

Study to Know the Infection Rate Postoperatively In Patients Undergoing Open Heart Surgery

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ABSTRACT

Objective: The aim of this study was to determine the frequency of postoperative wound infection in patients undergoing open heart surgery and to identify various risk factors for wound infection.

Study Design: A transverse analytical study.

Place and Duration: The study was conducted at the Cardiac Surgery department of Rawalpindi Institute of Cardiology for the period of one year from January 2016 to January 2017.

MATERIALS AND METHODS: A total of 282 patients were selected. The data were collected by medical records at the time of discharge from the hospital.

RESULTS: The mean age of the patients in this study was 54.11 ± 0.62 [95% CI 52.89 - 55.32]. 238 (84.4%) of 282 patients were male. 201 (71.3%) patients underwent coronary revascularization surgery (CABG), 47 (16.7%) patients underwent valvular surgery and 34 (12.1%) patients underwent CABG and valvular surgery. Overall, 39 (13.8%) patients had postoperative infection; 19 of the patients (6.7%) had deep infection in the sternum, 17 (6.0%) superficial and 3 (1.1%) mediastinitis. 10 (25.6%) infected patients were in intensive care unit and 29 (74.4%) patients were infected with ward / coccyx. Postoperative wound infection was associated with a significant increase in patient survival at room / ward (p value 0.002), erythrocyte sedimentation rate ($p = 0.009$) and

white blood cells ($p = 0.003$). Postoperative wound infection, sex, hypertension, diabetes, smoking, hyperlipidemia, abnormal hemoglobin, liver function, renal function and body mass index were not significantly associated. There was no difference between the mean number of grafts, the number of days in intensive care unit, and the duration of ventilation between postoperative wound infection and without infection.

CONCLUSION: In this study, the infection rate of the wound is higher, so special attention should be given to the disease and more studies should be done to determine the various predisposing factors for postoperative wound infection development. It will help to reduce the cost of antibiotics for postoperative wound infection and the economic burden on the health system. It will also reduce the mortality and morbidity of patients.

KEYWORDS: Postoperative wound infections, open heart surgery.

INTRODUCTION

Postoperative wound infections are one of the serious complications in open heart surgery. There are different types of infections such as superficial, deep sternal and mediastinitis. Most studies have reported infectious mortality from 0.9% to 20% of total wound infection prevalence after surgery, with an incidence of 0.25% to 25%.



The wound is as high as 21%. Post-operative wound infections not only increase the burden in the hospital, but also increase the economic burden on the patient and the health system. It also leads to long hospital admission, blood transfusion, reoperation, additional morbidity, high costs, and suffering for the patient. Various factors such as gender, age, diabetes mellitus, smoking, obesity, blood transfusion, renal insufficiency, duration of hospital stay, reoperation and previous cardiac surgery are associated with postoperative complications. In rare cases, major complications can lead to permanent disability and even loss of life, so classification of predisposing factors may help prevent treatment or help early onset. The most important step in the management of wound infections is prevention and prevention measures can be strengthened by identifying risk factors. This study was conducted to determine the frequency of postoperative wound infections during hospitalization in open heart surgery and to evaluate the different predisposing factors and outcomes in patients.

MATERIALS AND METHODS

In this cross-sectional study, we selected 282 patients who had undergone cardiac surgery between the ages of 20-60 and the study was conducted at the Cardiac Surgery department of Rawalpindi Institute of Cardiology for the period

of one year from January 2016 to January 2017. The Study was approved by the Ethics Committee.

Demographic data, patient history, postoperative hospital stay and infection, and bacteriological outcomes at hospital discharge were obtained by medical records. The paid nurse and registry manager helped save the files from the files. Infection criteria

(A) superficial, if only skin and subcutaneous tissue is present,

(B) when the infection reaches the sternum, but not included

(C) organ / space when sternal osteomyelitis or mediastinitis occurs.

Socioeconomic level Weak category: These patients are totally dependent on hospital resources. General user: patients who want to pay for their patients. Pay: Patients who want to pay the total amount of spending. Analysis of the data was made with IBM SPSS, statistical package for social sciences, version 20.

RESULTS

39 of the 282 patients (13.8%) had postoperative infection; 19 of the patients (6.7%) had deep infection in the sternum, 17 (6.0%) superficial and 3 (1.1%) mediastinitis. The average age of 54.40 ± 10:14, while patients without wound infection, the average age of patients with wound infection, was 52.28 ± 11.72.

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%)	

Table 1 shows baseline characteristics and comparison between patients with and without wound infection. significant differences in age between the characteristics of the patient, gender, residence, socioeconomic status, hypertension, diabetes mellitus, smoking, hyperlipidemia, hypertension, reopening, hemoglobin, kidney dysfunction, liver

dysfunction and had According to UN field. ICU patients with wound infection in patients and rooms / facilities, erythrocyte sedimentation rate and abnormal white blood did not have a statistically significant relationship between the rate of postoperative patients. However, patients with wound infections, wound infection (Table2 & 3)

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%)	0.262
Abnormal	10 (10.5%)	85 (89.5%)	
White blood cell			
Normal	12 (8.0%)	138 (92.0%)	0.003
Abnormal	27 (20.5%)	106(79.5%)	

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

According to non-patient stay in intensive care and ventilation times more likely to be more. Logistic regression of the risk factors for postoperative wound infection it creates, regarding OR and 95% confidence intervals are shown in Table 4.

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

Risk Factor	OR (95% CI)	p-value
Male sex	1.72 (0.56 – 5.12)	0.327
BMI \geq 25	0.74 (0.29 – 1.93)	0.545
Reopening	1.26 (0.27 – 5.98)	0.772

DISCUSSION

In this study, wound infection developed in 39 patients (13.8%) after open heart surgery; 19 of the patients (6.7%) had deep infection in the sternum, 17 (6.0%) superficial and 3 (1.1%) mediastinitis. This means that one in seven patients had post-operative wound infections. The rate of postoperative wound infection was higher than it was in YBU. A worrying fact in this study is that during the discharge, the infection rate of the wound was higher than the percentages reported in the literature and reported at the same time that the wound infection rate increased from the discharge to the first order of discharge. 90 days Proper comparison of infection rates is difficult due to differences in follow-up. In this study, wound infections were not associated with any of the factors studied except for the increased number of white blood cells and erythrocyte cleavage rate. WBC is an extraordinary situation when it emerges as a consequence of infection. Studies have shown that post-operative wound infection is common in elderly patients and women, whereas in this study it is found that men are more likely to have a wound infection, although not statistically significant. Compared to the work done in the Western countries, there are

many conflicting results. In this study, obesity patients were more likely to have a wound infection than low weight, whereas the literature was reported to be more common in low-weight patients.

CONCLUSION

In this study, the rate of wound infections is higher, so special attention should be given to the disease and more studies should be done to identify the various predisposing factors for improving postoperative wound infection; It will help reduce the cost of antibiotics for postoperative wound infection and reduce the economic burden for the health care system. It will also reduce the mortality and morbidity of patients.

REFERENCES

- [1]. Yokoe, D.S., 2018. The Surgical Care Improvement Project Redux: Should CMS Revive Process of Care Measures for Prevention of Surgical Site Infections?. In *Infection Prevention*(pp. 103-112). Springer, Cham.
- [2]. Sandler, N., Kaczmarek, E., Itagaki, K., Zheng, Y., Otterbein, L., Khabbaz, K., Liu, D., Senthilnathan, V., Gruen, R.L. and Hauser, C.J., 2018. Mitochondrial DAMPs are released during cardiopulmonary bypass surgery and are associated with postoperative atrial fibrillation. *Heart, Lung and Circulation*, 27(1), pp.122-129.



- [3]. Sartipy U. Vancomycin prophylaxis and acute kidney injury after cardiac surgery. *European Journal of Cardio-Thoracic Surgery*. 2018 Jan 2.
- [4]. Pei, K.Y., Davis, K.A. and Zhang, Y., 2018. Assessing trends in laparoscopic colostomy reversal and evaluating outcomes when compared to open procedures. *Surgical endoscopy*, 32(2), pp.695-701.
- [5]. Zhang, J.C., Matelski, J., Gandhi, R., Jackson, T., Urbach, D. and Cram, P., 2018. Can patient selection explain the obesity paradox in orthopaedic hip surgery? An analysis of the ACS-NSQIP registry. *Clinical Orthopaedics and Related Research*®, 476(5), pp.964-973.
- [6]. Curry, C., Eldrup-Jorgensen, J., Richard, J., Siciliano, M.C. and Craig, W.Y., 2018. Phenylephrine infusion impact on surgical site infections after lower extremity bypass surgery. *Journal of vascular surgery*, 67(1), pp.287-293.
- [7]. Raja, Shahzad G., Melissa Rochon, Clair Mullins, Carlos Morais, Antonios Kourliouros, Ellie Wishart, Anthony De Souza, and Sunil Bhudia. "Impact of choice of skin preparation solution in cardiac surgery on rate of surgical site infection: a propensity score matched analysis." *Journal of infection prevention* 19, no. 1 (2018): 16-21.
- [8]. Anesi, J.A., Blumberg, E.A. and Abbo, L.M., 2018. Perioperative Antibiotic Prophylaxis to Prevent Surgical Site Infections in Solid Organ Transplantation. *Transplantation*, 102(1), pp.21-34.
- [9]. Heble, Ann, Melanie D. Everitt, Jane Gralla, Shelley D. Miyamoto, Michael Lahart, and Jennifer Eshelman. "Safety of mTOR inhibitor continuation in pediatric heart transplant recipients undergoing surgical procedures." *Pediatric transplantation* 22, no. 1 (2018): e13093.
- [10]. Krezalek, M.A., Hyoju, S., Zaborin, A., Okafor, E., Chandrasekar, L., Bindokas, V., Guyton, K., Montgomery, C.P., Daum, R.S., Zaborina, O. and Boyle-Vavra, S., 2018. Can methicillin-resistant *Staphylococcus aureus* silently travel from the gut to the wound and cause postoperative infection? Modeling the "Trojan Horse Hypothesis". *Annals of surgery*, 267(4), pp.749-758.
- [11]. Eckardt, Jamie L., Matthew R. Wanek, Chiedozie I. Udeh, Elizabeth A. Neuner, Thomas G. Fraser, Tamer Attia, and Eric E. Roselli. "Evaluation of Prophylactic Antibiotic Use for Delayed Sternal Closure Post-Cardiothoracic Surgery." *The Annals of thoracic surgery* (2018).
- [12]. Katarincic JA, Fantry A, DePasse JM, Feller R. Local Modalities for Preventing Surgical Site Infections: An Evidence-based Review. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 2018 Jan 1;26(1):14-25.
- [13]. Tolis, G., Spencer, P.J., Bloom, J.P., Melnitchouk, S., D'alessandro, D.A., Villavicencio, M.A. and Sundt, T.M., 2018. Teaching operative cardiac surgery in the era of increasing patient complexity: Can it still be done?. *The Journal of thoracic and cardiovascular surgery*, 155(5), pp.2058-2065.
- [14]. Mohapatra A, Henry JC, Avgerinos ED, Boitet A, Chaer RA, Makaroun MS, Leers SA, Hager ES. Bypass versus endovascular intervention for healing ischemic foot wounds secondary to tibial arterial disease. *Journal of vascular surgery*. 2018 Jan 11.
- [15]. Hirata Y, Hirahara N, Murakami A, Motomura N, Miyata H, Takamoto S. Current status of cardiovascular surgery in Japan 2013 and 2014: A report based on the Japan Cardiovascular Surgery Database. 2: Congenital heart surgery. *General thoracic and cardiovascular surgery*. 2018 Jan 1;66(1):4-7.