FREQUENCY AND RISK FACTORS FOR WOUND DEHISCENCE/ BURST ABDOMEN IN MIDLINE LAPAROTOMIES

S H Waqar, Zafar Iqbal Malik, Asma Razzaq*, M Tariq Abdullah, Aliya Shaima, M A Zahid
Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad and *POF Hospital Wah Cantt

Background: Wound dehiscence/burst abdomen is a very serious postoperative complication associated with high morbidity and mortality. It has significant impact on health care cost, both for the patients and hospitals. The aim of the study was to determine the frequency of wound dehiscence/burst abdomen in patients undergoing emergency and elective laparotomies through midline incisions and to identify the risk factors for wound dehiscence. **Methods:** This study was carried out at department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad from 1st January 2002 to 31st December 2002. 117 consecutive patients undergoing laparotomy with midline incision were included. They were followed by wound examination from third post-operative day onwards to see their normal or otherwise healing. **Results:** Seven out of 117 (5.9%) patients developed wound dehiscence. Five of them (4.2%) were operated in emergency and two (1.7%) were operated on elective list. **Conclusion:** It is very clear from our study that frequency of wound dehiscence/burst abdomen is still very high in our hospital. Peritonitis, wound infection and failure to close the abdominal wall properly are most important causes of wound dehiscence. Malnourishment and malignant obstructive jaundice predispose a patient to wound dehiscence by slowing the healing, and increasing rate of wound infection.

Key words: Burst Abdomen, Wound Dehiscence, Laparotomy.

INTRODUCTION

Wound dehiscence/burst abdomen is a very serious postoperative complication which is associated with high morbidity and mortality rates. It affects the patients by increasing distress and risk of mortality; the attendants by increasing the cost of treatment; the surgeon for whom it is a disturbing reality; and the hospital resources by increasing the health care cost due to prolonged hospital stay. It is an end result of multiple causes, some of which may be unavoidable. The wound dehiscence rate reported in international literature varies from 1%[1-3] to 2.6%,[4,5] while local studies show a higher incidence, up to 6%,[6] which is unacceptably high and alarming. We have also been encountering a higher frequency of this complication, and the present study was conducted to review and identify risk factors responsible for such a high rate.

MATERIAL AND METHODS

All adult male and female patients undergoing laparotomy by midline incision for various indications were included in the study. This descriptive, non-interventional case study was conducted in the Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad, from 1st January 2002 to 31st December 2002.

There were 117 patients, admitted in surgical ward through emergency / outdoor clinic. Co-morbid factors like anaemia, hypertension, diabetes mellitus, etc were corrected where possible.

The investigations done pre-operatively were blood complete picture, urine routine examination, random blood sugar, urea, creatinine, x-ray chest, x-ray plain abdomen (erect) and serum electrolytes. Liver function tests, electrocardio-graphy, ultrasonography and CT scan abdomen were done where required.

In all patients laparatomy was done under general aneasthesia through midline incision. Antibiotics were started as part of pre-operative treatment in all patients presenting with acute abdomen in emergency ward, and course was prolonged accordingly in each case after operation. A prophylactic dose of antibiotics was given in all elective cases along with extension of antibiotic as required. As a routine, in all cases the linea alba was closed with non-absorbable monofilament, synthetic suture (Prolene No.1). Examination of wound was started from third post-operative day onwards, and included inspection for any redness, oedema or presence of discharge like pus or serosangunious fluid, and the day on which it was seen. Risk factors considered for evaluation are enlisted in table-1.

RESULTS

The age of patients ranged from 13 years to 78 years, with mean age 39.67 years. The patients developing wound dehiscence did not belong to a single age group, however, four patients were aged above 50 years as shown in table-1.

The distribution of primary diseases and their relative frequency is shown in table-2. The patients who were operated in emergency, presented

mostly with symptoms and signs of peritonitis, with history of road traffic accident (RTA), or firearm injury of abdomen, with an urgent need for exploration. Most of the patients were having symptoms and signs of acute illness with fluid & electrolyte imbalance, and required active resuscitation before operations. The most common primary diseases in patients operated on elective list were obstructive jaundice and abdominal malignancies.

Table-1: Distribution of risk factors (n=117, total wound dehiscence =7, more than one risk factors were present in the most)

Risk factors	No. of cases	Dehiscence	%
Old age (>50 years)	19	4	20%
Haemoglobin <10 mg/dl	41	7	17%
Smoking	44	3	07%
Obesity	15	2	13%
Malnourishment	23	3	13%
Malignancy	14	2	15%
Post-operative ileus	29	4	14%
Chest complications	32	5	17%
Wound infection	29	7	25%
Post-operative vomiting	45	3	06%

Table-2: Frequency of primary diseases (n=117)

Primary disease	Frequency	%
Peritonitis	28	24%
Intestinal obstruction	15	13%
Blunt abdominal trauma	12	10%
GIT malignancies	11	09%
Benign obstructive jaundice	05	04%
Malignant obstructive jaundice	03	2.5%
Benign hepatic pathology	04	03%
Benign GIT pathology	14	12.5%
Miscellaneous	24	20.5%

Seven patients developed wound dehiscence/ burst abdomen. Five (71%) of them were males and two were females (29%). One patient (75 years old male) was having severe peritonitis due to perforated duodenal ulcer and developed complete evisceration on 5th post-operative day; he died later. Second patient (55 years old male) presented with RTA and had polytrauma, with injury to colon and peritonitis. He developed complete wound dehiscence but no evisceration on 5th post-operative day. Third patient was a 19 years old female with frank pus in peritoneal cavity due to primary peritonitis. She developed partial wound dehiscence on 8th post-operative day. Fourth patient (35 years old male) had obstructive jaundice due to malignant peri-ampullary growth. He developed partial wound dehiscence on 7th post-operative day. Fifth patient (male aged 50) presented with severe peritonitis due to perforated duodenal ulcer, while sixth patient (45 years male) also had peritonitis due to ileal perforation. Both these patients developed complete evisceration on 6th post-operative day, which was managed by immediate resuscitation, and application of tension sutures. Last patient was a 65 years old female with carcinoma colon, who developed partial wound dehiscence on 8th post-operative day.

Overall rate of wound infection was 17% (21 patients). Among them 7 patients (33%) developed wound dehiscence. The wound infection rate in emergency laparatomies was 33% while it was 13% in elective laparotomies. This observation was statistically significant ($P<0.05$).

Out of 8 jaundiced patients, three had malignant obstructive jaundice: one of them developed wound dehiscence. This is significant when compared to patients with benign obstructive jaundice (5): none of them developed wound dehiscence. In 41 patients with haemoglobin level below 10 gm/dl, 7 developed wound dehiscence.

Four out of seven patients with wound dehiscence had shown serosanguinous discharge. No discharge was seen in patients with normal healing.

DISCUSSION

Acute wound failure has been discussed under various names i.e. wound dehiscence, burst abdomen, wound disruption and evisceration.[7] It is a very serious complication of abdominal surgery, with very high mortality rate and no single cause being responsible: rather it is a multi factorial problem. Two basic events seen in wound dehiscence are decreased wound strength and increased collagenolysis, most commonly due to infection. The rate of wound dehiscence in our study is 5.9 % (7/117), which is much higher as compared to several studies mentioned in western literature quoted above, but comparable to that reported by Hanif.[6]

In our study male to female ratio is 3:1. Male predominance has been mentioned in many studies.[3,8] Hampton and Hanif showed the ratio to be 2:1.[6,9]

Risk of wound dehiscence increases with advancing age. Four of our patients with wound dehiscence (57%) were above the age of 50. Hanif also showed advanced age in 50 % of cases.[6] Makela also observed advanced age as a risk factor.[10]

In our study 3 patients with dehiscence (43%) had peritonitis. This high incidence of dehiscence with peritonitis is also reported in other studies.[11]

Wound dehiscence rate was observed to be 12 % in emergency (5/62), and 4 % in elective laparotomies (2/55) in the present series, which is almost similar to that reported by Hanif.[6] This difference of wound dehiscence rates between elective and emergency laparotomies is statistically significant ($P<0.05$). McGinn reported 6.4% and 2.6

% rate of wound dehiscence in emergency and elective laparotomy respectively.[12]

In our study the high rate of wound dehiscence is due to many reasons. In our setup the emergency laparotomies are usually performed for acute abdomen cases which have been deteriorated due to course of acute illness, as well as mismanagement by at least 3 to 4 "intermediate" persons like *Quacks, Hakims, Aamils* (for *taaveez/ dhaga*) and local dispensers etc. Then, patients seek help from local health centers, who visualizing the patient's critical condition and lack of facilities at that centre refer the patients to tertiary care hospitals like Pakistan Institute of Medical Sciences. Most of the patients are already having complications like septicemia and fluid and electrolytes derangements. Also, poverty plays a vital role in making patients malnourished and compelling them to seek "cheaper" treatment out side hospitals at local dispensaries.

Second factor responsible for this high incidence of wound dehiscence especially in emergency cases may be the lack of proper sterilization in an emergency setup. Third factor, which can also play a major role in developing wound dehiscence, is lack of experience on part of surgeon. The emergency laparotomies are performed most of the time by surgical residents. Technical errors can be avoided by using non absorbable sutures, making secure surgical knots, taking deep tissue bites (1 cm or more from wound margin), using small stitching interval less than 1 cm apart, and with suture length: wound length ratio of more than 4:1.

Serosanguinous fluid discharge prior to wound dehiscence was present in 57 % of our cases with wound dehiscence. Other workers have also reported this discharge in 23%[13] to 84 %[6] cases.

One out of 8 patients with obstructive jaundice had wound dehiscence in our study: he had malignant obstructive jaundice. This is in accordance with some of the studies,[14] however, no such relation was seen by Hanif and Col and Soran.[6,15]

In our study, wound infection was found in all 7 cases with dehiscence. Col and Soran also reported wound infection as an important risk factor for wound dehiscence.[15]

Anaemia (haemoglobin below 10mg/dl at presentation) was found in all patients with dehiscence, but was also observed in other 34 cases that showed normal healing response. So, it alone cannot be significant risk factor but co-existence of other factors is necessary to give rise to wound dehiscence.

Malnourishment was present in 23 (20%) patients; 3 of them developed wound dehiscence. On admission 33 to 65 % of all hospital patients are some what malnourished.[16] In a study by Talati 41 % males and 38 % females were found to be malnourished, and 18 % males and 31 % females were obese, while 12.5 % of females also showed low hemoglobin level.[17] A similar pattern was also noted by Nizami from Karachi.[18] Windsor suggested that maintenance of normal food intake up till the time of surgery is of importance in preventing impairment of wound healing response.[19] According to a study reported by Col and Soran, hypoproteinemia, nausea/vomiting, fever, wound infection, abdominal distension, type of suture material, presence of 2 or more abdominal drains, and the surgeon's experience were factors significantly associated with wound dehiscence.[15] Emergency surgery, jaundice, ostomy, total parenteral nutrition, ascites, pulmonary morbidity, co-existence of any systemic disease, anemia, leukocytosis, and type of incision were non-significant variables. The number of patients with wound dehiscence increased with an increase in the number of risk factors, reaching 100 % for patients with 8 or more risk factors. The risk factors of wound dehiscence can be predicted early and their number can be decreased before and after surgery by an experienced surgeon, leading to a lowered incidence of wound failure.

One of our 7 patients with wound dehiscence (14%) died. Mortality rate associated with wound dehiscence mentioned in literature is 15-24 %.[3] Fischer reported it to be 36 %,[20] while in a local study by Hanif it was 50 %.[6]

CONCLUSION AND RECOMMENDATIONS

Many causes of wound disruption are avoidable. Good and active resuscitation of patients before surgery with emphasis on fluid and electrolytes balance, antibiotic cover, nasogastric tube aspiration, and proper intake and output monitoring, will pay in the end. Strict post-operative care with stress on prevention of wound infection, chest complications, and ileus, can avoid a tragic outcome.

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Address for Correspondence:
Dr S H Waqar, H # 385, St # 29, Sector G-8/2, Islamabad, Ph # 051-2280500
Email: drshwaqar@hotmail.com, drshwaqar@yahoo.com