



A PROSPECTIVE STUDY ON SURGICAL WOUND DEHISCENCE -PREVENTION AND MANAGEMENT

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ABSTRACT

Background: Wound dehiscence is defined as a partial or total disruption of the abdominal wound closure, with or without abdominal contents protrusion. It's one of surgeons' most dreaded consequences, and it's considered a serious postoperative complication with mortality rates as high as 45 percent. In the literature, the incidence ranges from 0.4 percent to 3.5 percent. The goal of this study was to determine the prevalence of abdominal wound dehiscence in relation to various risk variables, as well as to investigate effective management of abdominal wound dehiscence.

Methods: Patients with abdominal wound dehiscence after surgery were included. In light of the substantial risk factors, the types of surgery conducted, including surgical incisions made, and the type of disease involved, an extensive clinical history was obtained. This prospective study comprised a total of 60 patients. Appropriate software was used to analyse the data.

Results: Male patients had higher incidence for abdominal wound dehiscence in fifth decade. Patients presenting with peritonitis secondary to hollow viscus perforation are more prone to abdominal wound dehiscence. Class 3 surgery i.e., contaminated surgeries in emergency nature has higher risk for wound dehiscence.

Conclusions: Co-morbidities such as diabetes, malnutrition, anaemia, and COPD all contribute to the slow healing of wounds. Simple routine laboratory tests may aid in the identification of predisposing factors and their correction. The majority of patients can be treated conservatively with secondary suturing rather than undergoing re-exploration and surgery.

KEYWORDS : wound dehiscence, laparotomy, risk factors.

INTRODUCTION

Abdominal wound dehiscence is a word that is widely used to describe the separation of different layers of surgical wound before it has healed completely. Wound dehiscence happens when a wound isn't strong enough to endure the stresses it's subjected to. Dehiscence happens when sutures are disrupted by external pressures, absorbable sutures dissolve too quickly, or tight sutures cut through tissues due to excessive strain. Acute wound failure may be partial or complete^[1]. Only the superficial layers or a portion of the tissue layers reopen in partial dehiscence. All layers of the wound thickness are separated in complete wound dehiscence, revealing the underlying tissue and organs that may protrude out of the separated wound. The risk of a burst abdomen, the necessity for prompt intervention, and the probability of recurring dehiscence, surgical site infection, and incisional hernia formation make it one of the most feared post-operative consequences for surgeons^[2]. Among dehiscence at various sites Abdominal wound dehiscence is a serious postoperative complication that has been associated to death rates as high as 45 percent. Incidence as reported in literature peaks from 0.4% to 3.5%^[3]. Wound dehiscence is caused by a variety of factors including emergency surgery, intra-abdominal bacterial infection, malnutrition, low haemoglobin, elderly age >65 years, systemic co-morbidities (uremia, diabetes mellitus), and so on^[4]. Thorough understanding of risk factors is necessary for preventing wound dehiscence. By highlighting the risk factors for wound dehiscence, the incidence rate, and prophylactic measures to prevent or reduce the incidence of wound dehiscence, mortality and morbidity in the form of increased hospital stay, long-term repeated consultations, and additional burden on health-care resources can be reduced^[5].

Abdominal wound dehiscence has been a long term issue for which no single effective method is found for its management. In the last ten years, there have been a slew of publications attempting to explain how to solve this problem.

The purpose of this study was to assess the prevalence of abdominal wound dehiscence in relation to various risk factors, co-morbidities, and treatment options.

METHODS:

Prospective observational study of patients admitted at General surgical ward, Rajah Muthiah Medical College Hospital, Chidambaram from October 2019 to September 2021.

INCLUSION CRITERIA:

- During the study period, 60 patients who had an emergency or elective abdominal operation and experienced post-operative dehiscence were included
- Patients over the age of 18 of either gender who consented to investigations and treatment met the inclusion criteria.

EXCLUSION CRITERIA:

- Age < 18 years
- Wound dehiscence other than abdomen
- Gynaecological surgery induced wound dehiscence.

A detailed medical history was taken, as well as a thorough physical examination and any other pertinent information. Excel software tools were used to conduct the statistical analysis. Bar graphs and pie charts are used to represent observations.

RESULTS

The age wise distribution of subjects is depicted in the table below

Table 1: Incidence in different age groups

Age	No. of cases	Percentage
21-30	8	13.33%
31-40	12	20%
41-50	20	33.33%
51-60	11	18.33%

61-70	6	10%
>70	3	5%
	60	100

The majority of the patients in this study were between the ages of 41 and 50, with the youngest patient being 22 years old and the oldest being 82 years old. The average age of the patients that were afflicted was 46.25. (SD13.95).

Gender distribution- 46 males and 14 females among the study population In the current study, 52 cases (87 percent) were operated on as emergency surgery, whereas 8 cases (13 percent) were operated on as elective surgery.

Contaminated type of surgery accounts for 38 (63%) which is the common type of surgery done in the study population and no clean type of surgery.

Table 2: Distribution of wound dehiscence cases - types of surgery presenting

Type of Surgical wound	No. of cases	Percentage
Clean	0	0
Clean contaminated	6	10%
Contaminated	38	63.33%
Dirty	16	26.67%
	60	100

Table 3: distribution based on type of incision

Type of incision	No. of cases	Total
Upper midline (UM)	12	44
Midline (MM)	22	
Lower midline (LM)	10	
Right upper paramedian (RUP)	6	10
Right lower paramedian (RLP)	4	
McBurney's (MCB)	6	6
Total	60	60

In this study, 44 cases (73%) were performed with a midline incision and 10 instances (17%) were operated with a paramedian incision, out of a total of 60 cases.

In this study, perforation closure was performed in 28 cases, resection anastomosis in 17 cases, appendectomy in 9 cases, and other procedures such as intestinal obstruction, splenectomy, mesenteric tear, adhesiolysis, stricturoplasty, etc were performed on 60 cases with abdominal wound dehiscence.

Table 4: Distribution of patients with abdominal wound dehiscence according to diagnosis

Diagnosis	No. of cases
Hollow viscus perforation	28
Duodenal ulcer	13
Others (GP, IP, JP, MDP)	15
Appendicular pathologies	9
Intestinal obstruction	12
Malignancy	3
Others	8
Total	60

Out of 60 cases hollow viscus perforation closure was common surgery performed in the study population.

Out of 60 cases 36 pts had B.M.I > 25 and 24 patients had B.M.I < 25.

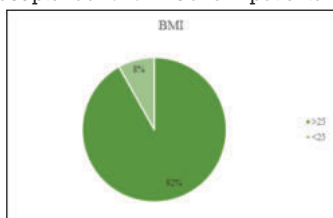


Figure 1: Frequency of abdominal wound dehiscence

according to body mass index

Table 5: Prevalence of abdominal wound dehiscence in relation to anemia

Hb%	No. of cases
> 10 g/dl	28
<10 g/dl	32
Total	60

Out of 60 patients, 28 had Hb levels greater than or equal to 10 g/dl, while 32 had Hb levels lower than or equal to 10 g/dl.

Lft And Wound Dehiscence

In the patients with wound dehiscence 36 patients (60%) had hypo proteinaemia.

Table 6: distribution of wound dehiscence in relation to liver function test (LFT)

LFT	No. of cases	Percentage
Hypoproteinemia (albumin < 2.9 gm/dl)	36	60%
Hyperbilirubinemia (total bilirubin > 1.5 mg/dl)	4	7%
Raised hepatic enzyme	2	3%

Table 9: Management of wound dehiscence

Type of wound dehiscence	No. of patients	Management
Partial wound dehiscence	32	Conservative Management (healing by secondary intention)
	16	Secondary suturing.
Complete wound dehiscence	8	Tension suturing
	4	Mesh repair



Figure 2: Wound dehiscence in a duodenal ulcer perforation case



Figure 3: Tension suturing

DISCUSSION

During the study period, this study looked at 60 individuals who suffered laparotomy wound dehiscence. Our research looked into the reasons of abdominal wound dehiscence, as well as the treatment options available before, during, and after surgery.

In this study mean age for patients with late wound healing was 46.2. patients with hollow viscus perforation were common in this age group. Mean age groups in some other studies

Spiliotis j et al^[8]
Waquar SH et al^[7]

Gender distribution and wound dehiscence

In a study conducted between 2007 and 2008, 3500 patients received abdominal procedures in the surgery departments of

Mesologgi General Hospital and the Urban Community Teaching Hospital of 150 beds, with a reported frequency of abdominal wound dehiscence of 60% in males. In a study conducted between January 1985 to December 2005 at Department of Surgery, Erasmus University Medical Center, male were 75% and female pts 25% [5,8]. With a male-to-female ratio of 3.3:1, there was a higher male population in our study. This rise in males can be ascribed to the male gender's higher rate of peptic ulcer perforation and bowel obstruction.

Comparison of incidence in elective versus emergency surgery.

Over the course of seven years, 107 occurrences of abdominal wound dehiscence were reported in a study undertaken by the Department of Surgery at Case Western Reserve University, Cleveland Veterans Affairs Medical Center USA.

These patients with intra-abdominal pathologies were more likely to have had emergency operations (p 0.02), colon surgeries (p 0.005), or an operation with a higher wound classification (p 0.02), with wound dehiscence being the most common emergency operation and surgery with a class IV/V (contaminated/dirty wound).^[9]

In our study, 87 percent of 60 patients who developed laparotomy wound dehiscence were operated on as an emergency. Our research found that abdominal wound dehiscence is more likely in patients who had had peritonitis owing to a perforated hollow viscus (47 percent). Duodenal perforation accounted for 22% of the total. Small bowel obstruction affected 20% of the patients, while underlying malignancy affected 5% of the patients. Hollow viscus perforation cases were managed with omental patch closure, bowel obstruction cases by resection anastomosis and adhesiolysis.

Day of presentation of abdominal wound dehiscence

According to a study conducted at the Long Island Jewish Medical Center, the average post-operative day of abdominal wound dehiscence is 11.1 days^[10]. Madsen et al recorded the sixth post-surgical day, while Anielski et al reported the average period of 6.5 days.^[11,12]

The average day of developing wound dehiscence was post-operative day 9 in a study conducted at Erasmus University Medical Center's Department of Surgery.^[5]

A study conducted at Mesologgi General Hospital and Urban Community Teaching Hospital found that wound dehiscence occurs on the 9th post-operative day on average, with a range of 6 to 15 days.^[8]

The average post-operative day in our study was also the ninth day. In a research at Oula University Hospital, mortality was reported to be 4% out of 48 patients with wound dehiscence (2 patients). Average length of stay in the hospital was 25 ± 15 days (mean \pm SD). Around 65% of patients with wound dehiscence had hypoalbuminaemia, other risk factors were anaemia malnutrition, pulmonary complication and emergency procedure^[13].

Mean hospital stay in our study was 18 days ranging from minimum of 5 days to maximum 36 days. Risk factors, anaemia 53% of study population had haemoglobin < 10 gm, hypoalbuminaemia 60%, chronic lung diseases (63%), old age, malignancy (5%), obesity (40%), emergency procedure (87%) and peritonitis with grossly contaminated surgical wounds.

In a study conducted at the Department of Surgery at Sundsväall County Hospital in Sweden, being overweight (BMI > 25) was found to be a risk factor for delayed wound healing due to an increased risk of infection, which could be

reduced if patients were sutured with a suture length to wound length ratio of 4 - 4.9.^[14]

In our study, 36 patients were overweight (BMI > 25), while 24 patients had a BMI of less than 25. Out of 60 patients in this study, 73 percent had midline incisions and 17 percent had right paramedian incisions, indicating that 90 percent of patients with vertical incisions developed wound dehiscence. Our finding was similar to the study conducted at University of Copenhagen^[15].

CONCLUSION

- Laparotomy wound dehiscence is more common in males when compared to females with ratio of 3.3:1.
- Patients between the ages of 41 and 50 were found to have the highest rate of abdominal wound dehiscence, with a mean age of 46.25 years.
- In individuals with peritonitis owing to hollow viscus perforation, abdominal wound dehiscence is more prevalent than in patients with intestinal blockage.
- Patients who have a surgical wound that has been identified as contaminated are more likely to have wound dehiscence.
- Elective surgeries have a lower rate of abdominal wound dehiscence than emergency surgeries (6.5:1).
- Because of the inadequate blood supply at Linea Alba, individuals who had a midline laparotomy had a higher risk of wound dehiscence than those who had a paramedian laparotomy.
- Wound dehiscence is more likely in people with a BMI greater than 25, compared to those with a BMI less than 25.
- Abdominal wound dehiscence is more likely in patients with haemoglobin levels below 10 percent.
- On the ninth post-operative day, there were the most incidences of wound dehiscence.
- When compared to a mass closure, a protracted procedure lasting more than 90 minutes with multilayer abdominal closure exhibited higher dehiscence.

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