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Research Article

STUDY TO DETERMINE THE POST-OPERATIVE INFECTION RATIO IN PATIENTS AFTER OPEN HEART SURGERY AND ITS RISK FACTORS

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Abstract:

OBJECTIVE: Postoperative complications are a good measure of the quality of cardiac surgery, provided that the patient's risk factors are taken into account. The purpose of this study is to determine the frequency of postoperative wound infection in patients with open heart surgery and to identify various risk factors for wound infection.

MATERIAL AND METHOD: This is a cross-sectional analytical study. The study was conducted at the Punjab Cardiology Institute (PIC) in Lahore March 2018 to March 2019. A total of 282 patients were selected. The data was collected using medical records when he was discharged from the hospital.

RESULTS: The average age of patients in this study was 54.11 ± 0.62 [95% C. AND 52.89-55.32]. 238 (84.4%) of 282 patients are male. Coronary artery bypass graft (CABG) was performed in 201 (71.3%) patients, valve surgery was performed in 47 patients (16.7%), CABG, and valve surgery in 34 patients (12.1%). A total of 39 patients (13.8%) had postoperative infection; 19 patients (6.7%) had deep sternal wound infections, superficial in 17 patients (6.0%) and mediastinitis in 3 patients (1.1%). In ICU, 10 (25.6%) patients had infections and 29 (74.4%) had infections in the ward. Postoperative wound infection was significantly associated with an increase in the number of patients in wards / departments (p value 0.002), ESR (p value 0.009) and white blood cells (p value 0.003). Postoperative wound infection did not show a significant relationship to patient sex, hypertension, diabetes, smoking, hyperlipidemia, abnormal hemoglobin, liver function, renal function and body mass index. There was no difference in the average number of transplants, the number of days in the intensive care unit and the ventilation time between postoperative wound infection and infection.

CONCLUSION: In this study, the percentage of wound infections is higher, therefore special attention should be paid to patients and more research should be carried out to identify various factors that predispose to the development of postoperative wound infection. This will help reduce the cost of antibiotics used in postoperative wound infection and the economic burden on the healthcare system. It will also reduce patient mortality and morbidity.

KEY WORDS: postoperative wound infections, open heart surgery

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INTRODUCTION:

Postoperative wound infections are one of the serious complications of open-heart surgery. There are various types of infections, such as superficial, deep sternum and mediastinitis. Most studies suggest that the incidence of postoperative wound infections is 0.9% to 20%, the incidence ranges from 0.25% to 25%, and the mortality rate is as much as 21% for wound infection. 2.5 Postoperative wound infections not only increase the burden on the hospital, but also increase the financial burden on the patient and the healthcare system¹⁻³. It also leads to long-term hospitalization, blood transfusions, re-operations, additional morbidity, high costs and patient suffering. Various factors, namely sex, age, diabetes, smoking, obesity, blood transfusion, renal failure, length of hospital stay, reoperation and previous heart surgery are associated with postoperative complications⁴⁻⁶. In rare cases, serious complications can lead to permanent disability or even loss of life, so classification of predisposing factors can help prevent treatment or in an emergency. The most important step in treating a wound infection is prevention, and preventative measures can be strengthened by identifying risk factors. This study was conducted to determine the incidence of postoperative wound infections during hospitalization in open heart surgery and to assess various predisposing factors and patient outcomes.

MATERIAL AND METHODS:

In this cross-sectional study, 282 patients were selected who underwent cardiac surgery aged 20 to 60. With appropriate probability from the Institute of Cardiology in Lahore Punjab. The study was approved by the Hospital Ethics Committee. Demographic data, patient history, postoperative hospitalization and infection, bacteriological results during discharge from the hospital were obtained

from medical records. A responsible nurse and registry manager helped extract data from files.

Criteria for infection

- (A) if there is only superficial skin and subcutaneous tissue,
 (B) deep when the infection reaches but does not participate in the sternum and
 (C) Organ / cavity when osteomyelitis occurs in the sternum area.

Socio-economic situation

Poor category: these patients depend entirely on hospital resources.

General user: patients willing to cover the costs.

Payment: patients who want to pay the full cost.

STATISTICAL ANALYSIS

Data analysis was carried out in version 20 of IBM SPSS (statistical package for social sciences). Although the mean \pm SD for the numerical variable is given, frequencies and percentages are for the categorical variable. To observe the significance of categorical variables, the chi-square test / Fisher's exact test was used, and the figures were compared with the Mann-Whitney U test. The probability index with a 95% confidence interval was calculated by logistic regression to identify a predictor of postoperative wound infections. A p value below 0.05 was considered statistically significant.

RESULTS:

39 of 282 patients (13.8%) had postoperative infections; 19 patients (6.7%) had deep sternal wound infections, appearance in 17 patients (6.0%) and mediastinitis in 3 patients (1.1%). The average age of patients with wound infections was 52.28 ± 11.72 and the average age of patients without wound infections 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

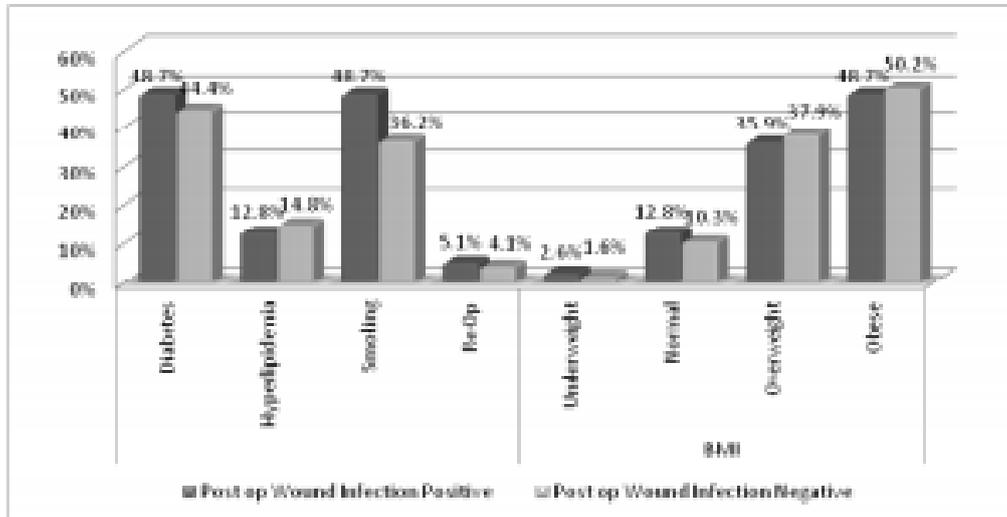


Table 1 shows the basic parameters and comparison between patients with and without wound infection. Patient characteristics include age, gender, location, socioeconomic status, hypertension, diabetes, smoking, hyperlipidemia, hypertension, reopening, hemoglobin, renal impairment, liver impairment and body mass index. The patient's postoperative stay in intensive care units and wards, abnormal white blood cell sedimentation rate and erythrocytes were statistically significant in relation to patients with wound infections. However, patients with wound infections have longer stays in the ICU and ventilation times compared to patients without wound infection (Table 3). Risk factors for postoperative wound infection detected by logistic regression are shown in Table 4, with their respective ORs and 95% confidence intervals.

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%)	
Abnormal	27 (16.3%)	139 (79.5%)	0.156
Erythrocytes Sedimentation Rate			
Normal	6 (6.3%)	89 (93.7%)	
Abnormal	33 (17.6%)	154 (82.4%)	0.009
Liver Function			
Normal	34 (15.5%)	185 (84.5%)	
Abnormal	5 (7.9%)	58 (92.1%)	0.124
Renal Function			
Normal	29 (15.5%)	158 (84.5%)	
Abnormal	10 (10.5%)	85 (89.5%)	0.252
White blood cell			
Normal	12 (8.0%)	138 (92.0%)	
Abnormal	27 (20.5%)	105(79.5%)	0.003

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

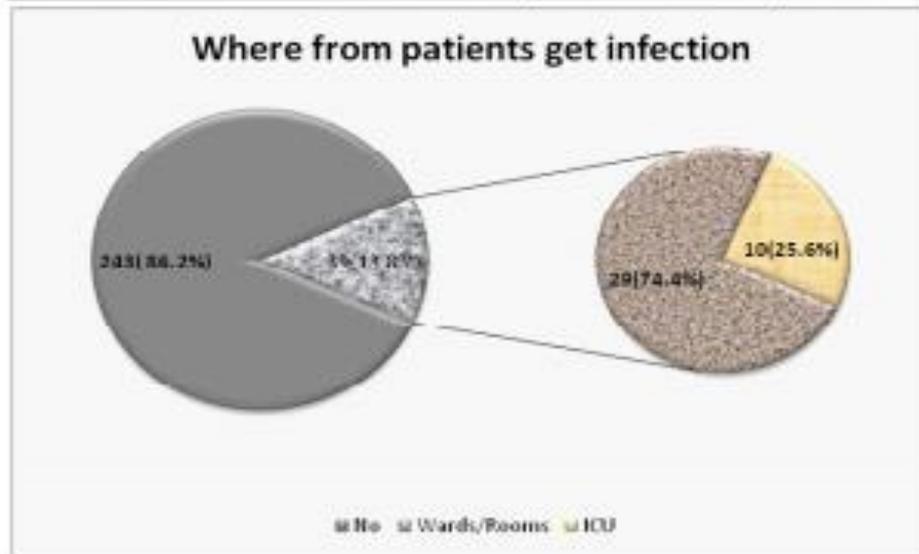


Table 3: Comparison of no. of grafts, ICU stay and ventilation time between Patients with and Without Post-operative wound infection

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

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 \geq 25	0.74 (0.29 – 1.93)	0.545
Reopening	1.26 (0.27 – 5.98)	0.772

BMI, Body Mass Index; Or Ratio Indicator; CI, Confidence Interval

DISCUSSION:

In this study, 39 patients (13.8%) developed wound infections after open-heart surgery; 19 patients (6.7%) had deep sternal wound infections, appearance in 17 patients (6.0%) and mediastinitis in 3 patients (1.1%). This means that "one of seven patients has postoperative wound infections." Postoperative wound infection rate was higher in the ward than in the ICU⁷⁻⁹. A disturbing fact in this study is that we report wound infection during discharge and exceed the interest rates reported in the literature, as well as the wound infection rate in the first 90 days after discharge. Due to the difference in observation time, it is difficult to properly compare infection rates¹⁰⁻¹².

In this study, wound infection was not associated with any of the factors examined, except for increased white blood cell counts and erythrocyte segmentation rate. This is an unusual situation

because WBC increases as a result of infection. Studies have shown that postoperative wound infection is common in elderly patients and women, while in this study the risk of wound infection is higher in men, although not statistically significant. This study has many conflicting results compared to studies conducted in Western countries¹³⁻¹⁵. In this study, obese patients are more likely to have a wound infection than a low weight, while, on the contrary, the literature reports that it is more common with low weight.

CONCLUSION:

In this study, the rate of wound infection is higher, therefore special attention should be paid to patients and more research should be carried out to identify various factors predisposing to the development of postoperative wound infection; This will help reduce the cost of antibiotics used in postoperative wound infection and the economic burden on the

healthcare system. It will also reduce patient mortality and morbidity.

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