

A Prospective Study of Risk Factors Influencing Wound Dehiscence in Patients Undergoing Midline Laparotomy in Pandit Deendayal Upadhyay Medical College, Rajkot, India

¹Dr. Parth K. Parikh*, ²Dr. Jatin G. Bhatt, ³ Dr. Devendra Rathore

¹Department of general surgery, Pandit Deendayal Upadhyay medical college, Rajkot, India

²Department of general surgery, Pandit Deendayal Upadhyay medical college, Rajkot, India

³Department of general surgery, Pandit Deendayal Upadhyay medical college, Rajkot, India

Corresponding Author: Dr. Parth Parikh

Department of surgery PDU medical college Rajkot, India

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 one of the most dreaded complications in the post-operative period and of greatest concern because of risk of evisceration, with mortality rates reported as high as 45%. Incidence as described in literature ranges from 0.4% to 3.5%. This study is aimed to assess the association and prevalence of risk factors involved in causing abdominal wound dehiscence and also to study effective management of abdominal wound dehiscence.

Methods: All cases presenting with wound dehiscence after surgery were included. An elaborate clinical history was taken in view of significant risk factors. The types of surgery performed and the type of disease involved. A total of 50 cases were included in this prospective study. Data was analyzed using appropriate software.

Results: The results concluded that male patients have a higher incidence of laparotomy wound dehiscence, moreover in 5th decade. Patients presenting with hollow viscus perforation are more prone to abdominal wound dehiscence. Patients classified with dirty wounds undergoing emergency surgeries show higher predilection for wound dehiscence.

Conclusions: Patient factors like older age group, male sex, with co-morbidities like anemia, diabetes, COPD patients and those with perforation peritonitis all act as determinant for wound dehiscence. Simple routine laboratory investigations may help identify predisposing risk factors and can be corrected accordingly. Most of the patients can be managed conservatively.

Keywords: Abdominal wound dehiscence, Emergency operation, Peritonitis

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I. Introduction

Wound dehiscence is described as partial or complete disruption of an abdominal wound closure with or without protrusion and evisceration of abdominal contents.¹ Two basic types of wound dehiscence are partial & complete, which is classified depending on the extent of separation of the wound. In partial dehiscence, only the superficial layers or part of the tissue layers reopen. Complete wound dehiscence is one in which all layers of the wound thickness are separated, exposing the underlying tissue and organs, which may protrude out of the separated wound.² It is one of the most dreaded complications in the post-operative period and of greatest concern because of risk of evisceration, the need for immediate intervention, and there is chance of recurrence of wound gaping, wound infection, and incisional hernia formation.³ Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication, with mortality rates reported as high as 45%. Incidence as described in literature ranges from 0.4% to 3.5%.⁴ Various risk factors are responsible for wound dehiscence such as emergency surgery, Intra-abdominal infection, Malnutrition Hypoalbuminemia, Anaemia, Advanced age >65yrs, systemic diseases (uraemia, diabetes mellitus) etc. Good knowledge of these risk factors is mandatory for prophylaxis.⁵ Mortality and morbidity in the form of prolonged hospital stay, increased economic burden on health care resources and long-term complication of incisional hernia can be reduced by highlighting the risk factors for wound dehiscence, the incidence rate and remedial measures to prevent or reduce the incidence of wound dehiscence.

That is why the objective of this study was to determine risk factors influencing abdominal wound dehiscence which can help in preventing the abdominal wound dehiscence.

II. Methods

This is a prospective study carried out from to in the department of General surgery, PDU medical college, Rajkot, India.

50 patients who developed abdominal wound dehiscence following Midline laparotomy during study period were included. The inclusion criteria used were patients more than 14 years of age and of either sex undergoing either emergency or elective abdominal operations.

The exclusion criteria were those patients below age of 14 years, patients with incisional hernia, those who developed wound dehiscence on site other than abdomen, and female patients who developed wound dehiscence after gynaecological procedure. A comprehensive history and thorough physical examination were recorded. Statistical analysis done and observations represented as bar diagrams and pie charts.

III. Results

Distribution of study subjects according to age

Table 1: Incidence in different age group

Age	No. of cases	Percentage
14-20	10	20
21-30	10	20
31-40	3	6
41-50	6	12
51-60	16	32
61-70	3	6
71-80	2	4
	50	100

In this study major number of patients belonged to the age group between 51-60 years, youngest age was 15 and the oldest patient was 80 years. The mean age of patients affected was 40.5 years.

Distribution according to gender

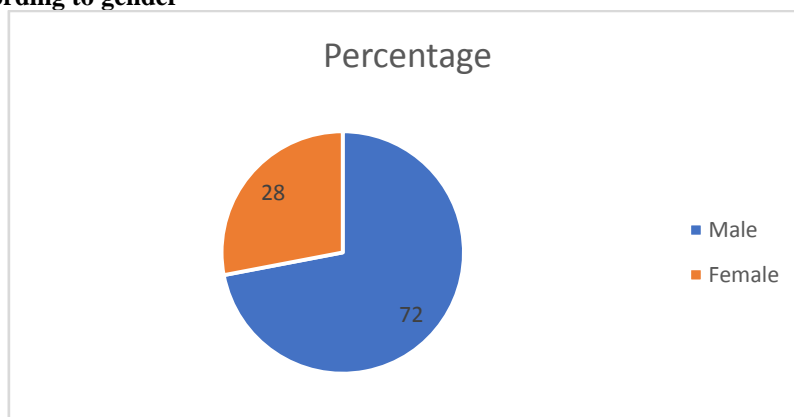


Figure 1: Incidence of abdominal wound dehiscence in different genders

Out of 50 cases, 36 cases were male and 14 were female. This higher incidence is due to Increased incidence of peptic perforation and intestinal obstruction in males.

Table 2: Co-morbid conditions at the time of admission

Conditions	No. of cases	Percentage
Diabetes	5	10
Hypertension	5	10
Koch's	5	10
IHD	1	2
Hypothyroidism	1	2

Table3: Postoperative causes associated with abdominal wound dehiscence

Postoperative causes	No. of cases	Percentage
Wound contamination	45	90
Cough	18	36
Abdominal distension	17	34
Vomiting	20	40

Wound contamination remained the most common post-operative cause of wound dehiscence. 45 out of 50 patients had wound contamination (90%). Cough was present in 18 patients (36%). Abdominal distension (34%) and vomiting (40%) cases.

Table 4: Effect of emergency surgery in development of abdominal wound dehiscence

Surgery	No. of cases		Percentage
	Elective	12	24
Emergency	38	76	

Table 5: Prevalence of wound dehiscence in relation to serum electrolyte

Serum Electrolytes	No. of patients	
	Normal	Deranged
36	14	

Out of 50 patients 14 had deranged serum electrolytes. Hypokalemia is an important cause of post-operative paralytic ileus and abdominal distension which increases intraabdominal pressure and thus one of the risk factors for abdominal wound dehiscence.

Table 6: Prevalence of abdominal wound dehiscence in relation to anemia

Hb%	No. of cases
<10	22
>10	28

Table 7: Prevalence of abdominal wound dehiscence in relation to hypoalbuminemia

Hypoalbuminemia	No. of Patients	
	Present	Absent
23	27	

Table 8: Prevalence of wound dehiscence in relation to serum bilirubin

Serum Bilirubin	No. of cases	
	Normal	Deranged
41	09	

Table 9: Various abdominal procedures leading to abdominal wound dehiscence

Procedure	No. of cases
Perforation closure	15
Resection and anastomosis	18
Appendectomy	4
Others	13
Total	50

Table 10: Distribution of patients with abdominal wound dehiscence according to intraabdominal pathology

Diagnosis	No. of cases
Hollow viscus perforation	24
Intestinal obstruction	19
Malignancy	2
Blunt trauma abdomen	2
Appendicular perforation	3

Out of 50 patients, 24 patients had peritonitis secondary to hollow viscus perforation which included duodenal perforation (8 cases) and other cases (16) of gastric perforation, jejunal perforation, ileal perforation, diverticular perforation. 19 patients had intestinal obstruction and 2 patients had malignancy and other 2 underwent laparotomy for blunt abdominal trauma.

Table 11: Duration of hospital stay

Average stay	17 days
Range of stay	7-33 days

Average stay of patients with abdominal wound dehiscence was 17 days which increases economic burden both on hospital and patients.

Table 12: Different types of surgical wound presenting with abdominal wound dehiscence

Type of surgical wound	No. of cases	Percentage
Clean	0	0%
Clean contaminated	11	22%
Contaminated	16	32%
Dirty	23	46%
	50	100%

Out of 50 patients, 22% patients had undergone procedure which are classified as clean contaminated, 32% were contaminated and 46% were classified as dirty wounds. Thus, making intra-abdominal infection as an important risk factor for abdominal wound dehiscence.

Table 13: Management of wound dehiscence

Type of wound dehiscence	No. of patients	Management
Partial wound dehiscence	20	Conservative management (Healing by secondary intention)
	09	Secondary suturing
Complete wound dehiscence	19	Tension suturing
	01	Conservative management (Healing by secondary intention)
	01	Secondary suturing

IV. Discussion

We have compared our study with study of Kapoor et al including 60 cases conducted at department of surgery in R.N.T medical college, Udaipur between January 2016 to June 2017 and with study of Verma et al including 50 cases conducted at department of surgery in Bangalore medical college & research institute, Karnataka between November 2014 to October 2016.

Comparison of sex distribution

Sex	Kapoor et al	Verma et al	Our study
Male	77%	70%	72%
Female	23%	30%	28%

Our study showed incidence in 72% males. This male predominance may be due to higher incidence of peptic ulcer perforation and intestinal obstruction in male sex.

Comparison of age group

Age	Kapoor et al	Our study
Mean age	46.25 yrs	40.5 yrs

In our study mean age of presentation was 40.5 years. Incidence of perforation & intestinal obstruction was common in this age group.

Comparison of incidence of wound dehiscence in elective versus emergency surgery

Type of surgery	Kapoor et al	Verma et al	Our study
Emergency	87%	92%	76%
Elective	13%	8%	24%

In our study 76% patients who underwent emergency surgery developed abdominal wound dehiscence. More chances of wound dehiscence were attributed to poor patient hygiene. The emergency conditions itself have detrimental effect due to course of acute illness as well as delayed presentation. Most of patients were already having complications like septicemia and electrolyte derangements due to lack of facilities in nearby local health Centre. In emergency laparotomies, surgical wound is not well secured from contaminated contents of peritoneal cavity. This is one of the factors which can also play a major role in probable explanation for a high prevalence of wound infections leading to wound dehiscence in emergency group of patients. Rural hospitals and nursing homes often keep patient with perforation peritonitis on conservative therapy. This results in increased intra-abdominal pressure which causes decreased capillary circulation in abdominal wall. This is in accordance to study conducted by Hermosa et al, where wound dehiscence was more common in emergency operation and operations with higher wound classification.

Comparison of abdominal wound dehiscence due to underlying intraabdominal pathology

Diagnosis	Verma et al	Kapoor kk et al	Our study
Gastrointestinal perforation	60%	46.66%	48%
Intestinal obstruction	8%	20%	38%
Appendicular perforation	12%	15%	6%
Malignancy	4%	5%	4%
Others	16%	13.33%	4%

In our study, among 50 patients developing laparotomy wound dehiscence, 76% were operated on emergency basis. Our study showed that wound dehiscence is more commonly in patients operated for peritonitis due to hollow viscus perforation (48%). Amongst which duodenal perforation accounted for 16% cases. Other perforations which included gastric perforation, jejunal perforation, ileal perforation, accounted for 32% cases. 38% of the patients had intestinal obstruction and 4% had underlying malignancy and other 4% had undergone laparotomy for blunt abdominal trauma. For the patients with bowel perforation which were classified mostly into contaminated surgical wounds, the procedure performed was peritoneal lavage with perforation closure. Most of the patients presenting with obstruction underwent resection & anastomosis while remaining few were subjected to adhesiolysis and colostomy.

In our study, 48% patients had perforation peritonitis. And in patients with peritonitis, bowel is edematous, tissues are friable due infections and there is increased tension on suture line during abdominal wall closure. Graham DJ et al pointed that intra-abdominal infection and colonic surgery were leading cause of wound dehiscence.

Comparison of wound dehiscence in patients with altered LFT

In relation to LFT	Kapoor kk et al	Verma et al	Our study
Hypoalbuminemia	60%	60%	46%
Hyperbilirubinemia	7%	16%	18%

Comparison of wound dehiscence in patients with Anemia

	Kapoor kk et al	Verma et al	Our study
Anaemic	53%	56%	44%

Co-morbid conditions at time of admission

	Kapoor kk et al	Verma et al	Our study
Diabetes	38%	30%	10%
Hypertension	25%	26%	10%
Pulmonary disease	63%	44%	10%
Malignancy	5%	2%	2%

In our study 46% patients were found to be hypoalbuminemic. so above observation confers to hypoalbuminemia as risk factor for wound dehiscence in patients undergoing laparotomy. Other risk factors found in our study were Anemia (44%), hyperbilirubinemia (18%), Tuberculosis (10%), Diabetes mellitus (10%), Malignancy (2%) and Emergency procedures (76%).

Comparison of Postoperative causes leading to abdominal wound dehiscence

Post-operative causes	Kapoor kk et al	Our study
Wound contamination	90%	90%
Cough	44%	36%
Abdominal distension	36%	34%
Vomiting	28%	40%

Our study showed abdominal wound dehiscence related to post-operative causes in 90% patients with wound contamination, 36% with cough, 34% with abdominal distension, 40% with vomiting. Raised intra-abdominal pressure due to cough, abdominal distension, vomiting leading to abdominal wound dehiscence.

V. Conclusion

Laparotomy wound dehiscence is more common in males when compared to females with ratio of 2.5:1. Patients in age group of more than 50 years of age were found to have highest incidence of abdominal wound dehiscence with mean age group being 40.5 years. Intra-abdominal infection is the most important factor in predicting wound dehiscence. Patient factors like older age group, male sex, anemia, diabetes, patients with perforation peritonitis act as determinant for wound dehiscence. Patients with above risk factors requires more attention and special care to minimize risk of occurrence. Emergency procedure is more prone for wound dehiscence. Patients undergoing emergency surgeries had higher incidence of wound dehiscence than elective

(3.1:1). Patients with surgical wound classified as dirty showed highest incidence of developing wound dehiscence followed by those classified as contaminated and clean contaminated. Simple investigations like Hemogram, RBS, RFT, LFT, chest x-ray may help to detect predisposing factors. Postoperatively abdominal wound dehiscence can be prevented by improving nutritional status of patient, early mobilization, and chest physiotherapy to avoid respiratory complications.

References

- [1]. Savage A, Lamont M. Wound dehiscence, incisional hernia, and parastomal hernia. Morris PJ, Wood WC, eds., Oxford textbook of surgery. 2nd edn. Alison Langton; 2000:1883
- [2]. Nyhus and Condon's hernia. Diagnostic and imaging of abdominal wall hernia 5th edn.
- [3]. Kulaylat M, MD Merrill Dayton, MD Surgical complications. Sabiston textbook of surgery 19th edition. p-283-284.
- [4]. Afzal S. Bashir M.M. Determinants of wound dehiscence in abdominal surgery in public sector hospital. Annals vol 14. No.3 Jul sept. 2008
- [5]. Burt B, Tavakkolizadeh A, Ferzoco S.J. Incisions, closures, and management of the Abdominal wound. Maingots abdominal operation 11th edn:97-99

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