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Original Article

Frequency of Burst Abdomen and Associated Risk Factors After Emergency Laparotomy in A Tertiary Care Hospital from Rawalpindi

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ABSTRACT

Objective: To assess the frequency of burst abdomen and associated risk factors after in patients undergoing laparotomy.
Study Design: Prospective longitudinal study
Place and Duration of Study: Combined Military Hospital Rawalpindi, Pakistan from Jan to Jun 2023
Methodology: One hundred and sixteen patients meeting our inclusion criteria who underwent emergency laparotomy were included in the study. Convenience sampling was performed for patient selection. The primary outcome was development of burst abdomen.
Results: Of 116 patients, 75(64.7%) were male and 41(35.5%) were female, with a mean age of 41.11±15.13 years. The major primary diagnosis for which patients underwent laparotomy were peritonitis, intestinal obstruction and blunt trauma. Only 12(10.34%) patients developed burst abdomen. The major risk factors associated with burst abdomen ($p< 0.05$) were age, history of smoking, anemia, obesity, diabetes mellitus, malnutrition, post-operative ileus, wound infection, wound leakage, post-operative cough and vomiting. Obesity, smoking and vomiting were not significantly associated with development of burst abdomen ($p> 0.05$).
Conclusion: We found that abdominal wound dehiscence, or burst abdomen, occurred in 10.34% patients who underwent emergency laparotomy at our set-up. The associated risk factors included wound infections, anastomotic leaks, and the presence of coexisting conditions like peritonitis, diabetes, anemia, malnutrition and advanced age.

Keywords: Emergency Laparotomy, Risk Factors, Surgical Wound Dehiscence

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INTRODUCTION

Abdominal wound dehiscence, also known as burst abdomen, is a challenging postoperative complication, which has a significant cost burden on both hospitals and patients, and is associated with high rates of morbidity and mortality.[1] The frequency of burst abdomen may be as high as 10–30% in impoverished countries.[2] With varying degrees of success, a number of retrospective investigations have attempted to determine the risk factors for this condition. Unfortunately, only a limited number of patients have undergone multivariate analysis.[3] Despite technological advancements in perioperative care and suture materials, this complication remains likely to occur in a small number of high-risk cases.[4] The majority of abdominal wound disruption happens on days six and seven following surgery, and is followed by serosanguinous discharge, which indicates a ruptured abdomen in a clinical sense.[5] The patient's age, sex, nutritional status (malnutrition), and preoperative medical conditions like anemia, diabetes, hypoproteinemia, jaundice, and renal failure (uremia) have all been linked to the aetiology of burst abdomen.[6,7] Although a lot of research and innovative methods have been created to stop or lessen the risk of abdominal wound dehiscence, it remains a serious post-operative concern.[8,9]

Over the past few decades, incidence and death rates have remained unchanged, despite advancements in perioperative care and suture materials. This can be attributed to patient population risk concerns outweighing the advantages of technical advancements.[10] The current study on the frequency of burst abdomen and associated risk factors following emergency laparotomy at CMH Rawalpindi aims to determine the incidence of burst abdomen within this specific patient population. Understanding the frequency of this complication is essential for healthcare professionals to better anticipate and manage postoperative risks.

METHODOLOGY

This prospective longitudinal study took place at the Department of Surgery, Combined Military

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Hospital Rawalpindi, Pakistan, from January to June 2023, after due approval by the Institutional Ethical Review Committee (IRB#536).

Inclusion Criteria: Patients of all age groups and either gender who underwent emergency laparotomy at our set-up during the study period were included.

Exclusion Criteria: Patients with previous history of surgery / laparotomy, or those who underwent elective surgery were excluded.

The sample size was calculated using WHO sample size calculator, taking prevalence of burst abdomen as 4.42 in Pakistan, margin of error of 5% and confidence interval as 95%, which came to 116 patients.11 Non-probability convenience sampling was performed in this study, and written informed consent was taken from patients and next of kin.

Pre-operative tests included complete blood count, urine examination, random and fasting blood sugar, urea, creatinine, chest and erect abdominal x-ray, and serum electrolytes. When necessary, liver function tests, electrocardiography, ultrasounds, and abdominal CT scans were performed. Midline incision laparotomy was performed under general anesthesia on each patient. All patients who presented to the emergency room with acute abdominal pain had antibiotics started as part of their pre-operative care, and their courses were extended post-operatively in each case. In selected cases, a preventive dosage of antibiotics was administered along with additional antibiotics as needed. In all cases, synthetic, non-absorbable monofilament sutures (Prolene No.1) were used to routinely seal the linea-alba. On the third post-operative day, the site was checked for edema, redness, and discharge (pus or serosanguinous fluid). Every day, the wound was checked, and if disruptions were discovered, and apparent loops in the gut found, burst abdomen was diagnosed. Potential risk factors including age, history of smoking, anemia, obesity, diabetes mellitus, malnutrition, pos-operative ileus, wound infection, wound leakage, post-operative cough and vomiting were noted. Statistical Package for Social Sciences (SPSS) version 26 was used to analyze data. Mean and standard deviation were computed for quantitative data, while frequency and percentage were determined for qualitative data. Chi square test was applied to determine association between dependent and independent variables, and a *p* value less than 0.05 was considered significant.

RESULTS

Of 116 patients, 75(64.7%) were male and 41(35.5%) were female, with a mean age of 41.11±15.13 years (range: 14 – 78 years). The major primary diagnosis for which patients underwent laparotomy were peritonitis, intestinal obstruction and blunt trauma (Table-I).

Table-I: Baseline characteristics of patients who underwent emergency laparotomy (n=116)

Characteristics	Values
Age (years)	Mean±Sd
	41.11±15.13
Gender	n (%)
Male	75(64.7%)
Female	41(35.5%)
Primary Diagnosis	n (%)
Peritonitis	48(41.4%)
Intestinal Obstruction	27(23.3%)
Blunt trauma abdomen	19(16.4%)
Others	22(19.0%)

Only 12(10.34%) patients developed wound dehiscence / burst abdomen. Of these, 8(66.66%) were male and 4(33.33%) were female (Figure).

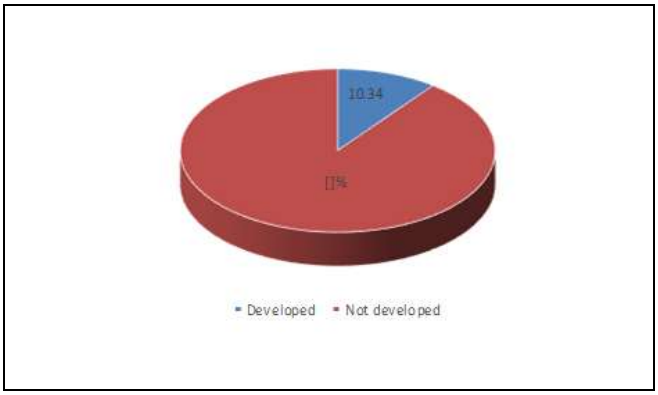

Figure: Frequency of Burst Abdomen in Patients who underwent Emergency Laparotomy (n=116)

The major risk factors associated with burst abdomen age, history of smoking, anemia, obesity, diabetes mellitus, malnutrition, pos-operative ileus, wound infection, wound leakage, post-operative cough and vomiting. Majority of the risk factors were significantly associated with development of burst abdomen (p<0.05, Table-II).

DISCUSSION

This study was carried out on 116 patients out of which 12 (10.34%) had burst abdomen. The results are in line with a study carried out by Waqar *et al*. where wound dehiscence was observed in 12%.[12] The results

of present study are also similar to a study carried out by Ogbuanya *et al*., where 12.6% of patients had wound dehiscence after surgery.[13] It was discovered in our study that jaundice and reduced liver function were not significant risk factors for abdominal wound dehiscence. While several studies cited jaundice as a risk factor for burst abdomen, Kenig *et al*. and Sandy et al. reported the same conclusion.[14,15]

Table-II: Percentage of Risk Factors Associated with Burst Abdomen (n=116)

Risk factors	Burst abdomen Developed (n=12) n (%)	Burst abdomen Not developed (n=104) n (%)	*p* value
Age (>50 years)			
Smoking	7(58.33%)	24(23.07%)	0.009
Anemia	6(50.0%)	26(25.0%)	0.067
Obesity	10(83.33%)	46(44.23%)	0.010
Diabetes	5(41.66%)	19(18.26%)	0.059
mellitus	8(66.66%)	16(15.38%)	0.000
Malnutrition	6(50.0%)	19(18.26%)	0.011
Post-op ileus	7(58.33%)	24(23.07%)	0.009
Wound	10(83.33%)	17(16.34%)	0.000
infection	7(58.33%)	10(9.61%)	0.000
Wound	7(58.33%)	25(24.03%)	0.012
leakage	7(58.33%)	34(32.69%)	0.079
Cough			
Vomiting			

The present study focuses on wound dehiscence as a complication of emergency laparotomies, and our results are in accordance with a study carried out by Soni *et al*. According to a study by Lotfy *et al*., there were more frequent cases of burst abdomen in emergency laparotomies.[16] However, the findings of our study are in contradiction with those from a study by Ibrahim *et al*., which found that abdominal wound dehiscence is more common in underdeveloped nations and can reach 30% during laparotomies performed for a variety of diseases.[17] The current study's finding that only 10.34% of emergency laparotomies resulted in a burst abdomen is not consistent with previous research that revealed that up to 18% of cases had a burst abdomen as reported by Denys *et al*., and as much as 15% in a study by Dowsett *et al*.[18,19]

LIMITATIONS OF STUDY

The major drawback of our study was a relatively small sample size, and that we did not further establish predictors of abdominal wound dehiscence, and determining statistically significant associations between certain proposed risk factors and abdominal wound dehiscence.

CONCLUSION

We found that abdominal wound dehiscence, or burst abdomen, occurred in 10.34% patients who underwent emergency laparotomy at our set-up. The associated risk factors included wound infections, anastomotic leaks, and the presence of coexisting conditions like peritonitis, diabetes, anemia, malnutrition and advanced age.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MSA & IA: Data acquisition, data analysis, critical review, approval of the final version to be published.

AN & SZ: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

AS & BSN: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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