

“Sternotomy” and the Factors Affecting Its Prognosis

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Abstract

Cardiac surgeries predominantly require median sternotomy, as it is a useful incision, which is required to be done, for different operations. This incision is useful in performing thoracic operations as it also allows access to both pleural spaces. Patients and medical variables increase the rate of infection of this surgical wound. Complication of sternal wound infection and durability of chest pain associated to sternotomy is lasting more than 1 year in the patient. However, the medical factors involving ministernotomy, hospital stay, use of steroids, and sternotomy wound closure technique are the factors contributing to early wound healing and less complications, but the better understanding of surgical wound management and precaution to reduce sternal pressure following postoperative period can help to reduce the rate of complication.

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INTRODUCTION

“Still have pain from sternotomy”

Sternotomy is a type of surgical procedure in which an incision is made along the sternum, after which the sternum gets divided, or, in other words, “cracked.” Suitable access to heart and lungs is provided through this procedure, which is a critical step for surgical procedures such as heart transplant, corrective surgery for congenital heart defects, or coronary artery bypass surgery.^[1] Chronic poststernotomy pain has become a well-recognized problem. It is an important complication that has a considerable influence on a patient's everyday life. As per the International Association for the Study of Pain (IASP), chronic pain is a “pain without any determined biological rate which persists after the normal rehabilitation period of a tissue for about three months.”^[2] Various studies have indicated that the inadequate pain relief that is endured by patients postsurgery has various detrimental effects, such as, negative physiological and psychological

consequences, delayed recovery, interference with the normal functioning of an organ, or else, increased mortality and morbidity rates.^[3] Patient undergone surgery following the surgical procedure of sternotomy complains persistent chest pain. Chronic pain, associated with the sternotomy wound, occurs in 40–50% of patients after cardiac surgery; 33–66% of these patients experience chronic pain lasting more than 3 months and in a 25–33%, it lasts more than 1 year.^[4]

INCIDENCE

According to various studies in Indian Journal of Medical Research on Indian immigrants and cross-sectional studies across India, it has been observed that cardiac diseases are widespread among Indians with its prevalence being several folds higher as compared to the number in industrialized nations. The Global Burden of Diseases Study has reported the estimated mortality rate from coronary artery disease in India in the year 2000 to be at 1.6 million. It needs the surgical

treatments which usually follow sternotomy.^[5]

Factors Affecting Surgical Wound Healing

Researches has identified that many patients remain functionally impaired long after cardiothoracic surgery because of pain there are various factors contributing to this difference in pain level and its perception by patient. Deep sternal wound infection (DSWI) is a significant cause of pain in cardiac surgery patients. DSWI occurs in 1–4% patients, although the incidence is increasing with advanced patient age, diabetes, obesity, smoking, steroid therapy, and COPD. Damage to the periosteum can cause problems with healing and puts the patient at increased risk of DSWI. Prolonged surgery or reopening of the sternotomy also puts the patient at higher risk of DSWI. Other medical factor that contributes to pain and infection includes type of sternotomy, number of time undergone surgery, method and material of sternotomy closure. When compared to total sternotomy (TS), ministernotomy and sternal precautions can procure better postoperative stability, which can aide in reduction of wound infections (Figure 1).^[6]



Fig. 1. Infected and Open Sternal Wound After Coronary Artery Bypass Graft.^[2]

Symptoms of Sternal Wound Infection

The patient with a sternal wound infection often has a fever, leukocytosis (an increase in white blood cell count), a sternal "click"

with movement or respiration, purulent discharge from the sternal wound, and sternal dehiscence. Patients may also have a pericardial effusion. Superficial wound infection is considerably more common than deep sternal wound infection with cardiac surgery patients. Patients suffering from chronic thoracic pain post the surgery, experience significantly lower physical and mental health status, when compared to patients who do not experience chronic thoracic pain.^[6,7]

Sternal Precaution

In order to prevent chronic chest pain and infection sternal precaution and physiotherapy can help to improve surgical wound healing. The following strenuous activities should either be avoided or minimized, activities above the head (i.e. hanging, washing, reaching above head, painting walls), pushing large objects (e.g. shopping trolley, lawn mower), carrying weights heavier than 5 kg (e.g. child, shopping bags) – heavy manual tasks (e.g. making a bed, sweeping), etc. Although using both the arms to do a task, care should be taken that both the arms are used symmetrically to do the task. Performing heavy activities using one arm should be avoided, as it can put unnecessary strain on sternum. A good posture should be maintained at all times. The person should take care to sit in an upright position, with their back supported at all times. They should also avoid sitting awkwardly (i.e. leaning on one forearm; rotation of trunk). Safe driving is dependent on a stable sternum and sound concentration levels. They should follow all the precautions as guided by their surgeon, as per their surgery. Additional precautions (if sternal stability is poor) – rotation of the trunk ("twisting") – prolonged driving >1 hour – swimming (all strokes) – exercises with weights (upper body).^[8]

SUMMARY

Higher incidences of cardiothoracic diseases are also increasing the number of

surgeries following sternotomy. Complete healing of a surgical sternotomy wound is now a challenge to health professionals. Understanding the factors leading to infection and patient's perception to the management of complication can help to reduce the deep and superficial sternal wound infections.

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