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Original Research Article

Study of risk factors in post-laparotomy wound dehiscence

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ABSTRACT

Background: Wound dehiscence/burst abdomen is a very serious post-operative complication associated with high morbidity and mortality. The need for this study is to highlight the risk factors for wound dehiscence and remedial measures to prevent or reduce the incidence of wound dehiscence. This will certainly reduce mortality and morbidity in the form of prolonged hospital stay, increased economic burden on health care resources.
Methods: This is a prospective and observational study involving all those who have developed abdomen wound dehiscence after initial surgery, an elaborative study of these cases with regard to date of admission, clinical history regarding the mode of presentation, significant risk factors, investigations, time of surgery and type of surgery postoperatively, study of diagnosis and day of diagnosis of wound dehiscence is done till the patient is discharged from the hospital. The collected data is analysed and statistics were made according to need.
Results: The incidence of abdominal wound dehiscence is more common in male patients in 4th to 5th decade. Patients with peritonitis due to duodenal perforation, complicated appendicitis, pyoperitoneum and intestinal obstruction and carried higher risk of abdominal wound dehiscence. Abdominal wound dehiscence was more common in patients operated in emergency. Patients with intra-abdominal infection, anaemia, hypoalbuminemia, jaundice had higher incidence of wound dehiscence.
Conclusions: Wound dehiscence can be prevented by improving nutritional status of patient, proper surgical technique, controlling infections and correcting co-morbid conditions.

Keywords: Abdominal wound dehiscence, Laparotomy, Malnutrition, Peritonitis, Pyoperitoneum

INTRODUCTION

Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication with mortality rates reported as high as 45%.[1-3] Abdominal wound dehiscence can result in evisceration, which require immediate treatment. Prolonged hospital stays, high incidence of incisional hernia and subsequent reoperations underline the severity of this complication.

Wound dehiscence is described as partial or complete disruption of an abdominal wound closure with or without protrusion and evisceration of abdominal contents. Conditions associated with increased risk of wound dehiscence are anaemia, hypoalbuminaemia, malnutrition, malignancy, jaundice, obesity and diabetes, male gender, elderly patients and specific surgical procedures as colon surgery or emergency laparotomy.[4] Despite advances in perioperative care and suture materials, incidence and mortality rates with regards to abdominal wound dehiscence have not significantly changed over the past decades.

This maybe attributable to increasing incidences of risk factors within patient populations outweighing the benefits of technical achievements. Several mainly retrospective studies have been performed to identify risk factors for this complication often presenting conflicting results. The goal of the underlying study was to evaluate

possible risk factors for abdominal wound dehiscence. This can be used to assess the risk for individual patients and it may prove useful for prevention strategies in clinical studies.

METHODS

This is a prospective and observational study involving all those who have developed abdomen wound dehiscence after initial surgery in MB Govt Hospital, RNT Medical College, Udaipur.

Inclusion criteria

- Patients of age >14 years and of either sex who have developed abdominal wound dehiscence following either emergency or elective abdominal surgeries who are willing for investigations and treatment
- All patients were examined for their presentation, course of disease, various examination and investigations. These records were also analysed for surgical interventions and outcome.

Exclusion criteria

- All patients with wound dehiscence who are less than 14 years of age
- Patients with incisional Hernia
- patients with wound dehiscence on sites other than the abdomen
- female patients who developed wound dehiscence after any gynecological procedures
- patients who have developed wound dehiscence after second surgery.

An elaborative study of these cases with regard to date of admission, clinical history regarding the mode of presentation, significant risk factors, investigations, time of surgery and type of surgery and postoperatively, study of diagnosis and day of diagnosis of wound dehiscence is done till the patient is discharged from the hospital. In history, details regarding presenting complaints, duration, associated diseases, significant risk factors like, anaemia, malnutrition, chronic cough, were noted. Details regarding the clinical diagnosis, whether the operation was conducted in emergency or electively, was noted. Intraoperative findings were noted. The type of surgical procedure done was recorded. Postoperatively the wound dehiscence was diagnosed according to the definitions given in oxford text book of surgery 2nd edition. The collected data is analysed and statistics were made according to need.

RESULTS

Incidence

A total of 930 patients underwent open abdominal surgery between January 2016 to June 2017.Incidence of wound dehiscence amongst them was 5.38% (50/930).

Table 1: Incidence of wound dehiscence.

Total cases	Incidence	%
930	50	5.38

Age distribution

Abdominal wound dehiscence was seen at all ages, the most common age group was found to be 41-50 years (28%) followed by 31-40 years (24%) (Table 2).

Table 2: Incidence of abdominal wound dehiscence in different age groups.

Age (years)	No. of patients	%
15-30	5	10
31-40	12	24
41-50	14	28
51-60	10	20
61-70	6	12
71-80	3	6
Total	50	100

Gender distribution

Out of 50 cases, 35 were male (70%) and 15 were female (30%) (Table 3).

Table 3. Gender wise distribution.

Gender	No. of patients	%
Male	35	70
Female	15	30
Total	50	100

Underlying Intra-abdominal Pathology

Table 4: Distribution of patients with abdominal wound dehiscence according to underlying intraabdominal pathology.

Diagnosis	No. of patients	%
Gastrointestinal perforation	30	60
Complicated appendicitis	6	12
Pyoperitoneum	5	10
Intestine obstruction	4	8
Penetrating abdominal injury	2	4
Blunt abdominal trauma	1	2
Carcinoma asc. Colon	1	2
Carcinoma rectosigmoid junction	1	2

Out of 50 cases of wound dehiscence, 30(60%) patients had peritonitis due to hollow viscus perforation secondary to duodenal ulcer, gastric or small bowel perforation, 6(12%) patients had complicated appendicitis, 5(10%) patients had pyoperitonium, 4(8%) patients were diagnosed with intestinal obstruction which included cases like gangrenous bowel, strictures and adhesions. 2(4%) cases were malignancy which included carcinoma

stomach and colon. Blunt injury, stab injury formed the underlying pathology in few cases (Table 4).

Timing of surgery

Wound dehiscence in our study was found to be more common in emergency surgeries 46(92%) compared to elective surgeries 4(8%) (Table 5).

Table 5: Timing of surgery.

Type of surgery	No. of patients	%
Emergency	46	92
Elective	4	8
Total	50	100

Preoperative causes

In present study 44 out of 50 patients had intra-abdominal infection making it the most common and important preoperative risk factor (88%). Hypoalbuminemia was found in 30(60%) patients. Anemia was present in 28 (56%) patients. Diabetes (30%), uremia (28%) and jaundice (16%) were other significant preoperative risk factors in that order. Most patients had more than one risk factors present (Table 6).

Table 6: Preoperative causes.

Preoperative causes	No. of patients	%
Intraabdominal infection	44	88
Hypoalbuminemia	30	60
Anemia	28	56
Diabetes	15	30
Uremia	14	28
Jaundice	8	16
Malignancy	1	2

Post-operative Causes:

Wound contamination remained the most common post-operative cause of wound dehiscence. 45 0ut of 50 patients had wound contamination (90%). Cough was present in 22 patients (44%). Abdominal distension (36%) and vomiting (28%) were the other common post-operative causes (Table 7).

Table 7: Postoperative causes.

Postoperative causes	No. of patients	%
Wound contamination	45	90
Cough	22	44
Abdominal distension	18	36
Vomiting	14	28

Anaemia

Out of 50 cases of wound dehiscence, 28 patients were having Hb% <10 gm%.

Further, 22 patients were having more than 10gm% (Table 8).

Table 8: Hemoglobin.

Hb (gm%)	No. of patients	%
>10 gm%	22	44
<10 gm%	28	56
Total	50	100

Liver function tests

Out of 50 cases 8 patients had serum bilirubin >1.2mg/dl and 30 patients had hypoalbuminemia (serum albumin <3.5mg/dl) (Table 9).

Table 9: Liver function test.

Liver function test		No. of patients	%
Serum bilirubin (mg/dl)	>1.2	8	16
	0.4-1.1	42	84
Serum albumin (mg/dl)	<3.5	30	60
	3.5-5.5	20	40

DISCUSSION

Acute wound failure is also known as wound dehiscence, burst abdomen, wound disruption and evisceration. It is a very serious complication of abdominal surgery, which carries very high mortality rate. It is a multi-factorial problem. Western studies showed an incidence of 0.4 to 3.5%.

In present study, incidence of wound dehiscence was 5.38%.The higher frequency of burst abdomen is, in contrast with many Western studies which showed an incidence of 0.4 to 3.5% but is in accordance with the study done by Mathur et al which showed that the problem of wound dehiscence is much more prevalent in South East Asia than the Western world.[5] This may be attributable to poor nutritional state of the patients, delayed presentation to the tertiary care hospitals, poor quality of suture material, diseases like tuberculosis of the abdomen which is endemic in the countries of South East Asia and higher load of emergency surgeries.

In present study, out of 50 patients who had wound dehiscence, 35 were males and females were 15 in number with the ratio of 2.33:1. The male predominance was due to the higher incidence of peptic ulcer perforation, intestinal obstruction and malignancies in male sex.

In present study, wound dehiscence was commonest in the age group of 41-50 years. The mean age of presentation was 48.8 years. In present study wound dehiscence was found in younger age group as incidence of perforation and intestinal obstruction was common in

this age group. Spiliotis et al, showed the incidence of abdominal wound dehiscence more commonly in male gender (60%) and with the mean age of 69.5 years.[6] Most of the patients who underwent laparotomy had malignancy and diverticular disease. 15 out of 3500 patients developed wound dehiscence (0.43%) amongst which 9(60%) undergone emergency laparotomy.

In the present study, 92% of patients of burst abdomen underwent laparotomy in an emergency setup. More chances for wound dehiscence were attributed to poor patient hygiene. The emergency conditions itself have detrimental effect due to the course of acute illness as well as delayed presentation etc. Most of the patients were already having complications like septicaemia and fluid and electrolytes derangements due lack of facilities in nearby local health centres. In emergency laparotomies, surgical wound is not well secured from contaminated contents of the peritoneal cavity. This is One of the factors which can also play a major role in probable explanation for a high prevalence of burst abdomen in our emergency group. Rural hospitals and nursing homes often keep patients with perforation peritonitis on conservative therapy (antibiotics and even steroids). 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.[7]

In present study, 60% patients had peritonitis. In patients with peritonitis bowel is oedematous, tissues are friable due to 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 a leading cause of wound dehiscence.[8]

Study conducted on 107 patients with abdominal wound dehiscence over a period of 7 years in Department of Surgery, Cleveland Veterans Affairs Medical Centre, Case Western Reserve University USA by Graham et al, showed that patients with Intra-abdominal infection were more likely to have undergone an emergency operations ($p<0.02$), wound dehiscence is more common in emergency operations and operations with higher wound classification.[8] Our study showed that abdominal wound dehiscence is more common in patients operated for peritonitis due to hollow viscus perforation and in which wounds were classified as contaminated. 30(60%) of the patients studied were operated for hollow viscus perforations including duodenal, gastric, ileal and jejunal perforations, 6(12%) patients had acute appendicitis, 5(10%) patients had pyoperitonium, 4(8%) patients were diagnosed with intestinal obstruction which included cases like gangrenous bowel, strictures and adhesions.

In a study carried out by Sivender et al, out of 50 cases 4(8%) cases had raised liver enzymes, 31(62%) patients had hypoalbuminemia,16(32%) patients had hyperbilirubinemia and 18(36%) patients had elevated renal parameters.[9] In present study out of 50 patients about 88% of patients showed intra-abdominal infection. Other risk factors in present study included, Hypoalbuminemia 60%, anemia 56%, diabetes mellitus 30%, uremia 28% and jaundice 16%.

In a study carried out by Parmar et al post-operative causes like cough (45%), abdominal distension due to paralytic ileus (35%), vomiting (10%) were noted.[10] Wound contamination (73.33%) remained the most common post-operative cause of wound dehiscence. In present study, 90% (45) patients had wound contamination. Cough was present in 44% (22) patients. Abdominal distension 36% (18) and vomiting 28% (14) were the other common post-operative causes.

CONCLUSION

Abdominal wound dehiscence causes significant morbidity and mortality. Intra-abdominal infection is the most important factor in predicting wound dehiscence. Patient factors like older age group, male sex, anemia, malnutrition, diabetes, patients with peritonitis due to bowel perforation act as determinant for wound dehiscence. Emergency procedure is prone for burst abdomen. Simple investigations like Hemogram, RBS, RFT, LFT, chest x-ray may help to detect predisposing factors. Patients with these risk factors require more attention and special care to minimize the risk of occurrence. Intra-operatively abdominal wound should be secured from the peritoneal contamination, thorough peritoneal lavage should be given, and abdominal wall layers should be closed under aseptic precautions. Postoperatively abdominal wound dehiscence can be prevented by improving the nutritional status of the patient, early mobilization of the patient and chest physiotherapy to avoid respiratory complications and cough.

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