethical review board. Patients who underwent laparotomy for emergency or elective surgery were selected by purposive sampling and allocated into two groups, 50 patients in each. Group-A (including 50 patients who underwent elective surgery) and Group-B (50 patients who underwent emergency surgery). The occurrence of wound dehiscence with other postoperative outcomes was evaluated. All information is recorded in the data collection sheet. **Result:** In this study, the majority of patients (28.0%) were in the 41-50 years age group, with a mean age of 46.4±11.2 years in Group-A and 45.1±11.5 years in Group-B. There was no significant difference between the two groups. The male-to-female ratio was 1.9:1. A large number of respondents came from the urban areas (73.0%), followed by rural areas (27.0%). The largest group (47.0%) was service holders and workers, with 46.0% in group A and 48.0% in group B. No significant difference was observed between groups with respect to the demographic profile. In this study, major compounding factors were: 1) age, 2) sex, 3) diabetes, 4) wound infection, 5) indication of surgery, 6) type of suture used; other: mentioned in background; additional factors: lack of proper preoperative preparation in emergency cases. Common indications for surgery included gastric, intestinal, and hepatobiliary procedures. On clinicopathological assessment, wound infections are categorized into three types: superficial, deep incisional, and organ-space SSIs. The present study shows that 2% of patients in group A had superficial incisional surgical site Infection, whereas in group B, it occurred in 10% of patients. Deep incisional surgical site infection developed in 2% of patients in group A and 8% of patients in group B. The difference between groups was statistically significant ($p<0.05$). The present study demonstrated that the frequency of wound dehiscence after abdominal surgery is 24.0%. Compared with group A, the frequency of wound dehiscence is 20.0% in patients who underwent emergency surgery (group B). Whereas this frequency was lower, e.g., 4.0% in patients undergoing elective surgery (group A). Therefore, emergency surgery is associated with a higher risk of postoperative wound dehiscence. Regarding the management-related issues, 5 of them underwent relaparotomy for the management of the wound dehiscence, and all were H/O emergency surgery. Five patients were treated with tension suture, and only 2 with layered suture during the second operation of abdominal closure. **Conclusion:** The present study concluded that an emergency surgical procedure was significantly associated with wound dehiscence. The overall magnitude of abdominal wound dehiscence in the study area was 24.0%. Strict observance of sterility techniques and auditing the use of the type of sutures are mandatory to decrease the incidence.

Keywords: Wound dehiscence, emergency surgery, elective surgery, SSI(Surgical Site Infection)

Received on: 14th May,2026 **Accepted on: 10th June,2026**

Introduction

Abdominal wound dehiscence is a partial or total separation of previously approximated wound edges, due to a failure of proper wound healing. This scenario typically occurs 5 to 8 days following surgery when healing is still in the early stages. The causes of dehiscence are similar to the causes of poor wound healing and include ischemia, infection, increased abdominal pressure, diabetes, malnutrition, smoking, and obesity.[1,2] Other factors like proper resuscitation, meticulous surgical technique, age, any co-morbid condition (coronary artery disease, diabetes mellitus, hypertension, any chronic illness), anesthesia technique, and postoperative care contribute to the final result. In comparison to elective surgery, postoperative complications and wound dehiscence are more common in emergency laparotomy.[3]

In a study out of 430 patients, 35 patients had acute wound failure, so the incidence of wound dehiscence was 8.13%. In another study, out of 173 elective laparotomies, three cases of wound dehiscence were noted, whereas 32 cases had the disaster occurring in emergency procedures. Thus, incidence was quite high in emergency laparotomies ($P< 0.001$).[4] In recent years, there has been a considerable drop in the incidence of burst abdomen in many reports, a result of the spread in popularity of mass closure technique usually combined with the use of non-absorbable suture material and with closely placed, wide bites of the abdominal wall.[5] The reported incidence of wound dehiscence varies from 0.2% to 3% of abdominal wounds.[6] Local literature reports a quite high incidence of 3% to 8%.[7] Local sepsis is the single most important factor delaying collagen synthesis and increasing collagenolysis, resulting in the development of a burst abdomen and incisional hernia.[8] A history of wound infection from a previous surgery can be sought in the majority of patients presenting for incisional hernia repair.[9] Prompt identification is important for preventing worsening dehiscence, infection, and other complications.

Proper wound healing occurs in three general phases: inflammation, proliferation, and maturation.[2] The repaired wound can be expected to regain 80% of the original tensile strength over 2 years, but will not reach the pre-injury level. Poor wound healing can occur due to the disruption of any of the three phases of healing. Common risk factors for abnormal healing include the presence of necrotic tissue, infection, ischemia, smoking, diabetes, malnutrition, glucocorticoid use, and radiation exposure.[10] When dehiscence is identified, it is crucial to determine the extent of wound failure. Superficial dehiscence can be managed with abdominal binders to reduce strain on the wound and prevent further dehiscence. The existing wound failure may be allowed to heal by secondary intention or may close secondarily. Deep dehiscence of the underlying fascia is a surgical emergency and must be closed in the operating room, as this can lead to evisceration. If the wound shows signs of evisceration, the wound can be covered with a sterile saline dressing until the herniating organs can be reduced back into the abdomen.[2]

Author's Affiliation:

1. *Md. Romijul Karim, Asssistant professor, Department of Surgery, Rajshahi Medical College Hospital, Rajshahi.
2. Towhidul Hasan Nahid, Junior Consultant, Department of Surgery, Rajshahi Medical College Hospital, Rajshahi.
3. Rina Akter Rumi, Medical Officer, Medical Officer, Upazila Health Complex, Premtoli, Godagari, Rajshahi
4. Alim Al Razy, Assistant Professor, Department of Gastro Surgery, Z H Sikder Women's Medical College & Hospital, Dhaka, Bangladesh
5. Md. Rokonuzzaman, Assistant Professor, Department of Islami Bank Medical College, Rajshahi
6. Rubayat Bithy, Medical Officer, Chest Disease Hospital, Rajshahi
7. Nafia Nawshin, Medical Officer, Department of Anesthesiology, Z H Sikder Women's Medical College & Hospital, Dhaka, Bangladesh.

Address of Correspondence: : *Dr. Md. Romijul Karim, Assistant Professor, Department of Surgery, Rajshahi Medical College Hospital, Rajshahi. Bangladesh, ORCID ID: https://orcid.org/0009-0008-9106-2341,Email: drromijul1238@gmail.com

Healing wounds require increased oxygen and other factors to promote proper repair. Wounds with poor perfusion or ischemia do not receive sufficient blood flow to meet demand and are unable to heal correctly. Patient comorbidities, including vascular disease or venous insufficiency, increase patient risk for wound failure and dehiscence. Careful suturing can reduce local ischemia and prevent wound failure. Infected wounds fail to heal appropriately and become 'stuck' in the inflammatory phase. Without proper resolution of wound inflammation, wound inflammation, proliferation, and maturation are unable to occur.[1,2]

Diabetes, a microvascular disease, can impair blood flow, leading to poor wound perfusion. Hyperglycemia also increases the risk of wound infection, decreasing healing. Tobacco smoking has a vasoconstrictive effect leading to decreased wound perfusion. Nicotine also impairs proper macrophage migration and fibroblast activation, thereby impeding the wound-healing process. Malnutrition/ Hypoalbuminemia - Protein status is essential for fibroblast proliferation, collagen synthesis, and angiogenesis. Without adequate protein stores, proper wound healing becomes slowed. Limited carbohydrate reserves can lead to protein catabolism and wound breakdown. Deficiencies of vitamin C and zinc also impair wound healing. Optimizing a patient's nutrition before surgery can decrease the risk of wound failure. Radiation causes microvascular obliteration, leading to a gradual decrease in tissue perfusion toward the epicenter of the irradiated target area and compromising wound repair. Radiation can also lead to altered cellular replication and increased fibrosis, inhibiting proper wound healing1.[11]

Surgeon-related factors, especially level of experience and technical ability, are more significant than patient-related factors in the development of wound dehiscence. The type of suture material or specific closure technique used is now less significant than patient-related risk factors. However, emphasis should be placed on proper surgical technique, including taking large fascial bites during abdominal closure. Avoid excess tension on the wound, as this increases the risk of direct dehiscence and decreases perfusion to the healing wound. Advanced techniques to reduce wound tension include small 'pie-crust' incisions during wound closure and the use of attachment plates, top closure, and the 3S system to reduce initial wound tension while allowing for gradual tension loading.[1,2] The aim of this study was to assess wound dehiscence in elective and emergency abdominal surgery in RMCH.

Objective

General Objective

- To assess wound dehiscence in elective and emergency abdominal surgery and its management outcome in a tertiary-level hospital.

Specific Objective

- To assess the factors causing abdominal wound dehiscence.
- To assess the incidence of wound dehiscence
- To assess the outcomes or results of abdominal wound dehiscence.

Material And Methods

Study Design

This Prospective observational study was carried out in the Department of Surgery, Rajshahi Medical College Hospital, Rajshahi, from 14th September 2020 to 14th September 2021. Patients who underwent laparotomy for emergency or elective surgery were selected by purposive sampling and allocated into two groups, 50 patients in each. Group-A (including 50 patients who underwent elective surgery) and Group-B (50 patients who underwent emergency surgery). The occurrence of wound dehiscence with other postoperative outcomes was evaluated. All information is recorded in the data collection sheet. Data were processed and analyzed using SPSS and Microsoft Excel.

Inclusion Criteria

1. Patients more than 14 years of age, of both sexes.
2. Patients presenting with abdominal wound dehiscence after emergency or elective operation.
3. Patients who are ready for investigations and treatment for this condition.

Exclusion Criteria

1. Patient less than 14 years of age.
2. Patients who refuse investigations and treatment.
3. Laparoscopic surgery

Operational Definition

Wound Dehiscence: Separation of a surgical wound after closure; may involve part or all layers, with or without infection.

Superficial SSI: Infection within 30 days after surgery involving only skin and subcutaneous tissue; presents with pus, redness, pain, swelling, or positive culture.

Deep SSI: Infection involving fascia or muscle, occurring within 30 days (or up to 1 year if an implant is present); presents with pus, wound breakdown, fever, pain, abscess, or other evidence of deep infection.

Organ/Space SSI: Infection of an organ or body space related to surgery, occurring within 30 days (or 1 year if an implant is present), diagnosed by pus drainage, positive culture, or evidence of abscess/infection.

Major Surgery: Any operation that opens a major body cavity/barrier such as the peritoneum, pleural cavity, or meninges.

Data collection

Data were collected using a semi-structured questionnaire from eligible patients attending the Department of Surgery at Rajshahi Medical College Hospital. The questionnaire was designed to capture relevant demographic, clinical, and laboratory data.

Data analysis

Data were analyzed by SPSS software, version 24. Categorical variables were summarized as percentages. Quantitative variables were summarized as the mean and standard deviation. Tests for association between groups and categorical variables were performed using the chi-square test. For quantitative variables, means will be compared by a Student's t-test. P<0.05 was accepted as statistically significant.

Results

Table 1: Age distribution of the patients (n=100)

Age (years)	Number of patients	Number of patients	Total (%)
	Group A (n = 50) No. (%)	*Group B (n = 50) No. (%)*	
14-30	8(16.0%)	7(14.0%)	15
31-40	11(22.0%)	15(30.0%)	26
41-50	16(32.0%)	12(24.0%)	29
51-60	13(26.0%)	12(24.0%)	25
61-70	2(4.0)	4(8.0%)	6
Mean ± S.D.	*46.4±11.2*	*45.1±11.5*	

The table shows the age distribution of patients. This study was conducted on patients aged 18 to 67 years. It was observed that the majority, i.e., 28.0% of patients, belonged to the 41-50 years age group, followed by 26.0% in the 31-40 years age group. The mean age was *46.4±11.2* years in Group A and *45.1±11.5* years in Group B. There was no significant difference between the two groups.

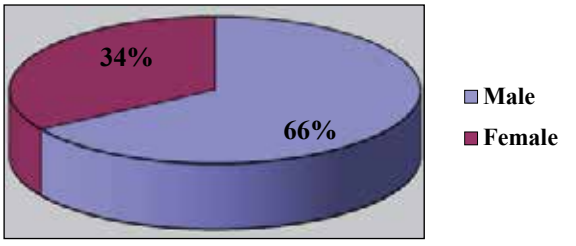

Figure 1: Gender distribution of study subjects (n=100)

The table shows the patients' gender. Out of 100 cases, 66.0% were male and 34.0% were female. The male-to-female ratio was 1.9:1.

Table 2: Distribution of patients according to surgery-related factors (n=100)

Surgery related factors	Frequency and Percentage	Frequency and Percentage	*p-value
	Group A (n = 50) No. (%)	*Group B (n = 50) No. (%)*	
Suture material			
Absorbable	14(28.0)	18(36.0)	0.391
Non-absorbable	36(72.0)	32(64.0)	0.391
Grade of surgeon			
Senior surgeon	46(92.0)	4(8.0)	<0.001
Junior surgeon	4(8.0)	46(92.0)	<0.001
Preoperative preparation			
Proper optimization	49(98.0)	5(10.0)	<0.001
Lack of optimization	1(2.0)	45(90.0)	<0.001
Suture technique			
Continuous suturing	9(18.0)	15(30.0)	0.160
Interrupted sutures	41(82.0)	35(70.0)	0.160

*p-value reached from Chi-square test,

The table showed that suture material and suture technique were not statistically significantly different between Group A and Group B (p>0.05). Proper optimization and senior surgeons were significantly higher in Group A compared to Group B (p<0.001).

Table 3: Occupational distribution of the study patients (n=100)

Occupational status	Frequency and Percentage	Frequency and Percentage	Frequency and Percentage	Frequency and Percentage	X2 test	p-value
	Group A (n = 50) No. (%)	*Group A (n = 50) No. (%)*	*Group B (n = 50) No. (%)*	*Group B (n = 50) No. (%)*		
	No.	**%**	**No.**	**%**		
Business	14	28.0	15	30.0		
House wife	13	26.0	11	22.0	8.042	0.158
Service & Worker	23	46.0	24	48.0		
Total	50	100.0	50	100.0		

Regarding occupational status, the largest group, i.e., 47.0%, was service holders and workers, with 46.0% in group A and 48.0% in group B. Housewives were present in 26.0% of patients in group A and 22.0% in group B. The difference between the two groups was not statistically significant (p>0.05).

Figure 2: Socioeconomic status of the study population (n=100)

Socioeconomically, patients are grouped into three classes. Poor class GNI per capita income (In Tk.): <7000, Middle class GNI per capita income (In Tk.): 7000-27000, and Upper class GNI per capita income (In Tk.) : >27000. Among the patients, the poor class comprises 42%, followed by the middle class at 38%, and the remaining are the upper class at 20%.

Table 4: Distribution of the patients according to indication for surgery (n=200)

Diagnosis	*Group A (n = 50) No. (%)*	*Group A (n = 50) No. (%)*	*Group B (n = 50) No. (%)*	*Group B (n = 50) No. (%)*	**Total (%)**
Diagnosis	*No.*	*%*	*No.*	*%*	
Gastric surgery	19	38.0	14	28.0	33%
Intestinal surgery	16	32.0	20	40.0	36%
Hepatobiliary surgery	14	28.0	2	4.0	16%
Blunt abdominal trauma	0	0.0	10	20.0	10%
Others	1	2.0	4	8.0	5%

The table shows the distribution of patients by surgical indication. No significant difference was observed between groups (p>0.05). Common indications were gastric surgery, intestinal surgery, hepatobiliary surgery, and blunt abdominal Trauma.

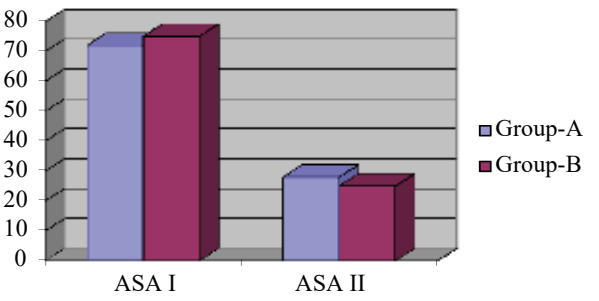

Figure 3: American Society of Anesthesiologists (ASA) physical status (n=150)

Patient distribution by ASA status. There was no significant difference between the groups (p=0.950). The comparison was done using the Chi-Square ($\chi 2$) test.

Table 5: Comparison of the different risk factors (n=100)

Risk factors	**Frequency and Percentage**	**Frequency and Percentage**	**Frequency and Percentage**	**Frequency and Percentage**	***p*-value**
	Group A (n = 50) No. (%)	*Group A (n = 50) No. (%)*	*Group B (n = 50) No. (%)*	*Group B (n = 50) No. (%)*	
	No.	***%***	***No.***	***%***	
Anaemia	29	58.0	25	50.0	0.168ns
Diabetes	14	28.0	12	24.0	0.648ns
Smoking	15	30.0	12	24.0	0.305ns
Previous surgery	9	18.0	8	16.0	0.242ns
Poor nutrition	7	14.0	8	16.0	0.779ns
COPD	15	30.0	12	24.0	0.305ns

(Multiple response)

The table compares the different risk factors. No significant differences were observed between the two groups regarding risk factors. The table shows the different risk factors among the study subjects. In group A, 58.0% of patients had anemia, 28.0% had diabetes, and 30.0% had H/O smoking. In group B patients, 50.0% of patients had anemia, 24.0% had Diabetes, and 24.0% had H/O smoking.

Table 6: Assessment and follow-up of surgical site during postoperative period (n=100)

Characteristics of wound site	**Number of patients**	**Number of patients**	**p-value**
	Group A (n = 50) No. (%)	*Group B (n = 50) No. (%)*	
Healthy wound with good healing	48(96.0%)	40(80.0%)	
Purulent discharge from the site	1(2.0%)	8(16.0%)	
Tenderness and localized swelling	2(4.0%)	6(12.0%)	0.004s
Redness or heat	1(2.0%)	6(12.0%)	
Spontaneously dehisces	2(4.0%)	10(20.0%)	

(Multiple respondents)

(p-value reached from Chi-square test, s=significant)

It is evident from the table that a total of 9 patients developed purulent discharge from the site with group B predominance (2.0% vs. 16.0% in group A and group B, respectively). Redness or heat was observed in 2% of patients in group A and 12% in group B. Spontaneous dehiscence was observed in 12 patients (4% of cases in group A and 20% in group B). The difference between groups was statistically significant ($p<0.05$).

Table 7: Types of wound infection according to extent of infection (n=100)

Types of wound infection	**Number of patients**	**Number of patients**	**Total (%)**	**P value**
	Group A (n = 50) No. (%)	*Group B (n = 50) No. (%)*		
Superficial Incisional Surgical Site Infection	1(2.0%)	5(10.0%)	6(12.0%)	
Deep Incisional Surgical Site Infection	1(2.0%)	4(8.0%)	5(10.0%)	0.014s
Organ/Space Surgical Site Infection	0(0.0%)	1(2.0%)	1(2.0%)	

p-value reached from Chi-square test, s=significant

All patients' regular follow-up and wound care were done. On clinicopathological assessment, wound infections are categorized into three types: superficial, deep incisional, and organ-space SSIs, depending on the site and extent of infection. The present study shows that 2% of patients in group A had superficial incisional surgical site Infection, whereas 10% of patients in group B had the infection. Deep incisional surgical site infection developed in 2% of patients in group A and 8% of patients in group B. The difference between groups was statistically significant ($p<0.05$).

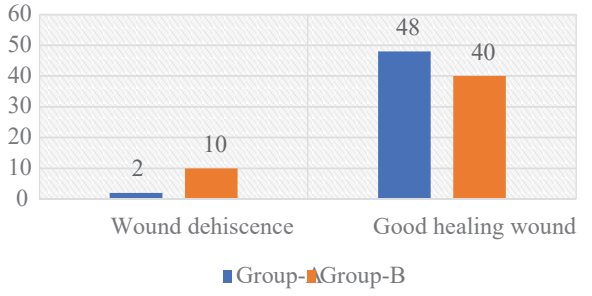

Figure 4: Overall outcome and frequency of wound dehiscence between groups (n=100)

The present study demonstrated that the frequency of wound dehiscence after abdominal surgery is 12.0%. In comparison with group A, the frequency of wound dehiscence is 20.0% in patients who underwent emergency surgery (group B). Whereas this frequency was lower, e.g., 4.0% in patients undergoing elective surgery (group A). Therefore, emergency surgical techniques are more often associated with postoperative wound dehiscence than elective techniques.

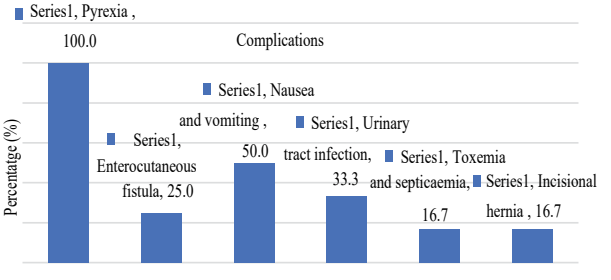

Figure 5: Evaluation of complications in wound dehiscent cases (n=12)

Complications most frequently observed in this study were pyrexia in 12(100.0%) patients, nausea & vomiting in 6(50.0%) of patients. Other complications were UTI (25%), Toxemia & septicaemia 4(33.3%), enterocutaneous fistula3(25.0%) and incisional hernia in 2(16.6%) of patients.

Table 8: Management of dehisced cases (n=12)

Management	Number of patients	Number of patients	Total
	Group A (n = 2) No. (%)	*Group B (n = 10) No. (%)*	
Relaparotomy	0	5 (50.0%)	5
Tension suture	2 (100.0%)	3 (30.0%)	5
Layered suture during the second operation	0	2 (20.0%)	2

The table shows the management of dehisced cases. Regarding the management-related issues, 5 of them underwent relaparotomy for the management of the wound dehiscence, and all were H/O emergency surgery. Five patients were treated with tension suture, and only 2 with layered suture during the second operation of abdominal closure.

Discussion

An observational study was conducted in the Department of Surgery, Rajshahi Medical College Hospital, over a 12-month period to assess wound dehiscence in elective and emergency abdominal surgery, including its management and outcomes. It was observed that the majority, i.e., 28.0% of patients, belonged to the age group 41-50 years; the mean age was *46.4±11.2* years in Group A and *45.1±11.5* years in Group B. There was no significant difference between the two groups. Out of 200 cases, 66.0% were male and 34.0% were female. The male-to-female ratio was 1.9:1. A large proportion of respondents came from urban areas (73.0%), followed by rural areas (27.0%). The largest group (e.g., 47.0%) was service holders and workers; 46.0% in group A and 48.0% in group B. No significant difference was observed between groups with respect to the demographic profile.

Findings are in accordance with the results of other studies. In a study, a total of 400 patients underwent laparotomy, among which 350 patients underwent emergency laparotomy, and 50 patients underwent elective laparotomy. 270 (77.14%) patients were male, and 80 (14.28%) were female. The age ranged from 8 to 70 years. In another study, the mean age of patients was 29.8 (SD = 1.21) years, with ages ranging from 1 to 80 years. Among the patients, the majority (21, 51.2%) were aged 41 and above, and 29 (70.7%) were male.[12]

This study showed that the most common indications for surgery were gastric, intestinal, and hepatobiliary procedures. There was no significant difference between the groups with respect to ASA status (p=0.950). No significant differences were observed between the two groups regarding risk factors. In group A, 58.0% of patients had anemia, 28.0% had diabetes, and 30.0% had H/O smoking. In group B patients, 50.0% of patients had anemia, 24.0% had Diabetes, and 24.0% had H/O smoking. The difference in the prevalence of coexisting disease between the two groups was not statistically significant. Teklewold et al reported that, among 41 patients with dehiscence, the majority, 37 (90.2%), underwent emergency surgery, and 21 (51.5%) had no comorbid illness, but 10 (24%) had anemia as a preoperative comorbidity. Twenty-eight (68.3%) of them were operated on for acute abdomen due to bowel obstruction (both small and large bowel obstruction). Thirty-six (87.8%) of the incisions were vertical midline incisions, and 24 (58.5%) of them developed wound dehiscence within 6–10th postoperative days.[12] A previous study reported that peptic perforation peritonitis constituted 110 (31.42%) cases, followed by typhoid perforation peritonitis 85 (24.28%), intestinal obstruction 76 (21.7%), blunt and penetrating trauma abdomen 28 (7.98%), appendicular perforation 17(4.85%), and 36.57% of patients developed complications after emergency laparotomy in the postoperative period.[3]

On clinicopathological assessment, wound infections are categorized into three types: superficial, deep incisional, and organ-space SSIs. The present study shows that 2% of patients in group A had superficial incisional surgical site Infection, whereas in group B, it occurred in 10% of patients. Deep incisional surgical site infection developed in 2% of patients in group A and 8% of patients in group B. The difference between groups was statistically significant ($p<0.05$). The present study demonstrated that 12 patients experienced wound dehiscence after abdominal surgery. In comparison with group A, the frequency of wound dehiscence is 20.0% in patients who underwent emergency surgery (group B). Whereas this frequency was lower, e.g., 4.0% in patients undergoing elective surgery (group A). Therefore, emergency surgical techniques are associated with a higher risk of postoperative wound dehiscence.

A previous study reported an overall rate of abdominal wound dehiscence of 0.99%.[12] Other studies conducted at Siddhartha Medical College, Pakistan Institute of Medical Sciences, Islamabad, show 5.9%,[29] and at RNT Medical College, Udaipur, India, 5.38%[30]. Teklewold et al reported that those who were operated for emergency (90.24%), those operated for acute abdomen secondary to bowel obstruction during the 1st surgery (68.3%), and those who underwent vertical midline incision (87.80%) were more likely to develop abdominal wound dehiscence than the other groups of patients[12] like our findings.

Similar findings were also noted by Chauhan et al. (2017), who reported that complications were recorded in 128 patients after emergency laparotomy, as compared to 11 patients after elective laparotomy. The reason for this might be that these procedures are life-saving and patients are rushed into operation with limited time for stabilization and adequate resuscitation, which greatly affects operative outcome; also, sterility during procedures is poorer during emergency hours than during elective hours. Another factor that might be associated with this is the suturing technique and the use of suturing material in emergency conditions. In elective surgeries, it is standard practice to close midline vertical incisions with slowly absorbable sutures, using a 4:1 ratio and a continuous technique in small steps. Different studies have also shown that the same technique used during emergency conditions has significantly reduced the rate of dehiscence.[25] In our studies (practice of technique and type of suturing material used were described), the maximum number of incisions was vertical; therefore, it is useful to audit routine practices and adopt best practices identified in other studies to reduce the rate of dehiscence.

Different studies show that fever is common among postoperative patients. After emergency laparotomy, as well as elective laparotomy, fever was seen in 20% of cases3. Most early postoperative fever (temperature above 38ºC/100.4ºF) lasting 48 hours or more is caused by the surgical inflammatory stimulus and resolves spontaneously.[31, 32] However, postoperative fevers can also be a manifestation of a serious complication. Pyrexia within 48 hours of surgery is often due to pulmonary atelectasis. Between 48 hours and five days, pyrexia may result from thrombophlebitis or infection of the urinary tract or the chest, and, more than five days after surgery, a wound infection or anastomotic breakdown should be suspected.[33] A low rate of fever in elective laparotomy may be due to a lower risk of wound and chest infections and fewer critically ill

patients in this group. Incidence of burst abdomen following emergency laparotomy was 0.57%, while no case of burst abdomen was found after elective laparotomy in the previous study.[3]

Complications most frequently observed in this study were pyrexia in 12(100.0%) patients, nausea & vomiting in 6(50.0%) of patients. Other complications were UTI 4(33.3%), Toxemia & septicemia 2(16.7%), enterocutaneous fistula 3(25.0%) and incisional hernia in 2(16.7%) of patients.

Previous study noted that most common complication evident was postoperative pyrexia in 70 (20%) patients followed by wound related complication in 43 (12.28%) patients and postoperative nausea and vomiting in 42 (12%) patients, respiratory complications seen in 24 (6.85%) patients, fecal fistula observed in 7 (2%) patients, post-operative obstruction seen in 6 (1.71%) patients, toxemia and septicemia developed in 28 (8%) cases. Deep vein thrombosis was seen in 1 patient. 30 patients died in the postoperative period because of complications (majority because of septicemia).[3] A study done by Jawaid et al, also recorded postoperative fever in 18.2% as the commonest complication, postoperative nausea and vomiting in 11.6% cases, and wound infection in 11.4% cases after emergency laparotomy.[34]

Regarding the management-related issues, 5 of them underwent relaparotomy for the management of the wound dehiscence, and all were H/O emergency surgery. Five patients were treated with tension suture, and only 2 with layered suture during the second operation of abdominal closure.

Teklewold et al reported that the majority (95.2%) of dehisced patients underwent relaparotomy for the management of wound dehiscence, and 48.8% were treated with a tension suture during the second operation of abdominal closure. Four of the patients (9.7%) died after the management of the second operation.[12] According to experimental studies on pigs, the mass closure technique showed greater wound separation than layered closure[26], but systematic reviews by Ceydeli et al. concluded that mass closure should be used as a standard[27]. To date, the recommendation for the use of ideal tension during abdominal closure remains unknown.

The current study finding is supported by the other study finding like the study carried out in St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, revealed that regarding factors related to management outcome, those patients who were operated for emergency condition (10.81%), who had pulmonary disease as a clinical comorbid illness (50%), those who underwent vertical midline incision (11.11%), had poor management outcome.[12] Another study finding carried out in Osmania General Hospital showed 72.72% of patients with emergency laparotomies, 51.51% of patients with peritonitis, 63.63% of patients with anemia, and 51.51% of patients with respiratory infections[35] in India, patients with complicated appendicitis, anemia (56%), and patients treated as emergency surgeries (92%)[36] were affected.

In a study of 430 patients, 35 had acute wound failure, yielding an incidence of wound dehiscence of 8.13%. Out of 173 elective laparotomies, three cases of wound dehiscence were noted, whereas 32 cases had the disaster occurring in emergency procedures. Thus, incidence was quite high in emergency laparotomies ($P< 0.001$).[4] In recent years, there has been a considerable drop in the incidence of burst abdomen in many reports, a result of the spread in popularity of the mass closure technique usually combined with the use of non-absorbable suture material and with closely placed, wide bites of the abdominal wall.[5] The reported incidence of wound dehiscence varies from 0.2% to 3% of abdominal wounds.[6] Local literature reports a quite high incidence of 3% to 8%.[7] Local sepsis is the single most important factor delaying collagen synthesis and increasing collagenolysis, resulting in the development of a burst abdomen and incisional hernia.[8] Prompt identification is important for preventing worsening dehiscence, infection, and other complications.

Limitations of the Study

- It was a single-center study. Only patients admitted to RMCH were taken for the study. So, this will not reflect the overall picture of the country. A large-scale study is needed to reach a definitive conclusion.
- Small sample size.

Conclusion

The present study concluded that an emergency surgical procedure was significantly associated with wound dehiscence. The overall magnitude of abdominal wound dehiscence in the study area was 12.0%. Postoperative complications

increase patient morbidity and mortality and are a target for quality improvement programs. Many complications may be prevented by thorough preoperative evaluation, sound surgical technique, and careful follow-up care. In this study, the fact that dehiscence commonly occurred at emergency surgery, male patients (because they are more in number), and the presence of co-morbidity (diabetes, hypoalbuminemia) patients shows that these circumstances need special attention for preoperative care to minimize the occurrence of this catastrophic complication. Strict adherence to sterility techniques and auditing the use of specific sutures are mandatory to reduce the incidence. Surgeon-related factors and also techniques of abdominal closure used during emergency conditions should also be carefully sought to identify preventable causes.

Recommendation

1. Surgical wound dehiscence (SWD) is a significant issue that affects large numbers of patients and is almost certainly under-reported. The impact of SWD can be considerable: increased mortality, delayed hospital discharge, readmission, further surgery, delayed adjuvant treatment, suboptimal aesthetic outcome, and impaired psychosocial wellbeing. Consequently, it is imperative to raise awareness of SWD and improve identification, prevention, and management.
2. Prevention of SWD comprises excellence in surgical practice, prevention of surgical site infection, reduction of the risk of healing impairment, and the use of strategies such as single-use negative-pressure wound therapy in appropriate high-risk patients.
3. Management also involves a holistic approach that includes ameliorating impediments to healing, optimizing conditions in the wound bed, and using appropriate treatment modalities to ultimately close the wound.

Author Contributions

In the study, Dr. Md. Romijul Karim is likely to have led the conception, design, data analysis, drafting, and final approval. Dr. Towhidul Hasan Nahid and Dr. Rubayat Bithy probably contributed to conception, data interpretation, critical revision, and final approval. Dr. Rina Akter Rumi likely participated in data acquisition, analysis, critical revision, and final approval. Dr. Alim Al Razy & Dr. Nafia Nawshin probably contributed to data analysis, interpretation, critical revision, and final approval. Dr. Md. Rokonuzzaman is likely to have assisted with data acquisition, drafting, and final approval.

Abbreviations

SSI – Surgical Site Infection

COPD – Chronic Obstructive Pulmonary Disease

ASA – American Society of Anesthesiologists

SWD – Surgical Wound Dehiscence

FUNDING: No funding sources

CONFLICT OF INTEREST: None declared

References

1. Ousey K. World Union of Wound Healing Societies (WUWHS) Consensus Document. Surgical wound dehiscence: improving prevention and outcomes. Wounds International, 2018: 1-34
2. Rosen RD, Manna B. Wound Dehiscence. [Updated 2021 May 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK551712
3. Chauhan S, Chauhan B, Sharma H. A comparative study of postoperative complications in emergency versus elective laparotomy at a tertiary care center. Int Surg J 2017;4:2730-5
4. Afzal S, Bashir MM. Determinants of Wound Dehiscence in Abdominal Surgery in Public Sector Hospital. ANNALS VOL 14. NO. 3 JUL.- SEPT. 2008
5. Krisner RS, Eaglstein WH. The wound healing process. Dermatol Clin 1993; 11: 629
6. Springfield DS. Surgical wound healing. Cancer Treat Res 1993; 61: 81.
7. Lodhi F, Ayyaz M, Majeed HJ, Afzal F,

Farooka MW, Chaudhary Z. Etiological factors responsible for abdominal wound dehiscence and their management. Ann K E Med Coll 1999; 5: 312-4.

8. Yao K. Post-operative wound management. Australian Family Physician 2013; 42(12): 867-872.

9. Richard NM, Ramzi SC. Repair: cell regeneration, fibrosis, and healing. In: Vinay K, Ramzi SC, Stanley LR. Basic Pathology. 6th ed. Philadelphia: WB Saunders; 1997. 56

10. Racz J, Dubois L, Katchky A, Wall W. Elective and emergency abdominal surgery in patients 90 years of age or older. Can J Surg. 2012;55(5):322-328.

11. Hunter S, Thompson P, Langemo D, Hanson D, Anderson J. Understanding wound dehiscence. Nursing 2007: 28-32.

12. Teklewold B, Dut Pioth, Tadele Dana, "Magnitude of Abdominal Wound Dehiscence and Associated Factors of Patients Who Underwent Abdominal Operation at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia", Surgery Research and Practice, vol. 2020, Article ID 1379738, 5 pages, 2020. https://doi.org/10.1155/2020/1379738

13. S. Waqer, Z. Malik, A. Razzaq, M. T. Abdullah, A. Shaima, and M. A. Zahid, "Frequency and risk factors for wound dehiscence/burst abdomen in midline laparotomies," Journal of Ayub Medical College Abbottabad, vol. 17, no. 4, pp. 70–73, 2005.

14. K. Kapoor and M. Hassan, "A clinical study of abdominal wound dehiscence with emphasis on surgical management in Bangalore Medical College and Research Institute, Karnataka, India," International Surgery Journal, vol. 4, no. 1, pp. 2349–3305, 2017.

15. M.-B. Tolstrup, S. K. Watt, and I. Gögenur, "Reduced rate of dehiscence after implementation of a standardized fascial closure technique in patients undergoing emergency laparotomy," Annals of Surgery, vol. 265, no. 4, pp. 821–826, 2017.

16. Hobar PC, Masson JA, Herrera R, Ginsburg CM, Sklar F, Sinn DP, et al. Fever after craniofacial surgery in the infant under 24 months of age. Plast Reconstr Surg. 1998;102(1):326.

17. Guinn S, Castro FP Jr, Garcia R, Barrack RL. Fever following total knee arthroplasty. Am J Knee Surg. 1999;12(3):164-1

18. Davidson B, Rai R. Postoperative care of surgical patients. Student BMJ. 1999;7:99101.

19. Jawaid M, Masood Z, Iqbal SA. Post-operative complications in a general surgical ward of a teaching hospital. Pak J Med Sci. 2006;22:171-5.

20. Y. Cengiz, H. Gislason, K. Svanes, and L. A. Israelsson, "Mass closure technique: an experimental study on separation of wound edge," European Journal of Surgery, vol. 167, no. 1, pp. 60–63,

21. Ceydeli A, J. Rucinski, and L. Wise, "Finding the best abdominal closure: an evidence-based review of the literature," Current Surgery, vol. 62, no. 2, pp. 220–225, 2005.

22. P. Qureshi, V. Modi, S. Qureshi, P. Gupta, and M. Gupta, "Study of early post-operative complications of major surgery in patients in a tertiary care teaching hospital in Central India-a prospective observational study," Asian Pacific Journal of Health Sciences, vol. 5, no. 2, 2018.

23. G. H. van Ramshorst, J. Nieuwenhuizen, W. C. J. Hop et al., "Abdominal wound dehiscence in adults: development and validation of a risk model," World Journal of Surgery, vol. 34, pp. 20–27, 2010.