



FREQUENCY OF POSTOPERATIVE WOUND INFECTIONS IN OPEN HEART SURGERY

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ABSTRACT

OBJECTIVE: Post operative complications are a good measure of quality of cardiac surgical care, as long as patient's risk factors are taken into consideration. The aim of this study was to determine the frequency of post operative wound infection in open heart surgery patients and to identify the various risk factors for wound infection.

MATERIALS AND METHODS: it was cross-sectional analytic study. The study was conducted at Punjab Institute of Cardiology (PIC), Lahore from 10th July, 2009 to 10th November, 2009. A total of 282 patients were selected. The data were collected using medical records at the time of discharge from the hospital.

RESULTS: In this study the mean age of patients was 54.11 ± 0.62 [95% C.I 52.89 - 55.32]. Out of 282 patients, 238(84.4%) patients were males. 201(71.3%) patients underwent Coronary Artery Bypass Grafting (CABG), 47(16.7%) patients underwent Valvular surgery and 34(12.1%) patients underwent both CABG and Valvular surgery. Overall 39(13.8%) patients had post-operative infection; 19(6.7%) patients had deep sternal wound infection, 17(6.0%) patients had superficial and 3(1.1%) have mediastinitis. 10(25.6%) patients got infection in ICU and 29(74.4%) patients got infection when in ward/room. Postoperative wound infection were significantly associated with increased in patient's stay in wards/rooms (p-value 0.002), erythrocytes sedimentation rate (p-value 0.009), and white blood cells (p-value 0.003). Post operative wound infection were not significantly associated with gender, hypertension, diabetes, smoking, hyperlipidemia, abnormal hemoglobin, liver function, renal function and body mass index of the patients. There were no differences in average number of grafts, number of days in ICU and time of ventilation between post operative wound infection and without infection.

CONCLUSION:In this study the wound infection rate is higher, so the special care should be provided to patients and further studies should be conducted to identify the various predisposing factors for development of the post operative wound infection. It will help in reducing the cost for antibiotics given for post-operative wound infection and an economic burden to the health care system. It will also reduced mortality and morbidity of patients.

KEY WORDS: Postoperative wound infections, Open heart Surgery

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INTRODUCTION

Postoperative wound infections are one of the serious complications in open heart surgery.¹ There are different types of infection such as superficial, deep sternal and mediastinitis. Most of the studies reported the prevalence of the total wound infections after surgery ranging from 0.9 to 20% and incidence of 0.25% to 25% whereas mortality rate due to wound infection is as high as

21%.^{2,5} Post operative wound infections not only increases the burden on hospital but also adds up economical burden on the patient as well as on the health care system. It also leads to long hospitalization, blood transfusion, re-surgery, extra morbidity, high costs and distress for the patient. Different factors i.e., sex, age, diabetes mellitus, smoking, obesity, blood transfusion, renal failure, length of hospital stay, reoperation and previous cardiac surgery are associated with postoperative complication.^{1,3,6-13} In rare cases, major complications can lead to permanent disability and even loss of life^{6,14,15}, so the classification of predisposing factors may help in prevention or early institution of treatment. The most important step in the management of wound infections is prevention, and preventive measures could be strengthened by identifying the risk factors. This study was con-

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ducted to determine the frequency of postoperative wound infections during hospitalization in open heart surgery and to assess different predisposing factors and outcome in patients.

MATERIAL AND METHODS:

In this cross sectional study 282 patients who underwent cardiac surgery during July to November 2009, aged between 20 to 60 years were selected, using non-probability convenient sampling, from Punjab Institute of Cardiology, Lahore. The study was approved by the Hospital Ethical Committee. Demographic data, patient’s history, postoperative hospital stay and infection, bacteriological results at the time of discharge from the hospital were collected using medical records. Charge nurse and record keeper helped in retrieving data from the files.

Criteria of infection

- (A) superficial if only the skin and subcutaneous tissue are involved,
- (B) deep when the infection reaches the sternum but does not involve it, and
- (C) organ/space when sternal osteomyelitis or mediastinitis occurs.

Socioeconomic Status

Poor Category: Those patients fully depend on hospital resources.

General User : Those patients willing to pay ¼ of expenditure.

Paying: Those patients willing to pay full amount of expenditure.

STATISTICAL ANALYSIS:

The analysis of data was performed with IBM SPSS (Statistical Package for Social Sciences), version 20. Mean ± SD was reported for numeric variable while frequency and percentages were reported for categorical variable. Chi-square test / Fisher’s Exact test were applied to observe significance for categorical variables, whereas numeric data were compared by using Mann – Whitney U test. Odds ratio with 95% confidence interval were calculated by logistic regression to identify the predictor for postoperative wound infections. A p-value less than 0.05 was considered statistically significant.

RESULTS:

Out of the 282 patients, 39 (13.8%) had postoperative infection; 19(6.7%) patients had deep sternal wound infection, 17(6.0%) patients had superficial and 3(1.1%) had mediastinitis. The average age of patients with wound infection was 52.28 ± 11.72 while the mean age of patients without wound infection was 54.40 ± 10.14.

Table 1: Study Characteristics and Comparison between Patients With and Without Post operative wound infection

Variables	With post operative wound infection (n = 39)	Without post operative wound infection (n = 243)	Total (n = 282)	p-value
Gender				
Male	35 (14.7%)	203 (85.3%)	238 (84.4%)	0.322
Female	4 (9.1%)	40 (90.9%)	44 (15.6%)	
Area of Residence				
Urban	28 (15.5%)	153 (84.5%)	181 (64.2%)	0.223
Rural	5 (14.3%)	30 (85.7%)	35 (12.4%)	
Semi urban	6 (9.1%)	60 (90.9%)	66 (23.4%)	
Socio-economic status				
Poor	20 (21.3%)	74 (78.7%)	94 (33.3%)	0.021
G. User	5 (6.8%)	69 (93.2%)	74 (26.2%)	
Paying patient	14 (12.3%)	100 (87.7%)	114(40.4%)	

Figure 1. Comparison of Frequency of Risk factors in patients with & without Wound Infection

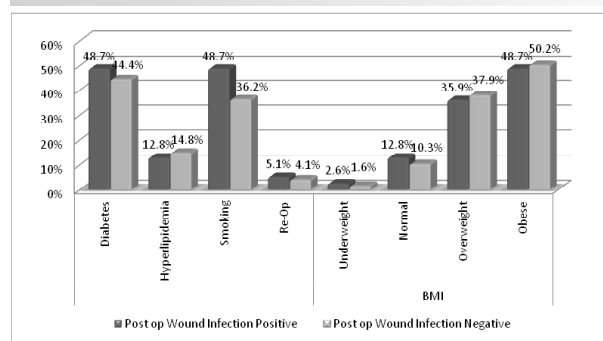


Table 1 shows the baseline characteristics and comparison between patients with and without wound infection.

There were no significant differences between patient characteristics according to age, gender, area of residence, socio-economic status, hypertension, diabetes mellitus, smoking status, hyperlipidemia, hypertension, reopening, hemoglobin level, renal dysfunction, liver dysfunction and body mass index. There was statistically significant association of postoperative patient’s stay in ICU and wards/rooms, abnormal white blood cell and erythrocytes sedimentation rate with the patients having wound infection. However, patients with wound infections were more likely to have more ICU stay and more ventilation times as compared to patients without wound infection (Table 3). The risk factors for the postoperative wound infection set up by logistic regression are shown in Table 4 with respective OR and 95% confidence interval.

Table 2: Hematological and Biochemical findings in patients with & without Wound Infection

Variables	With post operative wound infection (n = 39)	Without post operative wound infection (n = 243)	p-value
Hemoglobin			
Normal	12 (10.3%)	104 (92.0%)	0.156
Abnormal	27 (16.3%)	139 (79.5%)	
Erythrocytes Sedimentation Rate			
Normal	6 (6.3%)	89 (93.7%)	0.009
Abnormal	33 (17.6%)	154 (82.4%)	
Liver Function			
Normal	34 (15.5%)	185 (84.5%)	0.124
Abnormal	5 (7.9%)	58 (92.1%)	
Renal Function			
Normal	29 (15.5%)	158 (84.5%)	0.252
Abnormal	10 (10.5%)	85 (89.5%)	
White blood cell			
Normal	12 (8.0%)	138 (92.0%)	0.003
Abnormal	27 (20.5%)	105 (79.5%)	

Figure 2: Frequency distribution of getting infection on the basis of patients' stay

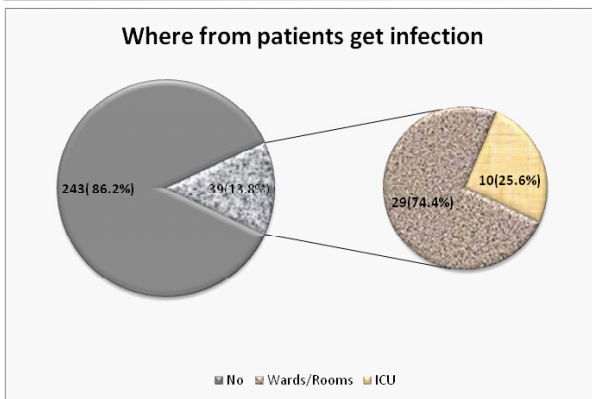


Table 3: Comparison of no. of grafts, ICU stay and ventilation time between Patients With and Without Post operative wound infection

	With post operative infection Mean ± SD	Without post operative wound infection Mean ± SD	p-value
No. of Graft	2.49 ± 1.36	2.81 ± 1.32	0.262
ICU stay (days)	5.46 ± 2.88	4.77 ± 2.21	0.237
Ventilation (hours)	10.41 ± 4.95	9.08 ± 4.49	0.135

Mann-Whitney U test

Table 4: Logistic regression analysis of risk factors for post operative wound infection

Risk Factor	OR (95% CI)	p-value
Male sex	1.72 (0.58 – 5.12)	0.327
BMI ≥ 25	0.74 (0.29 – 1.93)	0.545
Reopening	1.26 (0.27 – 5.98)	0.772

BMI, body mass index; OR, odds ratio; CI, Confidence interval

DISCUSSION:

In this study, after open heart surgery 39 (13.8%) of the patients developed wound infection; 19(6.7%) patients had deep sternal wound infection, 17(6.0%) patients had superficial and 3(1.1%) had mediastinitis. it means that one patient out of seven suffered from postoperative wound infections. The rate of post operative wound infection was greater in wards than ICU. The alarming fact in this study is also that we are reporting the wound infection at the time of discharge and it is higher than the literature reported percentages^{1,3,16-18} whereas it's also reported that the wound infection rate increases from discharge to early 90 days.³ A proper comparison of infection rates is difficult due to difference in their duration of follow-up.

In this study wound infection was not associated with any of the studied factors except white blood cell raised count and erythrocyte segmentation rate. It is phenomenal in as the WBC rise as a consequence of infection. The studies have revealed that the wound infection after operation was common in older age patients and women¹⁶ whereas in this study the risk of wound infection was higher in male though the odds were not statistically significant. This study has many contradictory results as compared to the studies conducted in western countries. In this study obese patients had higher chance of wound infection than underweight whereas in contrast the literature reported that it's more frequent in underweight.¹⁹

CONCLUSION:

In this study the wound infection rate is higher, so the special care should be provided to patients and further studies should be conducted to identify the various predisposing factors for developing the post operative wound infection; it will help in reducing the cost for antibiotics given for post-operative wound infection and an economic burden to the health care system. It will also reduced mortality and morbidity of patients.



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