



TO STUDY THE INCIDENCE AND ETIOLOGICAL FACTORS OF BURST ABDOMEN AFTER EMERGENCY MIDLINE LAPAROTOMY

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| Umesh Yadav* | Post Graduate Resident, Dept of General Surgery, PGIMS, Rohtak *Corresponding Author |
| Rajesh Godara | Senior Professor, Dept of GI Surgery, PGIMS, Rohtak |
| Shubham Kochar | Senior Resident, Dept of GI Surgery, PGIMS, Rohtak |
| Namrata Satbir Barak | Post Graduate Resident, Dept of General Surgery, PGIMS, Rohtak |

KEYWORDS :

INTRODUCTION

A major surgical complication after emergency laparotomy is abdominal fascial dehiscence. It may appear either as an early (burst abdomen with evisceration, partial dehiscence) or a late (incisional hernia) complication. It is among the most dreaded complications faced by surgeons and of greatest concern because of risk of evisceration, the need for immediate intervention.[1] Dehiscence most often develops seven to ten days post operatively but may occur any time after surgery.[2]

A serosanguinous discharge from the wound is a forerunner of disruption in 50% cases, is pathognomic sign of wound disruption. There are combination of factors responsible for wound dehiscence. These are categorized as patient related and operation related. Patient related factors such as age, sex, and nutritional status (malnutrition) and preoperative medical conditions like anemia, diabetes, hypoproteinemia, jaundice, renal failure (uremia), prolonged steroid therapy (before and after), peritonitis, malignancy, knot breakage, type and duration of surgery, prolonged postoperative abdominal distension, cough, wound infection, post-operative cough.[3] Operation related factors such as indication of surgery - elective/emergency, underlying abdominal pathology, type of suture used, type of incision, technique of abdominal closure have been linked to development of wound dehiscence. Good knowledge of these risk factors is mandatory for prophylaxis.[4]

This study is designed to highlight the risk factors for wound dehiscence, incidence rate in this hospital and remedial measures to prevent or reduce the incidence of wound dehiscence.

METHODS

After approval of the ethical justification committee, this prospective observational study conducted in the Department of General Surgery, Postgraduate Institute of Medical Sciences, Rohtak, a tertiary care center in North India from September 2021 to august 2022. Total 200 patients aged 21-88 years undergoing emergency midline laparotomy.

Inclusion criteria

All patients of age > 18 years and of either sex were subjected to undergo midline emergency laparotomy operations were included in the study.

On admission, a clinical history and proper physical examination was performed on all the subjects having emergency operations due to any aetiology. After recording basic information like name, age, sex and address of patient, a good clinical history, details regarding presenting complaints, duration, associated diseases, significant risk

factors like, anaemia, malnutrition, obesity, chronic cough, smoking, alcoholism were noted.

RESULTS

Demographic Data

The study group comprised of total 200 patients, out of which 128 male patients and 72 female patients. Abdominal wound dehiscence was seen at all ages, the most common age group was found to be 21-40 years (45%) followed by 41-60 years (30%).

Regarding the operation and the postoperative period, the development of burst abdomen was related to the operative diagnosis of peritonitis, trauma and intestinal obstruction. Burst was not related to duration of surgery, postoperative visual analog scale score, time of ambulation, time of oral feeding, hospital stay, or the suture material used to close the abdomen (Table 1 & 2).

Table 1: Incidence of abdominal wound dehiscence in different diagnosis of the patient. (N = 200)

| Diagnosis of the patient | Number of cases | Wound dehiscence |
|--------------------------|-----------------|------------------|
| Perforation peritonitis | 85 (42.5%) | 9(45%) |
| Intestinal Obstruction | 54 (27%) | 2(10%) |
| Abdomen Trauma | 27 (13.5%) | 1(5%) |
| Gut gangrene | 9 (4.5%) | 1(5%) |
| Leakage | 7 (3.5%) | 3(15%) |
| Perianal wound | 5 (2.5%) | 1(5%) |
| Appendicular Abscess | 4 (2%) | 0 |
| Koch Abdomen | 4 (2%) | 0 |
| Diversion | 3 (1.5%) | 3(15%) |
| Stoma prolapse | 2 (1%) | 0 |

There was no significant difference between women who had burst abdomen and others regarding age, sex, participants with controlled diabetes mellitus, hypertension, connective tissue diseases. (Table 2)

Table 2: Characteristics of study population and peri-operative measure

| | Wound dehiscence | No wound dehiscence | Total | P value |
|--------------------|------------------|---------------------|-------|---------|
| Age(years) | | | | 0.149 |
| <50 | 11 | 125 | 136 | |
| >50 | 09 | 55 | 64 | |
| Sex | | | | 0.282 |
| Male | 15 | 113 | 128 | |
| Female | 05 | 67 | 72 | |
| Haemoglobin(mg/dl) | | | | <0.001 |
| <9 | 12 | 11 | 23 | |

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|----------------------|----|-----|-----|--------|
| 9-11 | 6 | 131 | 137 | |
| >11 | 2 | 38 | 40 | |
| Serum albumin | | | | 0.006 |
| <3.5 | 12 | 70 | 82 | |
| >3.5 | 08 | 110 | 118 | |
| Serum creatinine | | | | 0.043 |
| <1.5 | 13 | 123 | 136 | |
| >1.5 | 7 | 57 | 64 | |
| Chest infections | | | | 0.001 |
| Present | 10 | 29 | 39 | |
| Absent | 10 | 151 | 161 | |
| DM Present | 7 | 8 | 15 | <0.001 |
| HTN Present | 3 | 31 | 34 | 0.803 |
| Peritonitis | | | | 0.262 |
| Present | 15 | 112 | 127 | |
| Absent | 05 | 68 | 73 | |
| Suture material | | | | 0.408 |
| Delayed absorbable | 11 | 116 | 127 | |
| Non-absorbable | 09 | 64 | 73 | |
| Post-operative ileus | | | | 0.010 |
| Present | 4 | 9 | 13 | |
| Absent | 16 | 171 | 187 | |

The occurrence of burst abdomen was linked to diversion and peritonitis, development of postoperative complications, namely, chest infection, leakage, albumin and wound infection, but not age, sex, suture, ileus and use of drain.

Table 3: Correlation of burst abdomen with risk factors. (N = 200)

| | Pearson correlation coefficient | p-value |
|----------------------|---------------------------------|---------|
| Age | -0.102 | 0.149 |
| Sex | 0.076 | 0.282 |
| Chest infection | 0.257 | <0.001 |
| Diabetes mellitus | 0.348 | <0.001 |
| Hypertension | -0.018 | 0.803 |
| Hemoglobin | 0.325 | <0.001 |
| Albumin | 0.195 | 0.006 |
| Creatinine | -0.144 | 0.043 |
| Peritonitis | 0.080 | 0.262 |
| Type of suture | -0.059 | 0.408 |
| Post-operative ileus | 0.183 | 0.010 |

DISCUSSION:

A burst abdomen is considered, when intestine, omentum or other viscera's were seen in the abdominal wound following any abdominal surgery. It occurs mostly between the sixth and eighth day after operation. Factors relating to the incidence of burst abdomen are suture, closure, incision, coughing, vomiting, distension, obesity, jaundice, malignancy, diabetes mellitus, hypoproteinaemia, anaemia, immuno-compromised patients and wound infection. It is very much within the means of surgeon to prevent development of burst abdomen even in presence of predisposing factors.[5]

In our study, we reported an incidence of burst abdomen of 10% in emergency midline laparotomy. Choudhury et al. [6] reported 5.64% incidence in emergency laparotomies (44/779 patients). In the study by Waqar et al. [7], wound dehiscence rate was observed to be 12% in emergency (5/62 patients). In the study by Talukdar et al. [8], 12.6% of patients developed wound dehiscence (27/ 213 patients).

In elective cases, there is time to correct or control the risk factors but the emergency laparotomies are usually performed for acute abdomen cases that have deteriorated owing to the course of acute illness, and by the time they are referred to tertiary care hospitals (Kasr Al-Ainy), most of them are already having complications like septicemia and fluid and electrolytes derangements.

Age in our study was not a significant factor in burst abdomen development. This is in accordance with the study by Choudhury et al. [6]. Most of the studies that claim age as a risk factor have included many geriatric patients, which is not the case in our study.

Sex was not a significant risk factor. Kenig and colleagues found similar findings in their study, whereas Kotwal et al. [9] demonstrated a higher incidence in the male sex. However, male to female ration in their study was 4 to 1, leading to uncertain results regarding sex.

Diabetes –

especially when uncontrolled – was a significant factor in development of burst abdomen in our study. Mahey et al. [10] found that diabetes mellitus was the most common comorbid condition found in 42% of patients who had wound dehiscence. Jaiswal and Shekhar [11] reported that 29% of cases were diabetic. However, Kenig et al. [12], Ramneesh et al. [13] found that diabetes was insignificant. Diabetes impairs wound healing through many mechanisms. Low wound oxygenation is a result of poor perfusion and ischemia, which lead to prolonged inflammation with release of oxygen radicals with resultant tissue injury. High matrix metalloproteases result in tissue destruction.

Chronic cough was a significant factor in our study. Probably its effect results from increase intraabdominal pressure and associated anemia of chronic element. Postoperative chest infection was also a significant risk factor. Probably its effect is related to the increase in intra-abdominal pressure and associated wound infection. Previous studies supported our findings. Jaiswal and Shekhar [11] found 52.4% of cases had chest disease.

Anemia was found to be a significant risk factor for burst abdomen. Previous studies supported that finding. Kotwal et al. [9] and Van Ramshorst et al. [14] also reported anemia as a risk factor of burst abdomen. Jaiswal and Shekhar [11] reported that 73% of the cases were anemic. Mahey et al. [8] reported that 24% of patients had hemoglobin less than 10. However, Kenig et al. [12] reported no significant differences between the study and control groups regarding anemia.

Hypoalbuminemia was found to be a risk factor for burst abdomen. Hypoalbuminemia probably was due to sepsis, so it is mostly associated with anemia and wound infection. Previous studies supported that finding. Choudhury et al. [6] reported 76.79% of cases had hypoalbuminemia. Parmar et al. [5] reported 46.6% had hypoalbuminemia. Jaiswal and Shekhar [11] reported 58% of cases with burst abdomen had hypoproteinemia with serum total proteins less than 6 g%.

We found no significant effect of **renal impairment** on the development of abdominal wound dehiscence. Similar findings were reported by Kenig et al. [12], Talukdar et al. [8]. However, Jaiswal and Shekhar [11] reported that 33% of cases were uremic. Mahey et al. [10] reported 20% of patients had elevated renal parameters. Moreover, the studies with different results considered renal failure, not merely renal impairment.

Peritonitis was a significant risk factor for burst abdomen. It probably exerts its effect through sepsis-induced anemia and wound infection. Previous studies supported that finding. Jaiswal and Shekhar [11] reported that 56% of cases were peritonitis. Ramneesh et al. [13] reported 70% of cases had perforation of hollow viscus. Muneiah et al. [15] reported 72.2% were peritonitis. Parmar et al. [15] also reported most patients had gastrointestinal perforation (53.3%).

Regarding suture material, we found no statistical difference

between prolene group and PDS group (both have high tensile strength and either slowly or nonabsorbable).

Postoperative paralytic ileus was not a significant factor in our study (6.5% of cases in group I developed paralytic ileus compared with 5.9 in group II). Van Ramshorst et al. [14] reported postoperative paralytic ileus was not a significant factor in burst abdomen.

Postoperative leakage was a significant risk factor (38.7% of burst abdomen cases had leakage). It was noted that leakage was a significant risk factor for wound infection. This means it probably exerts its effect through sepsis and wound infection. Parmar et al. [16] reported 10% of cases had bowel leakage.

CONCLUSION:

From this prospective observational study, to study the incidence and etiological factors of burst abdomen after emergency midline laparotomy, following conclusion drawn;

1. Surgical technique is one of the most important predicting wound dehiscence.
2. Patients with risk factors like older age group, anaemia, malnutrition, obesity, peritonitis, diabetes mellitus, hypoalbuminemia, chest infection are important factors influencing wound dehiscence.
3. Abdominal wound dehiscence is seen in all age groups with no age dependence
4. Intra-abdominal sepsis and surgical site infections also increase chance of wound dehiscence.
5. Abdominal wound dehiscence can be prevented by improving the nutritional status of patient, strict aseptic precautions, avoiding post-operative cough and vomiting and by proper surgical technique.
6. Good and active resuscitation of patient before surgery with emphasis on fluid and electrolyte balance, antibiotic cover, naso-gastric tube aspiration and proper intake and output monitoring will pay in the end.
7. Strict post-operative care with stress on prevention of wound infection, chest complications and ileus can avoid wound dehiscence.

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