PREVALENCE OF MUSCULOSKELETAL PAIN IN PATIENTS WHO UNDERWENT MEDIAN STERNOTOMY-A CROSS SECTIONAL SURVEY

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Abstract:

Background: One third of post patients experience moderate to severe chronic nonanginal postoperative pain (CPOP) and its management remains a challenge despite modern pharmaceutical preparations and new invasive and non-invasive pain –allaying techniques. Physiotherapy plays a major role in cardio-thoracic rehabilitation from the pre-operative period to postoperative period. Cardiac Rehabilitation is a medically supervised program that helps to improve the health and social well-being of people.

Objective: The aim of the study is to investigate the prevalence of musculoskeletal pain in patients who underwent cardio-thoracic surgery. **PROCEDURE:** Study design was non-experimental and study type was observational. 53 patients who satisfied the inclusion and exclusion criteria were selected conveniently for the study after obtaining informed consent. Nordic questionnaire is used as an outcome measure to identify the pain in post-operative patients.

Results: Highest pain was reported in upper back (94.3)% region followed by shoulder (37.7)% lower back (26.4)% and neck (24.5)%, region when patients were assessed on 7th post-operative day by using Nordic questionnaire.

Conclusion: This study concludes that there was a prevalence of upper back pain when compare to other regions and has showed the least prevalence of pain in elbow, wrist and hand.

Keywords: Median sternotomy patients, Musculoskeletal pain, Nordic questionnaire.

Introduction:

Cardio-thoracic surgery is a field of medicine involved in surgical treatment of the internal structures of the thoracic cavity especially heart conditions, lung diseases, etc. It is the major growing contributors to mortality and disability in South Asia. Though there is a tremendous advancement in the management of all categories of these diseases, open heart surgery remains the only method of treatment in selected cases of cardiovascular diseases.

Due to the anterior thoracic surgery, the postural changes can occur in the posterior thoracic region, which leads to neck pain, shoulder pain, low back pain. Commonly musculoskeletal pain is considered to be more among the patients who

lack physiotherapy rehabilitation after the surgery.

Complications following median sternotomy have been observed clinically, most of these are accepted as being unavoidable consequences of surgery. **Stiller et al (1997)** reported that approximately 30 per cent of patients developed musculoskeletal complications that interfered with their level of comfort and function 8-10 weeks following cardiac surgery² A delay in performing upper extremity range of motion exercises may result in more discomfort for the Coronary Artery Bypass Grafting (CABG) surgery patient during the recovery period, and the time required to achieve full recovery may be longer⁶. Looking at the broader spectrum these musculoskeletal problems may also affect the

quality of life of the cardiac patients making him/her feel less capable.

Despite the high percentage of musculoskeletal dysfunction in post-median sternotomy patients the number of studies performed in this field are very limited⁷. With the growing number of Coronary Artery Disease (CAD) patients in India, there is a proportional growth in the number of patients going for median sternotomy.

Procedure:

This was a cross-sectional, observational study. Total 53 Median sternotomy patients who

satisfied both inclusion and exclusion criteria were conveniently selected for the study. Clear instruction and explanations were given to the patients and an informed consent was obtained from the patients prior to the study. A standardized Nordic Questionnaire was clearly explained and given to the patients on 7th Post operative day for the pain analysis and asked to fill the form about their complete musculoskeletal problems. All the collected data were recorded and tabulated for statistical analysis. Data was analysed using IBMSPSS version 20.0 software.

Results:

Table1: Musculoskeletal pain among cardio-thoracic surgical patients on 7th pod

Musculoskeletal Pain	NO (percentage)	Yes (percentage)
Neck	40 (75.5)%	13 (24.5)%
Shoulder	33 (62.3)%	20 (37.7)%
Elbow	52 (98.1)%	1 (1.9)%
Wrist/ Hand	52 (98.1)%	1 (1.9)%
Upper back	3 (5.7)%	50 (94.3)%
Lower back	39 (73.6)%	14 (26.4)%
Hip/Thigh	53 (100)%	0 (0)%
Knee	53 (100)%	0 (0)%
Ankle and Foot	53 (100)%	0 (0)%

Discussion

This study aimed to evaluate the prevalence of musculoskeletal pain among postoperative median sternotomy patients. The results of the study demonstrated 50 out of 53 patients reported upper back pain following median sternotomy. Hence prevalence of musculoskeletal pain in this study was 94.3%. Use of sternal retractor, patient position during surgery, cannulation of the internal jugular vein and the relative devascularisation of the sternum once its main blood supply has been harvested are the probable factors responsible for the development of musculoskeletal and neurological complications following cardio thoracic surgery through median sternotomy.

According to this study, the prevalence of musculoskeletal pain more in the upper back(94.3%) and least in elbow, wrist/hand(1.9%)

in the age group of 51-60 years. The finding of the study shows the prevalence of musculoskeletal pain in median sternotomy patients. The study shows that there was no association between the age group, BMI with musculoskeletal pain.

The result of the study goes in hand with **Shifamanhal et al(2016)** who concluded that 36% of patients after CABG developed musculoskeletal problems and shoulder dysfunction. This shows median sternotomy has effect on musculoskeletal system like upper back, shoulder, lower back and neck due to the effect of sternal retraction on the joints and soft tissues of the thorax.

The result of this study goes in hand with **El-Ansary et al**, who stated that the patients who have undergone CABG towards IMAG surgery had reported with musculoskeletal complications

for 3 to 6 weeks after the surgery, it may be due to the surgery in the anterior chest wall and harvesting of IMA. In the same way, this study proved that the median sternotomy has effect on musculoskeletal system mainly upper half of the body.

In this study, patients perceiving pain after median sternotomy and answered the Nordic Questionnaire reported musculoskeletal pain at the percentage of Neck 24.5%, Shoulder 37.7%, Elbow 1.9%, Wrist/Hand 1.9%, Upper back 94.3%, Lower back 26.4%, Hip/Thigh 0%, Knee 0%, Ankle/Foot 0% **Hamid Kamalipour et al,(2014)** also showed that chronic pain after cardiac surgery was more prevalent in the Internal Mammary Artery (IMA) group (88.3%) than the non IMA group (75.5%). This percentage was considerably higher than other related studies, which could be attributed to different surgical techniques during sternotomy and separating the IMA, duration of operation, patient's position, and post operative acute pain management. In previous studies, chronic postoperative pain after cardiac surgery through sternotomy has been reported as 30% and 56% after CABG moreover studies reported a 20.6% brachial damage during cardiac surgery using the IMA.

The severity of postoperative pain was evaluated using the Numerical Rating Scale (NRS). The prevalence of severe chronic postoperative pain was 9.6% and 3.2% in the IMA and non-IMA group, respectively. Moderate pain was observed in 66% and 41.5% of the patients in the IMA and non-IMA groups respectively. The corresponding figures for mild postoperative pain in the IMA and non-IMA groups were 16% and 30.9%, respectively. But in our study we have used Nordic questionnaire instead of NRS.

According to **El-ansary et al**, the musculoskeletal problems after CABG are anterior chest wall, cervical spine, thoracic spine and lumbar spine which goes hand with this study upper thoracic pain is more common in the upper back due to sternal retraction which may cause to musculoskeletal pain in upper back, shoulder,

lower back and neck and it may also have shoulder dysfunction.

Conclusion

This study focussed to find out the prevalence of musculoskeletal pain in patient who underwent median sternotomy. The result of this study statistically shows that there was more prevalent of upper back region (94.3%) compared to other musculoskeletal region and has been showed the least prevalence of pain in elbow, wrist and hand.. Reddy KS. Cardiovascular diseases in the developing countries: Dimension, determinants, dynamics and directions for public health action. Public Health Nutr 2002;132:543-8.

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