Retrospective evaluation of sternal precautions protocol for the patients with coronary artery bypass grafting

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ABSTRACT

Aim: The purpose of the study is to 1) evaluate the literature and current trends for sternal precautions. 2) Formulate an evidence based sternal protocol for 'X' hospital 3) Assessing the impact of the protocol on sternal dehiscence and infection rates in 'X' hospital.

Objectives: the objective of the study is to review the current literature on the use of sternal precautions by physiotherapist in the treatment of patient after a CABG surgery and also to compare the sternal infection rate post CABG after implementing sternal precaution protocol in 'X' hospital.

Materials & Method: Hospital records and post discharge surveillance data from the HR of the 'X' hospital on rate of dehiscence and infection for 207 patients who underwent CABG procedures from 2010 through 2012 were reviewed, which gave an idea about the efficacy of the sternal precautions protocol used in this hospital. Literature review was done to find out about the current trends on sternal precaution protocol.

Results: This study includes 207 participants, median age was 55 years 37% of them were having DM and 63% were NDM. Data collected from 2010 to 2012 was reviewed and the rate of infection was 1.45% and rate of sternal dehiscence was not specifically collected, but from a case report only 2 cases were reported 1 male and 1 female both were having poorly controlled diabetic levels and high BMI.

Conclusion: Our study showed that the sterna precautions protocol did not contribute to an increase in the rate of infection. Our protocol was not overly restrictive and was well managed by patients.

Keywords: coronary artery, sternal precautions

INTRODUCTION

CABG surgeries are one of the most common methods used as a treatment for many heart conditions. Sternal complications is one of the biggest challenge faced by the health care institutions. Researchers reported that the incidence of sterna infection can range between 1 and 10%. Midline sternotomy is a frequent incision used in a CABG surgery. It provides a good access to the heart and surrounding structures. In this type of surgery the manubrium and sternum are divided centrally in to half and separated via a retractor.

Post surgery, patients are given sterna precaution advise in terms of activity and load precautions to prevent sternal complications such as sterna dehiscence, infection and sterna instability. It is belief that by avoiding certain movement will reduce the risk of sterna complications¹. The type of precaution instructed varies; there is no consistency in the type and duration of restrictions. Sternal precaution is given to all patient post CABG, Sternal precaution is necessary but rather than setting a standard guideline that implies to all patients, instructions should be patient specific. There is no standard definition of sternal precautions, the current sterna precautions protocols are based on theoretical knowledge. Secondly, the type of incision, extend and duration for which of sternum is kept separated, raise concerns regarding the effect of this surgery on the musculoskeletal unit.
major hospitals, patients are assessed by physical therapists pre-operatively and assessed again after the surgery in the immediate postoperative period while the patient is still on mechanical ventilation. Treatment is initiated at the time when the patient is extubated.

Many researches have stated these SP protocol to be overly restricted and cause functional impairment in patient post CAGB which tends to have a great impact on their recovery and quality of life. The main question is that is it really a precaution or a restriction. There is limited research on the sternal precaution protocols used by physiotherapist for the treatment of post CAGB patients. Many studies highlight more on the overall treatment rather than sterna precaution for post CAGB patients. Some amount of movement is necessary for normal bone healing. Completely limiting the sterna movement by limiting certain upper extremity movement and precaution may comprise its healing. These activity restrictions impact on sternal healing is unknown. The purpose of this article is to review the literature to know the current trends on sternal precaution and also aid in formulating a protocol that doesn’t hamper patient’s quality of life and reduces the risk of infection.

MATERIALS AND METHODS
This hospital-based retrospective record analysis was conducted for 207 patients who underwent CAGB surgery in X hospital from 2010 to 2012. The data collected was on rate of sternal infection and dehiscence. X-hospital ethical approval was sought before the research started. Confidentiality of patient’s identification was taken into consideration. Literature review was done on sternal precaution post CAGB and focus was on the different protocol used by various physiotherapist in various hospital, consistency and similarity of protocol inter and intra hospital. This study is aimed at to find the effect of these protocols on the rate on sternal complications including the rate of infections and dehiscence.

X hospital guideline:
- No lifting more than 2kg for first 4-6 weeks
- No bilateral upper limb movements above level of the shoulders
- Unilateral shoulder flexion full range unloaded
- Limit bilateral upper limb activities for first 6 weeks
  - Pushing with both arms with sit to stand
  - Driving
- Thoracic mobility ex from day 3/4 in pain free range
- Sternal wound support with transfers and coughing
- Binders only when high risk patient

DISCUSSION ON FINDINGS
This study includes 207 participants with 187 male and 20 were female, median age was 55 years 37% of them were having DM and 63% were NDM. Data collected from 2010 to 2012 was reviewed and the rate of infection was 1.45% and rate of sternal dehiscence was not specifically collected, but from a case report only 2 cases were reported 1 male and 1 female both were having poorly controlled diabetic levels and high BMI. Cahalin LP. Lapper TK. Shaw DK. Et al 2011, proposed that the duration and intensity of sternal precaution protocol should be designed based on an individual patient’s characteristics and that should be focused towards the limitations of specific functions or any activity of the patients. Such patient-specific SP focusing on function may be more likely to facilitate recovery after median sternotomy and less likely to impede it¹. Overend TJ. Anderson CM 2010 reported that the physical therapist those following the cardio respiratory treatment after POD-1. According to current available evidence, this level of care may be unnecessary for uncomplicated patients following cardiac surgery². Tuyl LJ. Mackney JH. Johnston CL. 2012 identified that there is a significant variation are found in the
sternal precautions and protocols used in the treatment of patients after median sternotomy in Australian hospitals. Further they suggested that the research is needed to find out whether the restrictions and precautions used are adequate and whether protocols have an effect on patient prognosis.

Our study is aimed at to find the effect of these protocols on the rate on sternal complications including the rate of infections and dehiscence of patients who undergone coronary artery bypasses grafting surgery.

**RESULTS**

Figure 1 shows that the total no of participants included in this study were 207 with 187 male participants and 20 were female participants.

Figure 2 shows that the wound infections rate identified during the period of 2011 and 2012 were 1.45% of total participants responded yes and 98.5% of total participants said no history of wound infections by following the our current sterna precautions protocol.

Figure 3 shows that there are 37% of the total participants are having diabetic mellitus and 63% of the total participants are identified with non diabetic mellitus.

**CONCLUSION**

The rate of infection – this study results are compared with the global infection rate value for the patients with CABG is at the lower end of the range (1% to 10%). DM is one of the most common risk factor for getting sternal infections. Our study showed that the patients who were following this protocol did not contribute to an increase in the rate of infection and also it is not overly restrictive and was well managed by patients.

Further research into the long term quality of life in these patient patients and compared to more restrictive protocols

**REFERENCES**


