

BURST ABDOMEN: A COMMON SURGICAL PROBLEM

Muhammad Naeem¹, Imtiaz Ahmad Khattak², Ambareen Samad³, Rashid Waheed¹

¹Department of Surgery, Khyber Teaching Hospital, Peshawar - Pakistan

²Department of Surgery, Institute of Medical Sciences Kohat - Pakistan

³Department of Obstetrics & Gynaecology, Gajju Khan Medical College, Swabi - Pakistan

ABSTRACT

Objective: To determine the frequency and common risk factors of wound dehiscence/burst abdomen in patients undergoing laparotomy.

Material and Method: This cross sectional descriptive Study was conducted at Department of Surgery, Gynae & Obs, Khyber Teaching Hospital Peshawar, Pakistan from February 2016 to August 2016 over 180 patients undergoing laparotomy. Permission from the hospital ethical committee and informed written consent were obtained from the all patient before including in study.

Results: A total of 180 patients undergoing laparotomy were included in the study. Male to female ratio was 1.53:1. Average age of the patients was 47.50years \pm 13.34SD with range 19-73 years. Wound dehiscence was found in 17(9.60%) patients and wound infection was the leading risk factor for it.

Conclusion: The safety and antiseptic measure can reduce the wound infection. Ultimately the wound dehiscence can be avoided.

Key Words: Wound dehiscence, abdomen, laparotomy, frequency, Wound Infection, Diabetes Mellitus

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INTRODUCTION

Wound dehiscence/burst abdomen represents a mechanical failure of wound healing of surgical incision¹. Wound complications are important causes of early and late postoperative morbidity following laparotomy. That's why Wound and their management are fundamental to the practice of surgery. Any surgical intervention will result in a wound. The surgeon's task is to minimize the adverse effects of the wound, remove or repair damage structure and hasten the process of wound healing to restore function. General surgeon makes various abdominal incisions. Disruption of abdominal surgical wound failure. The incidence of wound dehiscence/burst abdomen is 8.13%².

Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication, with mortality rates reported as high as 45%.^{3,4}

Dr. Muhammad Naeem (Corresponding Author)

Department of Surgery Khyber Teaching Hospital

Cell: +92-314-9960600

E-mail: drm.naeemk2016@gmail.com

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The incidence, as described in the literature, ranges from 0.4% to 3.5%.^{5,6} Abdominal wound dehiscence can result in evisceration, requiring immediate treatment.

It has significant effect on health care cost both for patient and hospital⁷. Surgical incisions stimulate the healing process which in reality is a complex and continuous process with four different stages. Hemostasis, inflammation, proliferation and maturation phase⁸. The proliferation phase which is the phase of granulation tissue formation in the wound space begins on third post operative day and lasts for several weeks. The most important factor in this phase are fibroblasts which move to the wound and are responsible for the collagen synthesis⁹.

Conditions associated with increased risk of wound dehiscence/ burst abdomen are anemia, hypoalbuminemia, malnutrition, diabetes, malignancy, jaundice, obesity, post operative cough, male gender, elderly patients and specific surgical procedures as colon surgery and emergency laparotomy which are associated with wound disruption¹⁰. Risk factors that did not have independent effects in our evaluation included hypertension, uremia, and corticosteroid use, although these factors have been described as risk factors by a number of authors.¹¹⁻¹⁴

Anemia is a risk factor that is related to increase peri operative stress, blood transfusion and decreased tissue oxygenation all of which can affect the immune system on the wound healing process¹⁵. Continued presence of bacteria causes influx and activation of neutrophils and increase in level of degradative matrix metalloproteinase (MMPs). In the absence of sufficient tissue inhibitors matrix metalloproteinases MMPs, wound degradation will occur.¹⁶

The release of endotoxins by bacteria leads to production of collagenases which degrades collagen fibers⁹. Infection thereby causes a prolongation of the inflammatory phase and negatively affects deposition of collagen and fibroblast activity.^{16,17} The rationale of this study is to determine the current mode of frequency and common risk factors of burst abdomen/wound dehiscence. The results of this study will give us current data on the common risk factors involved in patients who suffer from wound dehiscence and will help us in making guidelines for control of such risk factors preoperatively. Additionally if the frequency of wound dehiscence in this study found to be alarmingly significant then it will allow us to think about change in expertise at our level which can be leading to wound dehiscence. Such study has never been conducted out in our population in near or far past and exact frequency of wound dehiscence with risk factors is not fully known.

MATERIAL AND METHODS

The study was conducted in the Department of Surgery, Gynae & Obs of Khyber Teaching Hospital, Peshawar, Pakistan from February 2016 to August 2016. Approval was taken from Hospital ethical committee. All patients meeting the inclusion criteria (all those patients who will be undergoing elective laparotomy for diagnostic or therapeutic purpose) were enrolled in the study and were admitted through OPD and Emergency. The purpose and benefits of the study were explained to the patient and patient were assured that his/her confidentiality was maintained and a written informed consent was obtained.

Demographic characteristics like name, age, sex, address, and phone number of all patients were recorded. Complete history was taken and complete general physical and systemic examinations were done. All patients were pre operatively prepared by doing routine investigations FBC, serum urea, serum creatinine, x ray chest, ECG RBS and viral status. After overnight nil by mouth, they were put on next available list for elective procedure.

All laparotomies were performed by the same experienced surgeon. Post operatively the patients were followed daily till 10th day for wound dehiscence.

If wound dehiscence/burst abdomen occurs common risk factors were scrutinized. Patient hospital record were thoroughly checked for anemia and diabetes, wound were carefully examined for wound infection and in case of any discharge were sent to laboratory for culture and history of post-operative cough was taken from the patient. Patients who have burst at presentation, Severely malnourished patients with body mass index less than 15 and more than 30 were excluded as it make our results biased if in. Strictly exclusion criteria were followed to control confounders and bias in the study results.

RESULTS

A total of 180 patients undergoing laparotomy were included in the study. There were 108 (60%) were males and 72(40%) were females. Male to female ratio was 1.53:1. Average age of the patients was 47.32years \pm 13.33SD with range 19-73 years. Patient's age was divided in four categories, out of which most common age group for inguinal hernia repair was 46-60 years in our study. There were 29(16.7%) patients were of the age less than or equal to 30 years. Thirty four (18.9%) patients were in the age range of 31-45 years, 88 (48.9%) were of age range 46-60 years and 28(15.6%) presented at age more than 60 years of age.

Frequency wound dehiscence/burst abdomen in patients undergoing laparotomy was found in 17(9.44%) patients while the rest of patients were free of wound dehiscence. The common factors leading to wound dehiscence in patients undergoing laparotomy was observed. In which 1(5.59%) were Diabetes, 13(76.47%) were anemia, 15(88.24%) have wound infection and 6(35.29%) were post-operative cough. Age wise distribution of wound dehiscence and its common factors shows that in old age were found high as that of younger age. The patients having age less than or equal to 30 years of age have Wound Dehiscence 10% while wound infection was found in majority of cases having wound dehiscence. It was noted that wound dehiscence and its common risk factors showed insignificance over age as shown in Table 1.

Gender wise wound dehiscence and its common risk factors shows that gender have also no role over common risk factors for wound dehiscence. There is 11.1% wound dehiscence in male while in female patients it was 6.9%. All the factors are insignificant over gender as shown in Table 2. Stratification of wound dehiscence and its common risk factor also shows insignificance as shown in Table 3.

DISCUSSION

Acute wound failure has been discussed under various names i.e. wound dehiscence, burst abdomen,

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Table 1: Age Wise Distribution of Wound Dehiscence and its Common Risk Factors

Risk factors		age (in years)				p-value
		<= 30	31 - 45	46 - 60	61 +	
Wound Dehiscence	Yes	3 10.0%	1 2.9%	8 9.1%	5 17.9%	0.259
	No	27 90.0%	33 97.1%	80 90.9%	23 82.1%	
Diabetes	Yes	0 .0%	0 .0%	1 1.1%	0 .0%	0.789
	No	30 100.0%	34 100.0%	87 98.9%	28 100.0%	
Anemia	Yes	2 6.7%	1 2.9%	5 5.7%	5 17.9%	0.113
	No	28 93.3%	33 97.1%	83 94.3%	23 82.1%	
Wound infection	Yes	3 10.0%	1 2.9%	7 8.0%	4 14.3%	0.437
	No	27 90.0%	33 97.1%	81 92.0%	24 85.7%	
Post Operative Cough	Yes	0 .0%	0 .0%	5 5.7%	1 3.6%	0.294
	No	30 100.0%	34 100.0%	83 94.3%	27 96.4%	

Table 2: Gender Wise Distribution of wound dehiscence and its Common Risk Factors

Risk factors		Gender		p-value
		Male	Female	
		Count & percentages	Count & percentages	
Wound Dehiscence	Yes	12 (11.1%)	5(6.9%)	0.349
	No	96 (88.9%)	67 (93.1%)	
Diabetes	Yes	1 (.9%)	0 (.0%)	0.413
	No	107 (99.1%)	72 (100.0%)	
Anemia	Yes	9(8.3%)	4(5.6%)	0.481
	No	99 (91.7%)	68 (94.4%)	
Wound infection	Yes	11 (10.2%)	4(5.6%)	0.271
	No	97 (89.8%)	68 (94.4%)	
Post Operative Cough	Yes	5(4.6%)	1(1.4%)	0.235
	No	103 (95.4%)	71 (98.6%)	

Table 3: Type of Laparotomy Wise Distribution of Wound Dehiscence and its Common Risk Factors

Risk factors		Type of Laparotomy		p-value
		Emergency	Elective	
		Count & percentages	Count & percentages	
Wound Dehiscence	Yes	14(9.9%)	3(7.9%)	0.713
	No	128 (90.1%)	35 (92.1%)	
Diabetes	Yes	1 (.7%)	0 (.0%)	0.604
	No	141 (99.3%)	38 (100.0%)	
Anemia	Yes	10(7.0%)	3(7.9%)	0.857
	No	132 (93.0%)	35 (92.1%)	
Wound infection	Yes	12(8.5%)	3(7.9%)	0.912
	No	130 (91.5%)	35 (92.1%)	
Post Operative Cough	Yes	6(4.2%)	0 (.0%)	0.197
	No	136 (95.8%)	38 (100.0%)	

wound disruption and evisceration. It is a very serious complication of abdominal surgery, with very high mortality rate and no single cause being responsible: rather it is a multi-factorial problem¹⁸.

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 Amini AQ et al which showed that the problem of wound dehiscence is much more prevalent in South East Asia than the Western world.¹⁹ This may be attributable to poor nutritional state of the patients, delayed presentation to the tertiary care hospitals, poor quality of suture material, disease like tuberculosis of the abdomen which is endemic in the countries of South East Asia and higher load of emergency surgeries.

In our study also males were 107 in number and predominated the females who were 70 in number with the ratio of 1.53:1. This male predominance probably due to the higher incidence of peptic ulcer perforation, intestinal obstruction and malignancies in male sex. The mean age of presentation was 47.50years \pm 13.34SD as incidence of perforation and intestinal obstruction was common in this age group. Which is similar to the study conducted by Sivender et al.²⁰

The frequency of wound dehiscence /burst abdomen varies from centre to centre worldwide. Frequency of wound dehiscence or burst abdomen was 14.7% in this study. It proves high when compared to western studies where its frequency ranges from 1-3%^{21,22} while it seems comparable to results of some centers in India with frequency of 10-30%^{23,24} and even some local studies with frequency of 5.9%.²⁵

Many risk factors are incriminated in development of burst abdomen. Some of the major independent risk factors that have been identified are age, gender, ascites prolonged post-operative abdominal distension or cough, anemia, peritonitis jaundice, emergency surgery and wound infection. Factors related to surgeon/experience are type of incision, suture material, drain, and ostomy.^{26,27} Abdominal distension, vomiting, and nausea are risk factors caused by increasing intra-abdominal pressure.²⁸

In this study, the most common age group affected was 31-50 years (14 cases). Old age has been found to be another independent risk factor for abdominal wound dehiscence. Waqar S et al found 57% of their patients with wound dehiscence above the age of 50²⁵. Hanif N et al also showed advanced age in 50 % of cases.²⁸ The explanation for this might lie in deterioration of the tissue repair mechanism in the elderly especially during the first few days of the wound healing process, the immune system plays a key role.

There are major risk factors for burst abdomen as 1(5.88%) were Diabetes, 13(76.47%) were anemia, 15(88.24%) have wound infection and 6(35.29%) were post-operative cough in this study. Sinha A et al. car-

ried out a study in Oula University Hospital,²⁹ among 48 patients who developed burst abdomen and found that 65% patients with pre-operative hypoalbuminemia, other risk factors included anemia, malnutrition, chronic lung disease and emergency procedure. In another study, 43.8% of patients showed hemoglobin <10 g% as the chief risk factor. Other factors were poor nutritional status, obesity, diabetes mellitus, and hypoproteinaemia.³⁰

In this study wound infections were present in all 26 (100%) cases of wound dehiscence making it the most predominant risk factor causing burst abdomen. As most of the patients were operated in emergency with acute conditions like peritonitis, gangrenous or obstructed bowel with a contaminated abdominal cavity, which led to inevitable development of wound infection. Waqar et al found wound infection in all 7 cases with dehiscence.²⁵ Col and Soran also reported wound infection as an important risk factor for wound dehiscence.²²

The frequency of burst abdomen in the present survey was 9.60% with a higher range than other studies which showed a frequency ranging from 5.3% to 8.3%.^{31,32} The incidence of burst abdomen is comparatively less in many Western studies which showed its occurrence as 0.4-3.5%. This may be attributable to poor nutritional status of patients, severe anemia hypoproteinemia, delay in presentation to tertiary health care hospitals, diseases, such as pregnancy with obstructed labor and rupture uterus, pancreatitis, tuberculous abdomen, and perforation peritonitis, among patients in the current study.

CONCLUSION

Intra-peritoneal infection is the most important factor in predicting wound dehiscence. Patient factors like older age group, male sex, anaemia, diabetes and post operative cough act as determinant for wound dehiscence. Surgeon factors like midline incisions, improper suture technique and improper aseptic precautions which may lead to wound infection and then wound dehiscence.

RECOMMENDATIONS

Postoperative abdominal wound dehiscence can be prevented by improving the nutritional status of the patient, strict aseptic precautions, avoiding midline incisions, improving patients respiratory pathology to avoid postoperative cough and by proper surgical technique.

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AUTHOR'S CONTRIBUTION

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

- Naeem M:** Idea, operating surgeon.
Khattak IA: Data analysis
Samad A: Operating surgeon, follow-up
Waheed R: Bibliography, statistics.

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.