



ORIGINAL ARTICLE

Incidence of wound dehiscence and factors causing wound dehiscence in patients undergoing laparotomy at a tertiary care hospital.

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ABSTARCT... Objective: Wound dehiscence is a major complication of laparotomy procedure. It is more common in emergency procedure as compared to elective procedures. This wound dehiscence results in increase in both morbidity and mortality. **Study Design:** Cross Sectional study. **Setting:** Department of General Surgery, Gulab Devi Hospital Lahore. **Period:** January 2022 to December 2022. **Material & Methods:** All the patients undergoing laparotomy were included in this study through non randomized purposive sampling after their consent. Total of 86 patients were included in this study. **Results:** The mean age of patients were 35.66 ± 15 years. The mean BMI was 19.99 ± 4.201 Kg/m². Among these patients emergency procedures were performed in 23 (26.7%) while elective cases were 63 (73.2%). Incidence of wound dehiscence was 3.03%. Percentage of wound dehiscence was more in emergency procedure as compared to elective 8.7% versus 1.6% respectively. **Conclusion:** On the basis of this study we conclude that the wound dehiscence is more in patients treated in the emergency as compared to elective procedures. Wound dehiscence occurred more commonly among patient that had low BMI, anemia, malignancy, hypoproteinemia and peritonitis.

Key words: Hypoproteinemia, Laparotomy, Wound Dehiscence.

INTRODUCTION

The word laparotomy is from the Greek word Lapara. It is opening of abdomen through different incisions for management of intra-abdominal diseases. Ephraim McDowell performed first laparotomy at Danville, Kentucky, in 1809 without any anesthetic.¹ Anatomy of abdominal wall from superficial to deep includes skin, subcutaneous fat, fascias, external oblique muscle and internal oblique muscles laterally, rectus abdominis in midline and peritoneum.² Incisions which are used are Midline/Median/Sagittal. Other incisions made are para median, transverse, pfannenstiell and subcostal.³ The most common causes for laparotomy are emergency situations which includes acute intraperitoneal haemorrhage, uncontrolled gastrointestinal bleeding, traumatic or piercing abdominal injuries, and acute peritonitis due to perforated gastrointestinal tract.⁴ Most common cause for elective laparotomy

is intra-abdominal malignancy.⁵ Complications of laparotomy are bleeding, infection, wound dehiscence, wound infection, adhesions and iatrogenic injury to intra-abdominal structures. Post-operative wound dehiscence is defined as total or partial breakdown of abdominal wound closure with or without expansion.⁶

There are three different forms of wound healing. It can be primary healing which occurs in a clean wounds. In this healing wound margins are closed using sutures. Secondary healing occurs in contaminated or dirty wounds and wounds with soft tissue loss, such as those from severe trauma. In this wound is kept open and regular dressings are done and wound heals slowly with fibrosis. There is no early wound closure in secondary healing. In tertiary wound healing wound is kept open for some time until the infection subsides and later wound edges are

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approximated using sutures or wound is covered with skin graft or flap.⁷ Factors which influence wound healing includes wound infection, presence of necrotic material and foreign body in wound, poor tissue perfusion, venous and lymph obstruction, hematoma, large size defect, irradiation, wounds over joints. General factors includes age, obesity, smoking, alcohol, hypoxia, malignancy, uremia, jaundice, diabetes, steroids use and malnutrition.⁸ Procedure related includes operation type, type of incision and closure, poor incision technique, poor incision closure technique, length of operating time.

Optimization of patient pre operatively, use of correct sutures for fascia closure, use of proper technique for fascia closure and prevention from post-operative wound infection can prevent wound dehiscence. The rate of wound dehiscence is used as quality indicators in major surgical departments and hospital.⁹ The rationale of this study was to determine wound dehiscence in our hospital after laparotomy wounds and determine factors related to wound dehiscence in our part of world.

MATERIAL & METHODS

It was a cross sectional prospective study conducted in department of General Surgery Gulab Devi Hospital Lahore from January 2022 to December 2022. It was conducted after approval of institutional review board (ADMIN/GDEC/428/18). All the patients undergoing laparotomy at Gulab Devi hospital were included in this study through non randomized purposive sampling after their consent. Patient with age less than 15 and patients with anterior abdominal wall hernia and patients with previous history of laparotomy were excluded from this study. Total of 86 patients were included in this study. All data was collected on prescribed performa and analyzed with SPSS 23. All qualitative data is presented in the form of graph and frequency table while quantitative data is presented in the form of means with standard deviation.

RESULTS

In this study we included 86 patients who

underwent emergency or elective laparotomy at Gulab Devi Hospital Lahore. The mean age of patients were 35.66 ± 15 years with minimum age of 24 years and maximum age of 74 years. In our study 45.45% were male while 54.55% were female patients. The mean BMI was 19.99 ± 4.201 Kg/m² with range from 14.10 kg/m² to 32.60 kg/m². Among these patients emergency procedures were performed in 23 (26.7%) while elective cases were 63 (73.2%). Out of these 86 patients 36 (41.8%) had intestinal obstruction due to abdominal tuberculosis, 22 (25.6%) had intra-abdominal malignancies, 19 (21.0%) had intestinal perforation, 04 (4.6%) had pseudocyst of pancreas, 02 (2.3%) had gastric perforation, 02 (2.3%) had gastric bleed, 01 (1.16%) had ruptured ectopic and 01 (1.16%) had mesenteric cyst. Among these patients 69.7% had respiratory diseases, 11% had diabetes mellitus and 6.06% had hypertension. Serum protein and albumin levels were done of all patients undergoing laparotomy pre operatively as hypoalbuminemia and hypoproteinemia are the risk factors of wound dehiscence. Mean serum albumin level was 31.45 ± 0.759 g/dl with range from 1.40 to 4.20 g/dl. Mean serum protein level was 6.245 ± 1.826 g/dl with range from 4.80 to 11.90 g/dl. Anemia was present in 27.2% patients.

Mean hospital stay was 13.2 ± 3.01 range from 4 to 20 days. Complications included serous discharge from wound 15%, wound infection 13% and wound dehiscence 3.03%. Wound dehiscence occurred in two patients on 5th post operative day while one had on 6th post operative day.

Risk factors that resulted in wound dehiscence were low BMI, hypoproteinemia, hypoalbuminemia, anemia, malignancy and intestinal perforation. Percentage of wound dehiscence was more in emergency procedure as compared to elective 8.7% versus 1.6% respectively. Patients with wound dehiscence had low BMI but mean of 15.6 ± 4.2 (p-value 0.29). Patients having hypoproteinemia and hypoalbuminemia had wound dehiscence mean 4.2 ± 1.81 (p-value 0.26) and 1.40 ± 0.17 g/dl (p-value 0.017) respectively. Patients with wound

dehiscence had more hospital stay as compared to other patients 20 ± 2.19 and 13.9 ± 2.78 respectively (p-value 0.002).

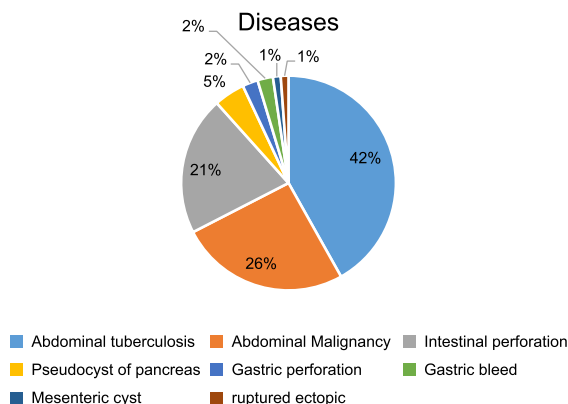


Figure-1

DISCUSSION

In our study 86 patients participated in this study during January 2022 to December 2022 at Gulab devi hospital lahore. In this duration burst abdomen was found only in 03 (3.3%) patient. In many national and international studies documented wound dehiscence is 0.4-6%.^{9,10} Wound dehiscence in our study is within this limit. According to present national and international data higher incidence was seen in laparotomies undergoing in emergency as compared to elective procedures. According to different studies documented incidence of wound dehiscence in emergency laparotomies was

20.01% and elective laparotomies was 3.3%.^{11,12} In our study wound dehiscence was seen in 8.7% patients having emergency laparotomies as compared to 1.6% in elective laparotomies. These high incidence in emergency procedures were due to presence of peritonitis and poor nutritional status of the patients presenting in emergency department. Our results are according to the data present in both national and international studies.

According to Lakshmi et al wound infections, anemia and hypoproteinemia are the risk factors for wound dehiscence in laparotomy patients.¹³ Similarly study conducted by Siddhart et al also elaborated these risk factors for wound dehiscence.¹⁴ In our study factors that resulted in wound dehiscence were low BMI, hypoproteinemia, hypoalbuminemia, anemia, malignancy and intestinal perforation (Table-I).

According to our study wound dehiscence resulted in prolonged hospital with mean stay of 20 ± 2.19 days as compared to mean of other patients included in this study 13.9 ± 2.78 . This increase in hospital stay was statistically significant (p-value 0.002). This is similar to both national and international literature. No association of wound dehiscence was found with age and sex of the patients which is similar to other national and international studies.¹⁵

Factors		Wound Dehiscence		P-Value
		Yes	No	
BMI		$15.6 \pm 4.2 \text{ kg/m}^2$	26.12 ± 2.96	0.29
Serum Albumin		$1.40 \pm 0.17 \text{ g/dl}$	3.20 ± 0.46	0.01
Serum Protein		$4.2 \pm 1.81 \text{ g/dl}$	6.30 ± 1.96	0.26
Peritonitis	Yes	02	19	0.28
	No	00	65	
Anemia	Yes	02	09	0.71
	No	01	74	
Malignancy	Yes	01	21	0.07
	No	00	64	
Procedure Type	Elective	01	22	0.03
	Emergency	02	61	

Table-I. Factors effecting wound healing

In laparotomy rectus sheath can be closed by continuous or interrupted method by using non absorbable suture mostly polypropylene of size 1. The chances of wound dehiscence is less in interrupted method of abdominal closure as compared to continuous closure. According to Bansawal et al the incidence of wound dehiscence in continuous closure technique was 20.1% versus 5.4% in interrupted method.¹¹ In our study all abdominal closure were done using continuous method with polypropylene 1 suture. Mostly wound dehiscence occurs between 3rd to 5th postoperative days. In our study all patients had wound dehiscence on 5th and 6th post-operative days.

CONCLUSION






On the basis of this study we conclude that the wound dehiscence is more in patients treated in the emergency as compared to elective procedures. Wound dehiscence occurred more commonly among patient that had low BMI, anemia, malignancy, hypoproteinemia and peritonitis. These result indicate that the risk of developing a wound dehiscence of abdominal surgical wound can be reduced by application of adequate perioperative and postoperative measures.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Muhammad Adil Iftikhar	Conceptualization of Project, Statistical Analysis.	
3	Mohammad Zia ul Miraj	Literature Search.	
4	Maliha Javaid Butt	Drafting, Revision, Statistical Analysis.	
5	Iftikhar Ahmed	Data Collection.	
6	Humaira Yousaf	Data Collection.	