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Management of abdominal wound dehiscence at a tertiary care hospital

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Abstract
There are two basic types of wound dehiscence, partial or complete, depending on the extent of separation. In partial dehiscence, only the superficial layers or part of the tissue layers reopen. In complete wound dehiscence, all layers of the wound thickness are separated, revealing the underlying tissue and organs, which may protrude out of the separated wound. This can be seen in some cases of abdominal wound dehiscence. A comprehensive study of these cases with keeping in record the date of admission, presenting complaints and general condition, risk factors, bold investigations, clinical diagnosis, the need for surgery and the types of surgery, followed by wound care, course in ward and day of dehiscence. Co-morbid conditions like anaemia, hypertension, diabetes mellitus, etc. were treated where possible. Initial dose of prophylactic intravenous antibiotics were given to all patients presenting with acute abdomen before surgery in emergency as well as elective cases, and course was continued with respect to requirements of every surgery. Out of 60 cases 28 patients had Hb% more than 10g/dl and 32 patients had Hb% less than 10g/dl. In the present study amongst 60 cases 2 patients had elevated hepatic enzymes. 36 patient had hypoalbuminemia. 4 patient had hyperbiluribinemia. Average stay was 18 which increases economic burden both on hospital and patients. There were 2 deaths. Mortality was mainly due to post-operative complication like septicaemia and respiratory tract infection.

Keywords: Dehiscence, septicaemia, wound thickness

Introduction
Laparotomy wound dehiscence (LWD) is a terminology which is commonly used to explain separation of different layers of an abdominal wound before complete healing has taken place. Other terms used interchangeably are acute Laparotomy wound failure and burst abdomen.
Acute wound failure may be partial or complete. Partial wound failure follows early removal of sutures leading to evisceration. Complete or occult dehiscence occurs with disruption of musculo-aponeurotic layer beneath intact skin sutures [1].
Wound dehiscence usually occurs when a wound fails to achieve required strength to withstand stresses placed upon it. Dehiscence occurs when overwhelming forces disrupt sutures, when absorbable sutures dissolve too rapidly or when right sutures cut through tissues through unnecessary pressure.
There are two basic types of wound dehiscence, partial or complete, depending on the extent of separation. In partial dehiscence, only the superficial layers or part of the tissue layers reopen. In complete wound dehiscence, all layers of the wound thickness are separated, revealing the underlying tissue and organs, which may protrude out of the separated wound. This can be seen in some cases of abdominal wound dehiscence [2].
The most feared post-operative complications for the surgeons and is of greatest regard because of risk of burst abdomen, the need for immediate intervention, and the possibility of repeat dehiscence, surgical site infection and incisional hernia formation [3] abdominal wound dehiscence is reported to be a severe postoperative complication, with death rates reported as high as 45%^. Incidence as reported in literature peaks from 0.4% to 3.5% [4].
Many risk factors are accountable for wound dehiscence such as surgeries in emergency set up, intra-abdominal bacterial infection, malnutrition, hypoproteinemia, decreased Hb, elderly age >65Yrs, systemic Co morbidities (Urmia, diabetes mellitus) etc. Good knowledge of these risk factors is compulsory for prophylaxis [5].
Mortality and morbidity in the form of increased hospital stay, long term repeated consultations,

with extra burden on health care resources can be reduced by highlighting the risk factors for wound dehiscence, the incidence rate and prophylactic measures to prevent or reduce the incidence of wound dehiscence [6].

L.W.D. has been a long term dilemma for which no surgical unit has come with a 100% plan (i.e. none of the surgical units worldwide has reported 0% failure rate). However many institutes globally have been trying successfully to achieve and keep failure rates well below 1%. These statistics however do not discourage the continuing research in attempts to eliminate the problem. A wide variety number of publications have been done in the past ten years trying to explain how this problem can be overcome.

Methodology

A total of 60 cases were included in the study. A comprehensive study of these cases with keeping in record the date of admission, presenting complaints and general condition, risk factors, bold investigations, clinical diagnosis, the need for surgery and the types of surgery, followed by wound care, course in ward and day of dehiscence. Co-morbid conditions like anaemia, hypertension, diabetes mellitus, etc. were treated where possible. Initial dose of prophylactic intravenous antibiotics were given to all patients presenting with acute abdomen before surgery in emergency as well as elective cases, and course was continued with respect to requirements of every surgery.

As per protocol in the institutes, all midlines were closed with Prolene, non-absorbable monofilament, synthetic suture (Plypropylene No.1).

All patients proforma containing details of the date of admission, age, gender clinical diagnosis, whether emergency or elective surgery, type of surgery, clinical classification of wounds, types of incision and types of procedure performed, day of abdominal wound dehiscence and its management was recorded accordingly. All wounds were examined from third post-operative day, mainly to look for signs of inflammation like erythema, tenderness, purulent or serosanguinous discharge. Examination to be continued till the removal of sutures and scar formation. Wounds which showed complete signs of healing with removal of sutures by 10th post-operative day were labelled as normal healing. Any complication or delay was deemed delayed wound healing.

Inclusion criteria

- Patient age more than 18 years and of either sex.
- Patients with abdominal wound dehiscence after being subjected to any elective or emergency general surgical operations.
- Patients who are willing for investigations and treatment for their condition.
- Patients willing to give written informed consent

Exclusion criteria

- Patients age less than 18 years.
- All female patients who presented with wound dehiscence after any gynaecological procedures.
- All patients with incisional hernia.
- All patients who are not willing for investigation and treatment.
- Patients refusing to give informed consent.

Results

Table 1: Frequency of abdominal wound dehiscence according to body mass index

BMI	No. of cases
>25	36
<25	24
	60

Out of 60 cases 36 pts had B.M.I. >25 and 24 patients had B.M.I <d25.

Table 2: Prevalence of abdominal wound dehiscence in relation to anaemia.

100%	No. of cases
>10g/dl	28
<10g/dl	32
	60

Out of 60 cases 28 patients had Hb% more than 10g/dl and 32 patients had Hb% less than 10g/dl

Table 3: Prevalence of wound dehiscence in-relation to liver function test (LFT)

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

In the present study amongst 60 cases 2 patients had elevated hepatic enzymes. 36 patient had hypoalbuminemia. 4 patient had hyperbilirubinaemia.

Table 4: Co morbid conditons at the time of admission.

Conditions	No. of cases	Percentage
Diabetes (DM)	23	38%
Hypertensions(HTN)	15	25%
Pulmonary disease	38	63%
Malnutrition	36	68%
Anemia	32	53%
CRF	4	7%
Malignancy	3	5%
Steroid uso	-	-
Radiation	-	-

Malnutrition, DM, HT, pulmonary diseases, anemia etc. are important risk factors for wound dehiscence. Professors and Associate Professors operated on 6 out of the 8 elective patients. All emergency procedure and one elective procedure were done by final year post graduates. However owing a usual practice where the assistant surgeon tends to be the one who closes the abdomen, seniority was not considered as an significant factor. More over senior post graduates are the assisting surgeons to their seniors.

Table 5: Duration of hospital stay

Average stay	18 days
Range of stay	5-36 days

Average stay was 18 which increases economic burden both on hospital and patients. There were 2 deaths. Mortality was mainly

due to post-operative complication like septicaemia and respiratory tract infection.

Table 6: 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

Discussion

Study conducted at the long Island Jewish Medical Centre reports the mean post-operative day of abdominal wound dehiscence to be 11.1 days after surgery. Anielski *et al*. showed average time of 6.5 days while Madsen *et al*. Reported the sixth post-surgical day [7].

In a study conducted at Department of Surgery, Erasmus University Medical Centre, post-operative day 9 was the mean day of developing wound dehiscence. Study conducted at department of surgery of Mesologgi General Hospital and Urban community Teaching Hospital reports 9 the post op day as the mean for wound dehiscence with a range from 6th to 15 th day. In our study mean post op day was also 9th day [8].

In a study carried out at Oula university Hospital, out of 48 patients who had wound dehiscence, mortality was reported to be 4% (2 Patients). The mean hospital stay was 25 +/- 15 days. 31 (65%) patients had pre-operative hypoalbuminemia; other risk factors included anemia, malnutrition, pulmonary complication and emergency procedure [9].

In our study out of 60 patients, the mean hospital stay was 18 days with a range of 5-36days. About 53% of patients showed haemoglobin < 10gm%. Other risk factors in the study included, hypoalbuminemia (60%), chronic lung diseases (63%), old age, malignancy (5%), obesity (40%), emergency procedure (87%) and peritonitis with grossly contaminated surgical wounds.

2 patients (i.e.2%) died, one was due to mesenteric ischemia and other was due to septicaemia.

In a study at Department of Surgery sundsvaell Country Hospital, Sweden being overweight (BMI >25) was considered as a risk factor for delayed wound healing due to increased chance of infection but this could be minimized if patients are sutured with a suture length to wound length ratio of 4-4.9 our study 36 patients were overweight, (BMI > 25), 24 patients were having their BMI below 25.

In a study conducted in Department of Surgical Gastroenterology, University of Copenhagen, Hvidovre Hospital in 2001 reported that the incidence of abdominal wound dehiscence and burst abdomen is more common in patients with vertical incision in comparison to those with horizontal incision ($p = 0.0001$). In this present study out of 60 patients 73% patients underwent surgery with midline incisions and 17% patients with right paramedian incisions, i.e. 90% patients with vertical incisions had wound dehiscence [10].

Conclusion

- Surgeon factors like inappropriate and overzealous incisions, wrong suturing technique and inadequate aseptic precautions which may lead to wound infection and then wound dehiscence.
- Emergency laparotomies are at a higher risk of delayed healing, probably due to increase in contamination and inadequate preparation for surgery.
- Every patient developing wound failure should not be subjected to re-laparotomy.

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