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Original Research Paper

Surgery

STUDY OF THE EFFECT OF USE OF IO-BAN IN CARDIOVASCULAR SURGERY PATIENT'S IN SURGICAL SITE INFECTION IN SUPER SPECIALITY HOSPITAL OF CENTRAL INDIA

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ABSTRACT

Introduction: Sternal wound infections and mediastinitis after cardiac surgery was most serious complication observed among patients. Objective of the study was to see efficacy of iodine-impregnated incision drapes to assess their value in the prevention of SSI.

Methodology: The present retrospective study was done at department of Cardiovascular thoracic surgery; Super speciality Hospital Nagpur. Total 102 cases operated from June 2016 to June 2017 in our centre were included in the study. Patients were followed for the prevalence of sternal wound infections (SWI) and/or donor site infections (DSI) for 90 days after cardiac surgery.

Results: Mean age of study participants were 60.5 years with standard deviation of 11.2. Majority of patients underwent coronary artery bypass grafting i.e. 72 (70.5%) followed by valve replacements i.e. in 14 (13.7%). Surgical site infection was seen in 22 (21.5 %) cases. Among them sternal wound infection was in 13 (12.7%) cases and 9 (8.8%) cases were having donor site infections.

Conclusion: Use of closed sterile dressing, antibiotic impregnated suture, and an additional wound barrier seal may provide the most conducive environment for decreasing SSI, although further studies are warranted.

KEYWORDS :

Introduction

Sternal wound infections and mediastinitis after cardiac surgery was most serious complication observed among patients. Late investigations report profound sternal injury diseases in 0.2– 2.9% of patients, while others depict the pervasiveness of aggregate injury contaminations after heart surgery, including both sternal injury and contributor site diseases, running from 1.3 to 12.8% of patients.[1–3]

Recent studies report deep sternal wound infections in 0.2–2.9% of patients, while others describe the prevalence of total wound infections after cardiac surgery, including both sternal wound and donor site infections, ranging from 1.3 to 12.8% of patients. Postoperative surgical site infections (SSI) can be associated with a considerable amount of health care costs, resources, and patient morbidity. There have been studies that have identified either patient-related or surgeon-related risk factors that can affect postoperative SSI. As discharge, nowadays is as early as possible, post-discharge surveillance is important for reliable assessment of wound infections.[4–7]

The IO-ban surgical drape has been around for thirty years, and its use has been shown to decrease SSI. In addition to its bactericidal properties, the drape prolongs sterility by acting as a sterile adhesive around the surgically prepped site. In some studies, the use of IO-ban has aided in decreasing contamination of the surgical field. Inherently, it may decrease postoperative infections by decreasing the amount of bacteria that may become impregnated during surgery. There is in vitro literature reporting at 30, 60, and 90 minutes of exposure in which the IO-ban drape significantly reduced microbial counts, including MRSA and MRSE. Here we planned study to see efficacy of iodine-impregnated incision drapes to assess their value in the prevention of SSI.[4,8,9]

Methodology

The present retrospective study was done at department of Cardiovascular thoracic surgery; Super speciality Hospital Nagpur. Adult Patient (> 18 years) undergoing cardiac surgery in whom IO-ban were used included in the study. Total 102 cases operated from June 2016 to June 2017 in our centre were included in the study. All consecutive patients older than 18 years undergoing elective surgery. Patients having Pregnancy, Diabetes; H/o Smoking and heart transplants and patients where the prolonged CPB required with MUF was judged by the operating surgeon to be unsafe (e.g. excessive intraoperative blood loss, long CBP time, emergency) were excluded from the study. Ethical clearance from college Institutional Ethics Committee was obtained. Cardiac operations, including coronary artery bypass grafting (CABG), valve replacements, heart-septal defects and aortic aneurysms or dissections, were performed in the Department of Cardiothoracic Surgery. The preoperative preparation of the patients included two showers with a 4% chlorhexidine soap and shaving with electric clippers at most 12 hours before surgery. In the operating theatre, the skin of the patients was disinfected with either 1% iodine in 70% alcohol or 0.5% chlorhexidine in 70% alcohol in case of iodine allergy. Antibiotic prophylaxis was given to each patient. The surgical wound is irrigated with an antibiotic solution after the operation. Upon completion, of the closure of the wound by appropriate sutures. The wound is then covered with non-adherent dressing Then, using IO-ban surgical adhesive tape (3M, Canada), the wound is covered in a closed manner. The surgical adhesive tape is maintained on the incision during the hospital stay, to promote sterility and the bactericidal effects of the dressing. During removal of the surgical drain, the minimum amount necessary is removed, while the remainder of the dressing is maintained. Gloves were changed between the preparation of the graft and the main part of the operation and in case of damage. After surgery, patients went to the cardiothoracic intensive care unit and after stabilization of vital functions they were extubated and transferred to the ward.

Demographic and patient characteristics were obtained from all patients. Patients were followed for the prevalence of sternal wound infections (SWI) and/or donor site infections (DSI) for 90 days after cardiac surgery. Wound infections were defined per the CDC criteria. Sternal wound infections included superficial infections (involving skin or subcutaneous tissue) and deep infections (osteomyelitis). During hospitalization, following the cardiac surgery as well as during re-hospitalization, infection data were collected using medical records, bacteriological results. After discharge when patients visited the out-patient clinic for control after 2 and 6 weeks. Data were obtained through HIMS portal. After 90 days, postoperatively, those patients had visited for a wound infection during were recorded. Postoperative time until diagnosis of a wound infection was registered for all post-surgical wound infections. The continuous variables will be expressed as mean and standard deviation, and the categorical variables will be expressed as proportions. All variables will be tested for normality. For Inferential statistics, open epi software will be used.[10]

Result

Total 102 cases were studied in the study. Mean age of study participants were 60.5 years with standard deviation of 11.2. Male outnumbered the female.

Table: 1 Baseline characteristic of study participants

Variable	Study Participants (n:102)
Age (mean ± SD)	60.5 **± 11.2**
Male: Female	69 :33
Body Mass Index (kg/m^2)	27.6 **± 4.1**
Type of surgery	
CABG	72
Valve replacements	14
CABG and Valve replacements	10
Other	06
Mean duration of surgery	2.8 **± 1.2**
Mean postoperative hospitalization days	10.9 **± 11.8**

Majority of patients underwent coronary artery bypass grafting i.e. 72 (70.5%) followed by valve replacements i.e. in 14 (13.7%). Average operative time needed for surgery was 2.8 hours with standard deviation 1.2. Mean hospitalization stay was 10.9 **± 11.8.**

Table 2: Occurrence of surgical site infection among study participants

Surgical site of infection	Number	Percentage
Sternal wound infection		
Superficial	07	6.86
Deep	06	5.88
Donor site infection		
Superficial	05	4.90
Deep	04	3.92

Surgical site infection was seen in 22 (21.5 %) cases. Among them sternal wound infection was in 13 (12.7%) cases and 9 (8.8%) cases were having donor site infections.

Discussion

In the present study, after cardiac surgery 13 (12.7%) of the patients developed a sternal wound infection (6 (5.8%) deep and 07 (6.86%) superficial) and of patients developed a donor site infection in 9 (8.8%) study cases during the 90-days postoperative follow-up period after use of IO ban. The prevalence of total wound infections 22 (i.e. 21.5%) are in the higher range. Study done by Daisy Jonkers et al observed Sternal wound infection and donor site infection among 9.0 and 7.3% of patients at 90 days postoperatively. Prevalence of post-operative wound infections is reducing over period because of some cost-effective interventions. A uniform definition of post-surgical wound infections is important for surveillance. [7] Culliford et al describe an 'early onset' group (presenting within the first month postoperatively) and a 'late onset' group of sternal wound infections after cardiac surgery (presenting after the first month postoperatively) and found a better prognosis for the early compared with late group of wound infections. This supports the importance of post-discharge surveillance especially as nowadays hospital discharge occurs as early as possible.[11]

The postoperative wound care science appears to fall more into the realm of myth, with little reported data regarding dressing care, time allotted for patient bathing, and postoperative drain use; use of IO ban drain. IO-ban dressing has been shown to have topical antimicrobial barrier properties. Together with meticulous attention to sterile technique, the addition of an antibiotic impregnated suture in combination with a protective wound barrier with prolonged application of IO-ban dressing may provide a synergistic effect in providing the most sterile environment for the initial wound healing. A potential criticism for these multiple mechanisms to prevent infection is that bacterial drug resistance may result if an infection occurred.[4,12]

Although the current study did not reveal a statistically significant effect of use of IO ban in postoperative surgical site re-operations. But study was useful to understand the effect of IO ban in the prevention of surgical site of infection. Results of present study might be biased because of potential local infections that may have been treated with oral antibiotics and local wound care. This may be a potential future inclusion in another study. Daneil et al mentioned that there was a trend towards significance in the IO-ban group, which may become statistically significant in a larger surgical cohort over a prolonged period, and is being reviewed here.[12] There are many limitations to our study, including it being a retrospective data collection; surgeon experience not having control group allowing for a potential reviewer bias. In addition, there were need of randomized controlled trail for the routine use of IO-ban, which may have influenced infection rate. A prospective study controlling for the multiple variables affecting surgical site infection would be best for providing information regarding postoperative wound management.

In conclusion; the use of closed sterile dressing, antibiotic impregnated suture, and an additional wound barrier seal may provide the most conducive environment for decreasing SSI, although further studies are warranted.

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