



A STUDY OF STERNAL WOUND INFECTIONS IN POST CARDIAC SURGERY PATIENTS IN TERTIARY CARE CENTRE

Surgery

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ABSTRACT

Background: Post cardiac surgery, median sternotomy is associated with sternal wound infection in subset of patients, this is a dreaded complication associated with increased duration of hospital stay, and hospital costs, and increased morbidity and mortality. The purpose of this study was to focus on issues of deep sternal wound infection after cardiac surgeries.

Aims : The aim of this study is to analyse factors involved in sternal wound infection in Post cardiac surgery patients.

Settings and Design: single centre, retrospective study.

Methods and Material: INCLUSION CRITERIA: All patients who underwent elective open heart surgeries in Department of cardio-thoracic surgery, Government Stanley hospital, Chennai.

EXCLUSION CRITERIA : 1. All patients with HIV / HBSAG / Anti HCV Positive status. 2. long term steroid abuse patients.

SAMPLE SIZE : 100 patients.

DURATION : Cases operated from 2015 to 2017.

STATISTICAL ANALYSIS USED: SAS.

Results: 1. staphylococcus was found to be the commonest organism in our study as already been reported elsewhere. 2. risk factor most commonly associated with sternal wound infections is diabetes mellitus. 3. Coronary bypass grafting (CABG) was found to be the most common open heart surgery associated with sternal wound infection.

Conclusions: sternal infections were associated with diabetes and other co morbidities. All 3 cases shows type I sternal infections. Staphylococcus infections most common in sternal wound infections. To some extent sternal wound infections can be prevented with strict aseptic precautions, preoperative diabetic control, length of hospital stay reduction.

KEYWORDS

open heart surgery, sternotomy, mediastinitis, debridement, diabetes mellitus

INTRODUCTION:

Post cardiac surgery¹, median sternotomy is associated with sternal wound infection in subset of patients, this is a dreaded complication associated with increased duration of hospital stay, and hospital costs, and increased morbidity and mortality. Sternal wound infections range from superficial sterna site infections to full blown mediastinitis.. Superficial wound infections do not penetrate the sternum, whereas deep wound infections include mediastinitis² with sternal dehiscence and osteomyelitis of the sternum. The purpose of this study was to focus on issues on deep sternal wound infection after cardiac surgeries.

BACKGROUND

Deep sternal wound infection (DSWI), also termed mediastinitis, is a life threatening complication after median sternotomy³ with an incidence of 1 to 5%. Incidence of deep sternal wound infections is twice as that of superficial sternal wound infections. The associated mortality rate in the literature ranges from 10 to 47%. Well known risk factors for the development of DSWIs after median sternotomy include diabetes, obesity, chronic obstructive pulmonary disease, osteoporosis, tobacco use, redo surgery, reopening for any cause, more than 10 days stay in intensive care unit and use of assist devices. It is important to distinguish DSWIs from superficial sternal wound infections (SSWIs). A superficial sternal wound infections extend from epidermis to pectoralis fascia only and do not penetrate periosteum of sternum. There is a well documented evidence on the incidence of sternal wound infections in western countries begins with exploration and debridement of all necrotic tissues with removal of all foreign materials and exposed cartilage. Suction drains and muscle transposition are used to close the wound when the sternum is soft and pliable. Sternotomy infections occurring months to years are classified under Type III with clinical features of chronic draining sinus tracts and cellulitis of local area. Mediastinitis is rare but osteomyelitis, costochondritis are commonly seen. They are treated by packing the open wounds with regular dressing and debridement. If type III wounds appear clean they are managed similar to type II infections. It cannot be typically extrapolated to our set up and need to be evaluated.

SUBJECTS AND METHODS:

This is a Retrospective study consisting of 100 patients who underwent cardiac surgeries and were monitored for sternal wound infections. Sternal wound infection was defined by the modified US center for disease control and prevention criteria for surgical infection. The diagnosis required atleast one of the following criteria⁴ 1) organisms cultured from mediastinal tissue or fluid obtained during surgical operation 2) clinical evidence of mediastinitis seen during surgical operation 3) fever, chest pain or sternal instability with either purulent discharge from mediastinal area or positive culture from discharge.

INCLUSION CRITERIA

All patients who underwent elective open heart surgeries in department of CTS in Stanley medical college

EXCLUSION CRITERIA

1. All patients with HIV / HBSAG / Anti HCV Positive status
2. long term steroid abuse patients

SAMPLE SIZE : 100 patients

DURATION: Cases operated from 2013 to 2017

METHODOLOGY:

1. A total of 100 consecutive patients undergoing open heart surgery at Stanley medical college are included in this retrospective, randomized study.
2. It includes patients underwent coronary artery bypass grafting, valve replacement or plasty, various other procedures.
3. Patients over 16 years undergoing elective cardiac surgery with sternotomy and cardiopulmonary bypass (CPB) were included in the study.
4. The only exclusion criteria were immunosuppressive or steroid medications prior to surgery.
5. All surgeries were made sure of strict aseptic precautions.
6. Pre-operative antibiotic were given to all patients at the time of induction of anesthesia
7. In case of CABG⁵, bilateral internal mammary artery graft were not harvested for any patients.
8. All patients with mediastinitis underwent re-exploration with

debridement, sternal closure, irrigation and systemic antibiotic therapy.

9. All infected patients were treated post operatively with adequate antibiotic coverage for 3 weeks according to wound culture & sensitivity report.
10. Data were obtained by review of the hospital in patient record including the following preoperative risk factors: age, gender, underlying disease.

RESULTS:

This retrospective study was done in patients admitted in department of cardiothoracic surgery, Stanley medical college. Table 1- documents the age distribution of the patients taken for the study. Table 2- shows the distribution of co-morbidities of the patients taken during study. Table 3- shows the number of patients with the type of surgery done. Table 4- shows the relative percentage of different organisms causing sternal wound infection. Table 5- shows the number of patients with clinical and radiological symptoms.

Table 1: Age Distribution

Age Group	non infected	infected
<20	5	0
21-30	20	0
31-40	35	0
41-50	15	2
51-60	12	0
61-70	11	1
>71	2	0

Table 2. Distribution of comorbidities

Comorbidities	Number of patients – non infected	Number of patients – infected
Diabetes mellitus	12	3
Hypertension	7	2
Renal diseases	0	0
COPD	0	0
Current smoker	26	0
Steroid treatment	0	0

Table 3: Type of open heart surgery done

Type of surgery	Number of patients	Number of patients infected
CABG	34	2
SINGLE VALVE REPLACEMENT	43	1
DOUBLE VALVE REPLACEMENT	10	0
SURGERY FOR C O N GENITAL HEART DISEASE	10	0

Table 4: wound discharge culture organisms

Number of patients with staphylococcus infection	Number of patients with E.coli infection	Number of patients with mixed growth	No growth
2	1	0	0

Table 5: clinical signs and symptoms

CLINICAL AND RADIO- LOGICAL SYMPTOMS	NO. OF PATIENTS
Sternal dehiscence	0
Wound discharge	3
Sternal instability	1
Fever	3
Fluid collections on CT thorax	0

DISCUSSION:

Sternal wound infection is a feared complication following cardiac surgery. This study describes clinical, microbiological outcomes of sternal wound infection and determines the risk factor for sternal infections. Wound infection occurred in 3 patients out of 100 open heart surgeries. Sternal infections were associated with diabetes and other co-morbidities. No clinically relevant cross infection were demonstrated. All 3 cases shows type II sternal infections⁶. This is retrospective study with its own disadvantages and there is need of prospective study with more number of samples to further analyse sternal wound infection in post cardiac surgeries. Vacuum assisted closure are routinely done in western countries but the cost effectiveness limits its use in our setup. Staphylococcus infection is the

most common sternal wound infections. Sternal wound infections can be managed⁷ by wound debridement with sternal resuturing, flap cover, vacuum assisted closure, closed suction and irrigation. In our set up all 3 cases were managed by early debridement, irrigation and re-suturing. To some extent sternal wound infections can be prevented with strict aseptic precautions, pre-operative diabetic control, length of hospital stay reduction.

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