FACTORS RELATED TO BURST ABDOMEN: POST OPERATIVE CHALLENGES FOR SURGEONS- A PROSPECTIVE STUDY

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ABSTRACT

Background: Burst abdomen is post-operative separation of the Musculo-aponeurotic layers, including the peritoneum, with exposure of the intestines. Type of incision, vertical or transverse, nature of surgery, elective or emergency, and postoperative complications affect the outcome of Laparotomy.

Objective: The study aims to find the etiological factors of burst abdomen and to find and evaluate effective management of abdominal wound dehiscence in elective and emergency Laparotomy and how to prevent and overcome its complications. This post-operative complication encountered by the surgeon is always a challenge. The main concern is because of the risk of evisceration and the need to intervene; there is always a possibility of recurrence of dehiscence.

Material and Methods: Our study was conducted on 280 patients who had undergone exploratory laparotomy at MKCG MCH, BERHAMPUR, ODISHA. Of 280 patients, 136 underwent emergency laparotomy, and 144 were elective cases. They were managed either by midline vertical incision or transverse incision, and results were analysed for wound dehiscence.

Result: Most significant variation associated with wound dehiscence was hypoproteinaemia, anaemia, chronic cough and emergency procedures. Pre-operative and post-operative etiological factors such as chronic cough, anaemia, hypoproteinaemia, diabetes, obesity, use of Steroids. Results concluded that male
patients have higher incidence of laparotomy wound dehiscence and in fourth and fifth decade. Patients presented with peritonitis secondary to gastro-duodenal or ileal perforation are more prone to burst abdomen. 

**Conclusion:** Burst abdomen is a serious sequela of impaired wound healing. Incidence of burst abdomen is less in transverse incision in comparison to midline vertical incision. 

**KEYWORDS** Wound dehiscence, Laparotomy, midline vertical incision, Abdominal wound disruption.

**Introduction**

A significant postoperative complication that has a high risk of morbidity and mortality is a ruptured abdomen. For abdominal surgeons, it represents a typical difficulty.

That has an enormous effect on the hospital's and the patient's medical expenses. The incidence as it is documented in literature ranges from 0.4% to 3.5%, while it might be as high as 10 to 45% in poor nations.

Patients or the type of surgery are both potential causes of burst abdomen. This consequence is inevitable even when a technically flawless surgery is carried out on a sick patient. The possibility of evisceration is a constant source of worry for the surgeon. To avoid an incisional hernia and subsequent wound infection, prompt management is necessary.¹

Although perioperative care and suture materials have advanced technically, this complication is still likely to arise in select high-risk cases with many comorbid disorders and when emergency laparotomies are required in such urgent circumstances. Most abdominal wound disruption occurs between the sixth and seventh postoperative day and is accompanied by serosanguinous discharge, which clinically denotes a ruptured abdomen. The technique used to close the abdomen, intra-abdominal pressure, the patient's poor metabolic status, and intra-abdominal faeces are common risk factors for abdominal wound dehiscence.²,³,⁴

The purpose of the study is to assess the difficulties that surgeons encounter when performing comorbid conditions and elective or emergency laparotomies. It can be difficult for a surgeon to avoid such issues, stop the growth of an incisional hernia, and lessen the financial burden on both the patient and the hospital.

**Methods**

Our study was conducted on 280 patients who underwent exploratory laparotomy at MKCG MCH, BERHAMPUR, ODISHA. The patients were chosen at random from elective and emergency procedures when exploratory laparotomies were carried out for a variety of reasons. Peptic ulcer perforation, typhoid perforation, intestinal obstruction, malignancy, large bowel perforation, tubercular abdomen, and blunt abdominal trauma were the most prevalent diseases.

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Out of 280 patients, 136 were emergency, and 144 were elective cases. Of the 136, who had undergone emergency surgery, 18 patients were open through a transverse incision. Even patients with Appendicular lump or Phlegmon was extended transversely. In the remaining 118 cases, a midline vertical incision was given. In 144 elective cases, 14 were given transverse incisions, and 130 were given midline vertical incisions. A thorough history was obtained, and a physical exam was performed. They underwent surgery after comprehensive investigations and obtaining consent.

**Inclusion and exclusion criteria**

Both elective and emergency laparotomies patients were included in the study. Those who had had prior laparotomies were not allowed. Also, all patients who experienced an abdominal burst during the study period were included, while those who passed away were eliminated.

**Results**

Out of 280 patients in our study group, 136 patients had undergone Emergency Laparotomy, and 144 cases had undergone elective surgery. Out of 136 emergency cases, 12 (8.8%) patients had burst abdomen, and out of 144 elective surgery groups, only 4 (2.7%) patients had wound dehiscence.

Burst abdomen was significantly higher in the older age group compared to the younger age group. Out of a total number of Burst abdomen cases, emergency surgery cases were 12 (8.8%), and elective surgery cases were 4 (2.7%). 9 cases were seen in patients above 45 years of age. It constitutes 66.1% of the total abdominal dehiscence cases. The youngest patient in our study was 8 years old, and the oldest patient was 76 years old. When compared to individuals who underwent elective surgery, the incidence of a burst abdomen was much higher in emergency surgery patients. Malnutrition, obesity, anaemia, wound infections, chronic smokers, chronic drinkers, abdominal distension, immunocompromised, diabetes mellitus, post-operative vomiting, post-operative paralytic ileus, and distension were the most prevalent risk factors in patients with ruptured abdomen.

Gangrene bowel, perforated appendix, typhoid perforation, perforated peptic ulcer, acute abdominal trauma, obstruction from bands and adhesions, volvulus intussusception, and diverticulosis were among the common surgical procedures performed in an emergency.

Most patients operated upon in an emergency for intestinal perforation - 96 (70.5%) individuals, is what is responsible for the highest percentage of occurrences of burst abdomen. Of them, typhoid perforation and perforated peptic ulcer surgery accounted for 20 (14.7%) and 20 (14.7%) of all emergency procedures, respectively.

Due to contamination of the peritoneal cavity and surgical incision despite the best aseptic precautions used, this is one of the most significant causes linked to most cases of burst abdomen in peritonitis emergency cases.
12 cases were operated on by Transverse incision with wound dehiscence, and both were acute appendicitis with phlegmon.

**Types of incisions:** Out of all the wound dehiscence cases, 4 (25%) patients with transverse incisions had burst abdomen were as in this study, in 12 (75%) patients burst abdomen occurred after vertical midline incision.

**Pre-operative risk factors:** The most frequent risk factors for ruptured abdomen among all cases were anaemia, hypoproteinemia, cough, diabetes, obesity, and steroid usage.

**Post-operative causes:** In our study, postoperative cough and dyspnea, wound infection, abdominal distension, bowel leak, and electrolyte abnormalities were common risk factors for ruptured abdomen. In the vast majority of instances, these were the primary reasons of burst abdomen. Moreover, the majority of patients' wound dehiscence was caused by a combination of causes.

**The mean hospital stay** in burst abdomen cases was 23(+/-6.4) days, whereas in normal patients, the mean hospital stay was 7 days (+/-4.2). This was statistically significant.

Serosanguinous discharge from the site is visible on the sixth or seventh postoperative day. There were 16 cases of ruptured abdomen in our investigation. In 3 (18.75%) of the patients, conservative treatment was used to manage the condition; in 13 (81.25%) of the patients, total burst necessitated mass closure, a common procedure that involves including all layers of the abdominal wall following a thorough abdominal wash. Incisional hernias were discovered in 3 individuals and were treated with mesh placement after 6 to 8 months.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Showing incidence of burst abdomen in different age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td><strong>Emergency</strong> (136 cases)</td>
</tr>
<tr>
<td>Below 20 years</td>
<td>25 (18.3%)</td>
</tr>
<tr>
<td>20 - 45 years</td>
<td>32(23.5%)</td>
</tr>
<tr>
<td>45 years and above</td>
<td>79 (56.2%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Showing Primary cause of surgery.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnosis</strong></td>
<td><strong>Number of Patients</strong></td>
</tr>
<tr>
<td>Peritonitis</td>
<td>4</td>
</tr>
<tr>
<td>Intestinal obstruction</td>
<td>2</td>
</tr>
</tbody>
</table>
Blunt abdominal trauma | 3
Malignancy of stomach | 1
Penetrating abdominal injury | 4
Acute appendicitis | 1

<table>
<thead>
<tr>
<th>Incisions</th>
<th>Number of patients with burst abdomen</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midline vertical incision</td>
<td>13</td>
<td>81.21%</td>
</tr>
<tr>
<td>Lower transverse incision</td>
<td>3</td>
<td>18.7%</td>
</tr>
</tbody>
</table>

Table 3 Showing Types of incision.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic cough</td>
<td>7</td>
</tr>
<tr>
<td>Anaemia</td>
<td>11</td>
</tr>
<tr>
<td>Hypoproteinemia</td>
<td>10</td>
</tr>
<tr>
<td>Diabetes</td>
<td>9</td>
</tr>
<tr>
<td>Obesity</td>
<td>3</td>
</tr>
<tr>
<td>Use of steroids</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4 Showing Pre-operative risk factors.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough and dyspnea</td>
<td>12</td>
</tr>
<tr>
<td>Wound infection</td>
<td>16</td>
</tr>
<tr>
<td>abdominal distension</td>
<td>9</td>
</tr>
<tr>
<td>Bowel leak</td>
<td>4</td>
</tr>
<tr>
<td>Electrolyte imbalance</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 5 Showing Post-operative risk factors.

<table>
<thead>
<tr>
<th>Hospital stay</th>
<th>Number of patients</th>
<th>Days</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burst abdomen</td>
<td>16</td>
<td>23(+/-6.4)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 6 Showing Mean hospital stay
Discussion

When abdominal contents are visible through an abdominal wound, a significant surgical complication known as a burst abdomen (wound dehiscence) can occur. During the sixth to eighth postoperative day, it typically happens. With the potential for recurring dehiscence, surgical site infection, and the development of an incisional hernia, it requires rapid attention. By managing risk factors and taking preventative actions, incidence can be decreased. Incidence of burst abdomen in the present study was 5.71%, similar to the studies showing frequency range from 5.3% to 8.3% 5,6,7,8.

Patients with gastrointestinal perforation were more likely to experience a ruptured abdomen than other patients, especially those who had undergone an emergency laparotomy with a vertical midline incision. The factors that are significantly responsible for the occurrence of burst abdomen are preoperative predisposing factors like chronic smoking, anaemia, and hypoproteinaemia, and postoperative factors like cough, wound infection, anaemia, abdominal distension, bowel leak, vomiting, electrolyte imbalance, and immunocompromised patients and management of most of the patients requires ICU care postoperatively.9,10,11,12

In our study, the older age group had a considerably higher incidence of ruptured abdomen than the younger age group. Nine of the 16 cases of burst abdomens were in people over 45, making up around 56.2% of all cases of abdominal dehiscence. Our research has also indicated that age is a risk factor. According to our analysis, there were 8.8% more cases of abdominal burst during emergency procedures than during elective ones (2.7%). The high frequency may be explained by less-than-ideal circumstances during crises that cause additional complications. Though some studies interpret similar results during emergency as well as elective surgeries few other authors have reported burst abdomen occurrences as high as 10 to 30% of emergency cases.13,14,15,16

In the present study, a burst abdomen is more common in males. Out of 16 who had wound dehiscence,10 (62.5%) patients were males, and 6 (37.5%) patients were female, which is comparable to other studies.17,18

Vertical midline incision increases the incidence of wound dehiscence, according to numerous research. Out of all cases of ruptured abdomen in the current study, 13 patients (81.2%) received surgery using a vertical midline incision, and 3 patients (18.8%) underwent surgery using a transverse incision. Blood supply interference has been blamed for this. Because skin's elastic fibres run transversely, the vertical incision cuts them, weakening the wound. As opposed to upper midline incisions, the transverse approach does not impact pulmonary functioning. This is
primarily because the transverse incision has a lower rate of wound dehiscence. Peritonitis brought on by the drainage of an abdominal abscess and a hollow viscus hole may inevitably contaminate the site, delaying healing and increasing the bacterial load of the wound. Our study demonstrated a higher risk of wound dehiscence in patients who had undergone surgery for peritonitis, and acute appendicitis occurred in 6 (37.5%) patients, closely matching studies that demonstrated a high incidence of burst abdomen caused by perforations.19,20,21,22,23

In our study, chronic cough/dyspnoea, hypoproteinaemia, and anaemia were significant risk factors for abdominal burst. Many research have produced similar findings.

Mass closure of burst abdomen with polypropylene sutures with continuous sutures seems to be the best method of closure as it is fast, easy, and cost-effective with the least complications we also used the same suture material we could achieve facial closure in all the patients who had undergone surgery for burst abdomen.24

Recurrence, death, and incisional hernia are among the most frequent side effects of a burst abdomen. Another complication of a ruptured abdomen brought on by gut erosion is an enterocutaneous fistula. A few patients experience a violent and rapid disturbance, and their intestines may protrude through the wound and onto the surface of their belly.25

**Conclusion**

Midline In situations where rapid access to the intra-abdominal artery is necessary, the vertical incision is always the method of choice. Nonetheless, a transverse incision provides adequate access to an intra-abdominal approach, and burst abdominals are less common. It is important to use proper surgical technique and make every attempt to reduce risk factors before and during surgery.

**Conflict of Interest**
Nil.

**References**


