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Causes, Frequency and Risk Factors of Burst Abdomen in Patients With Peritonitis

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ABSTRACT

Objective — *To find out the causes, frequency and risk factors of burst abdomen in patients presenting with peritonitis.*

Study design — *Cross sectional observational study.*

Place & Duration of study — *Surgical ward 2, Jinnah Postgraduate Medical Center (JPMC) Karachi, from September 2021 to September 2022.*

Methodology — *All the patients with peritonitis who presented through emergency department were included. Risk factors like anemia, diabetes mellitus, hypertension, obesity, respiratory infection, frequency of burst abdomen and causes like typhoid ileal perforation, tuberculous perforation, ruptured appendix, duodenal ulcer perforation, ruptured liver abscess were recorded on pre designed forms.*

Results — *The age of the 90 patients who presented with acute peritonitis was from 13 years to 65 years with the mean age of 39±5 year. There were 60 (66.67%) male and 30 (33.33%) female patients. Burst abdomen occurred in 24 (26.66%) patients. Causes of peritonitis were ruptured liver abscess (n=4 - 4.44%), colonic perforation (n=2 - 2.22%), intestinal tuberculous ileal perforation (n=9 - 10%), duodenal ulcer perforation (n=19 - 21.11%), ruptured appendix (n=17 - 18.89%) and typhoid ileal perforation (n=38 - 43.33%). The risk factors in burst abdomen were hypoalbuminemia (66.67%), postoperative respiratory tract infection/cough (41.67%), intra-abdominal collection (33.33%), anemia (8.3%), paralytic ileus (16.67%), obesity/BMI>30 (8.3%). A total of 66 (73.33%) patients recovered uneventfully.*

Conclusion — *The most common cause of peritonitis was typhoid ileal perforation and frequency of burst abdomen was 26.66% in this group of patients.*

Key words — *Burst abdomen, Peritonitis, Risk factors, Enteric perforation, Tuberculous ileal perforation.*

INTRODUCTION:

Abdominal wound dehiscence is a serious complication effect of laparotomy and causes high morbidity and mortality. Abdominal wound dehiscence is divided into partial and complete disruption. Emergency closure is necessary. If treated conservatively incisional hernia may occur. Burst abdomen is common in all genders and age groups and no significant difference is reported. However, number of risk factors are reported like smoking, diabetes mellitus, hypertension, connective tissue disease, chronic steroid therapy, malignancy, obesity, chronic cough and ascites.[1] Peritonitis is the major cause of burst abdomen (95%). During surgery inadequate peritoneal toilet and faulty surgical technique are important contributing factors.[2] In presence of risk factors, the frequency of burst abdomen

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increases.[3,4]

Most of the patients who develop burst abdomen are operated as emergency cases. Of these, about 49% patients have co-morbid. In such instance, abdominal closure technique in second procedure also plays its role. Application of tension sutures and layered closure during operation is preferred. The second procedure in patients with burst abdomen has a high mortality and a rate of 9.8% is reported.[5] Incidence of burst abdomen is high in old age group who have multiple co-morbid. These must be carefully managed preoperatively in elective surgeries. However, in emergency situation these co-morbid add to morbidity and mortality.[6]

Peritonitis is a common surgical emergency. The common causes for peritonitis as reported in literature include typhoid and tuberculous enteric perforation along with duodenal ulcer perforation and ruptured appendix. If the duration of peritonitis is more than 24 hours and patient develop septicemia, the incidence of burst abdomen is increased. This study was conducted to determine the causes of burst abdomen and its risk factors in a tertiary center so as to find out if any change has taken place over the years with advances in technology and healthcare facilities.

METHODOLOGY:

This cross sectional observational study was conducted at Surgery Ward 2 JPMC Karachi, from September 2021 to September 2022. Institutional review board approval was taken. Sample size was 90 who were enrolled after taking informed consent / assent. All the patients of peritonitis above the age of 12 years and gender were included. Patients of burst abdomen due to intestinal obstruction, malignancy and those operated as elective cases, were excluded.

Patients were diagnosed as having acute peritonitis on clinical grounds. They were admitted for exploratory laparotomy. A detailed history was taken including symptoms like abdominal pain, distension and vomiting. Signs of acute peritonitis like tenderness, rebound tenderness, rigidity and gut sound were recorded. X-rays chest and abdomen were advised to document the presence of free air and other features like intestinal obstruction. Investigations done in these patients included complete blood count, electrolytes, RFT. Ultrasound abdomen was also done. Patients were resuscitated in emergency room. After stabilization of vital signs and organ perfusion as noted by adequate urine output, exploratory laparotomy was performed. Findings at laparotomy like ileal perforation, ruptured appendix, ruptured liver abscess, duodenal perforation were recorded. The risk factors like diabetes mellitus, hypertension, anemia, and others were recorded as well. In patients of peritonitis who presented within two days, primary closure of the abdominal wound was done. Where indicated stoma was made. Postoperatively IV analgesics, antibiotics, fluids were continued. Wound was examined daily and if found disrupted and gut loops became visible, a diagnosis of burst abdomen made. Other variables recoded in postoperative period included cough, paralytic ileus - if gut sounds remained absent for more than 5 days, electrolyte imbalance, inter-loop collection on ultrasound. Data were entered and analyzed using SPSS version 23. Frequency of burst abdomen, and risk factors were determined. Descriptive statistics were used to present data as frequencies, percentages and 95% confidence interval.

RESULTS:

A total of 90 patients of acute peritonitis were managed during the study period. The age of the patients were from 13 years to 65 years with the mean age of 39±5 year. Most (n=60 - 66.67%) of the patients were males. Burst abdomen occurred in 24 (26.66%) patients. This was noted more frequently in males (n=14 -58.33%). Frequency of burst abdomen in patients with typhoid was 20.51%, and in duodenal perforation 31.57%. Details are given in table I. The risk factors of burst abdomen are given in table II. Hypoalbuminemia was the most common factor noted.

DISCUSSION:

In this study highest frequency of the burst abdomen was in patients of less than 40 years of age. This is different from another study where burst abdomen was reported more often in the 5th decade.[7] Males were more frequently involved in this study as observed in other study by Aksamija et al.[8] The most common cause of peritonitis in our study was typhoid ileal perforation followed by duodenal ulcer perforation. Different pattern is reported in a study by Kumar et al.[9] However, two most common conditions remained typhoid ileal and tuberculous perforations. The pattern is reflective of similar environmental and eating habits of people from India and Pakistan where gastrointestinal infections are more prevalent.

Frequency of burst abdomen in this study was 26.66% which is higher than that reported by Waqar et al where the rate of this complication was 12%.[10]

Table I: Distribution of Various Causes of Peritonitis and Frequency of Burst Abdomen

Cause of Peritonitis	Number of Cases (n %)	Number of Burst Abdomen (n %)	95% Confidence interval (CI)
Typhoid Ileal Perforation	39 (43.33%)	8 (20.51%)	10.01 - 35.26
Duodenal Ulcer Perforation	19 (21.11%)	6 (31.57%)	13.92 - 54.50
Ruptured Appendix	17 (18.89%)	4 (23.53%)	7.95 - 47.50
TB Perforation	9 (10%)	4 (44.44%)	16.05 - 75.96
Ruptured Liver Abscess	4 (4.44%)	None	-
Colon Perforation	2 (2.22%)	2 (100%)	-

Table II: Risk Factors of Burst Abdomen

Risk Factors	Total Number of Patients (n)	Burst Abdomen Cases (n %)
Hypoalbuminemia	26	16 (66.67)
Diabetes mellitus	04	2 (8.3)
Hypertension	03	2 (8.3)
Anemia	06	2 (8.3)
Postoperative respiratory tract infection	16	10 (41.67)
Paralytic Ileus	08	4 (16.67)
Intra-abdominal Collection	12	8 (33.33)
Obesity BMI>30 Kg/m^2	02	2 (8.3)

This difference is due to the inclusion criteria. We included only patients with acute peritonitis while they reported outcome of all surgical procedures performed in emergency. Burst abdomen is more common in peritonitis due to residual peritoneal abscess, paralytic ileus and other factors.

The most common risk factor in this study was hypoalbuminemia, cough and intra-abdominal collection. In another study hypoalbuminemia was most frequent factor followed by jaundice and uremia.[11] Acute malnutrition that leads to hypoalbuminemia is a major cause of burst abdomen therefore nutritional requirements of the patients must be addressed in postoperative period.[12] Cough is another important risk factor as it results in increased intra-abdominal pressure and leads to disruption of surgical wound. High protein diet through central line and diligent chest physiotherapy with early mobilization of the patients, are important measures to address these issues.

Suture material of adequate length was used in our study and adequate margins were taken during its application. In literature it is reported to ensure suture to wound length ratio as 4:1. The continuous suturing technique is reported as the best method to close the abdomen.[13] In a study wound infection and intra peritoneal abscess were the major factors leading to burst abdomen.[14] Same were the findings in our study. Postoperative cough was risk factor associated pulmonary diseases and is considered with as a major risk factor.[15]

The frequency of burst abdomen was high in this study. Two most common causes for the peritonitis were infective in nature. Typhoid ileal perforation due to salmonella and duodenal perforation due to H. Pylori were the offending agents. It is therefore important to create awareness and improve environmental as well as personal hygiene practices.

LIMITATIONS OF THE STUDY:

This study included patients with already established peritonitis thus frequency of burst abdomen was high. This is a single center study. A large multicenter research can provide more robust data on this subject.

CONCLUSION:

Frequency of burst abdomen was high in this study. Males were predominantly involved. The most common cause of peritonitis was typhoid ileal perforation and most common risk factor was hypoalbuminemia.

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