

Incidence of Acute Adhesive Capsulitis among Post-CABG Patient

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Abstract:-

Objective: The objective of the current study was to investigate the incidence of adhesive capsulitis in patients who had undergone coronary artery bypass graft (CABG) surgery.

Introduction: Coronary artery bypass grafting (CABG) is considered to be one of the most painful surgical procedures, and patients can experience post-operative pain for several months. This can result in limitations in movement throughout the upper extremity, which can make daily tasks such as mobility, ambulation, and activities of daily living challenging. The surgery can lead to shoulder dysfunction due to restricted movement, incorrect positioning, and muscle division during surgery, as well as rib spreading.

Method and Materials: In this cross-sectional study, a total of 273 patients between the ages of 51 and 60 years who had undergone CABG surgery were enrolled through convenient sampling. The Shoulder Pain and Disability Index (SPADI) questionnaire was distributed to all participants, and they were asked to complete it to determine the incidence of adhesive capsulitis. The collected data was analyzed using statistical software SPSS version 22.

Results: In this study, most of the patients show (n=221) 80.9% show 0-20% of incidence of adhesive capsulitis, (n=52) 19.1% show 21-40% incidence of adhesive capsulitis and no patient show greater than 40% of incidence of adhesive capsulitis..

Conclusion: The study's findings indicated that the incidence of adhesive capsulitis among patients who had undergone CABG surgery was high, with more than three-quarters of the participants exhibiting symptoms of this condition. However, there were no significant findings in terms of severe pain and disability. Instead, post-CABG patients were observed to have mild to moderate pain and disability.

Keywords:- CABG, SPADI, Adhesive Capsulitis.

I. INTRODUCTION

CABG is known as one of the most painful surgical procedures, and patients may experience post-operative pain for several months¹. This pain can result in limited shoulder function, making it challenging to perform activities such as walking, moving around, and completing daily tasks. Shoulder dysfunction may occur due to restrictions in movement caused by incorrect positioning, muscle division during surgery, and the need to spread the ribs². During cardiac surgery, some patients may experience a stroke,

which can contribute to shoulder immobility. Immobilization of a joint may activate the body's immune response, leading to adhesive capsulitis, a condition characterized by the inflammation and thickening of the shoulder capsule, which further restricts movement³. Patients with various cardiac conditions and those who undergo cardiac surgery have a greater chance of developing frozen shoulder compared to the general population. According to a study, male patients who underwent cardiac surgery had a 33% incidence of adhesive capsulitis⁴. The occurrence of adhesive capsulitis following cardiac surgery is not unexpected as procedures such as valve replacement, CABG, and others involve sewing the sternum, invading internal tissues and muscles, and retracting the ribs, leading to pain and restricted shoulder movement. These factors can contribute to the development of adhesive capsulitis, which is characterized by inflammation and stiffness of the shoulder joint⁵. The exact cause of adhesive capsulitis after cardiac surgery is not well understood, but several secondary factors have been proposed. These may include fractured ribs, musculoskeletal trauma during surgery, sternal nonunion, separation of costal cartilages from the sternum, the presence of sternal wires causing pressure, and wound infections. These factors can all contribute to restricted shoulder movement and ultimately lead to the development of adhesive capsulitis^{5,6}. Restricting shoulder movement after open heart surgery out of concern for pain or wound care can contribute to the development of adhesive capsulitis. This condition is characterized by inflammation and stiffness of the shoulder joint, and immobilization can exacerbate these symptoms^{7,8}. Compared to other types of cardiac surgeries, CABG is linked to a higher risk of frozen shoulder development. This condition involves stiffness and limited range of motion in the shoulder joint, and patients who undergo CABG may be more susceptible to its development than those who undergo other cardiac procedures⁹. The exact cause of the increased risk of frozen shoulder after CABG compared to other cardiac surgeries is not fully understood, but it may be related to differences in patient age and the prevalence of other risk factors like diabetes. In the postoperative period, patients may limit the movement of their upper limbs due to pain, which can contribute to the development of frozen shoulder¹⁰. Restricted shoulder movement due to adhesive capsulitis after CABG can result in considerable morbidity. However, this musculoskeletal condition is not well understood, and its natural progression has not been definitively established, which can make it challenging to evaluate treatment outcomes. Therefore, the aim of this study was to determine the incidence of adhesive capsulitis among patients who underwent CABG in Pakistan.

II. METHODS AND MATERIALS

It is a cross-sectional survey based study among post CABG patients in Karachi. The time period of study is from June 2020 to November 2020. The suggested study sample comprised (n=273) post CABG patients in which (n=196) was male and (n=77) was female. Data were collected by using non-Probability Convenience sampling method. Male and female post CABG patients with 51 to 60 years of age are included. Participant with unstable medical condition were excluded from the study. Independent variables are gender and age while dependent variable are patient with painful shoulder with a diagnosis of coronary artery bypass grafting. The Shoulder Pain and Disability Index (SPADI) questionnaire is used in this study, this questionnaire is designed to be filled out by the individual themselves and has two parts: one measures the level of pain, using five questions, and the other measures the difficulty of daily activities that require the use of upper extremities, using eight questions. The Shoulder Pain and Disability Index is a reliable and valid tool specifically designed to measure shoulder function, and it takes 5 to 10 minutes for a patient to complete. This questionnaire was used to collect data from post-coronary artery bypass grafting patients who are being treated in the outpatient department at the National Institute of Cardiovascular Diseases. The result were analyzed using the frequency distribution of the data obtained. The SPADI, which classified participants into pain and disability of shoulder. Statistical analysis is done by using SPSS statistics 22.0.

III. RESULT

A total of (n=273) participant from general population in which (n=196) 71.8% was male and (n=77) 28.2% was female were enrolled in this cross sectional study. The age of the participant is between 51 to 65 years. See Figure 1. The incidence of adhesive capsulitis in post CABG patient is observed in this study through shoulder pain and disability index in which the researcher evaluate the adhesive capsulitis in groups among both male and female. Most of the patients show (n=221) 80.9% show 0-20% of incidence of adhesive capsulitis, (n=52) 19.1% show 21-40% incidence of adhesive capsulitis and no patient show greater than 40% of incidence of adhesive capsulitis. See Figure 2. Post CABG male patients (n=151) 55% and female patients 25.6% (n=70) show 0-20% incidence of adhesive capsulitis and also post CABG male 16.48% (n=45) and female patients (n=7) 2.56% with the 21-40% incidence of adhesive capsulitis. See Figure 3. The shoulder pain and disability index is consisted on two parts, first is pain and the other is disability. The specific response of SPADI about pain and disability among male and female is shown in Table 1 and 2 respectively.

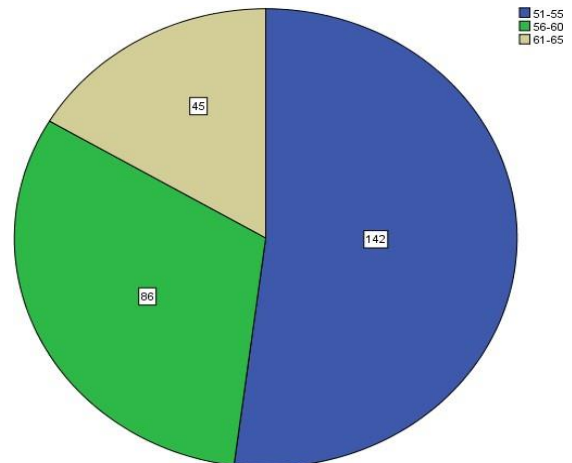


Fig. 1: Age of Participant

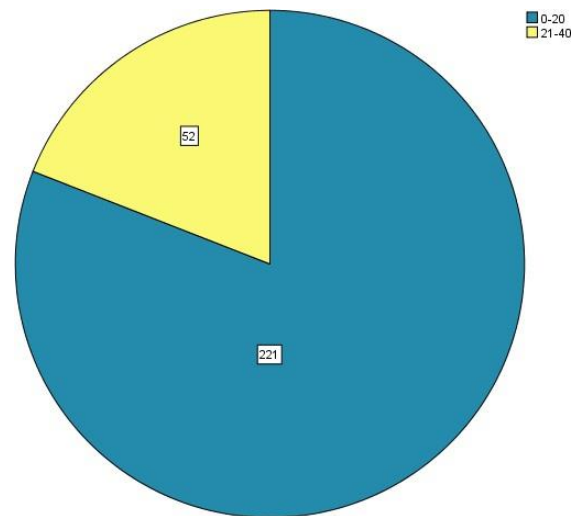


Fig. 2: Incidence of Adhesive capsulitis

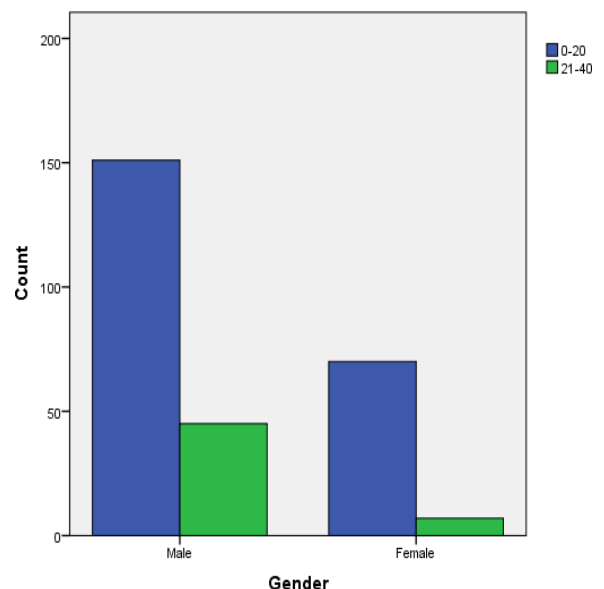


Fig. 3: Association between gender and incidence of Adhesive capsulitis

Table 1: Intensity of Pain

Pain Intensity	Male	Female
0-20%	18	6
21-40%	133	63
41-60%	42	6
61-80%	3	2
81-100%	0	0
Total	196	77

Table 2: Shoulder Disability

Disability	Male	Female
0-20%	6	1
21-40%	80	47
41-60%	103	29
61-80%	7	0
81-100%	0	0
Total	196	77

IV. DISCUSSION

Based on the findings of the research, 71.79% of patients who had undergone coronary artery bypass grafting (CABG) surgery reported experiencing pain in their shoulder. Among the various musculoskeletal disorders that can occur after CABG, adhesive capsulitis is a common condition that can lead to reduced quality of life and functional limitations. Since adhesive capsulitis is a common problem among post-CABG patients, and its prevalence can vary from 2% to 26% across different countries, it is crucial to have a functional measurement tool that specifically assesses the shoulder region. This can help evaluate the functional status and level of disability in these patients. Research has demonstrated that the majority of individuals who require CABG for coronary artery disease are typically 55 years of age or older 11-13. Patients who have undergone CABG are at a higher risk for developing various musculoskeletal disorders. Idiopathic frozen shoulder, for instance, is more commonly observed in female patients aged 50 to 70 years. 14. According to a particular study, approximately 35% of patients who undergo CABG surgery may develop frozen shoulder.13. The study concluded that frozen shoulder is more commonly observed among older females than younger males. Additionally, diabetic patients were also found to have a higher incidence of this condition compared to non-diabetic individuals. Individuals with frozen shoulder experience persistent pain in the shoulder that tends to worsen at night and in cold temperatures. Pain is reported to occur throughout the day and night in most patients. Moreover, having a history of cardiac disease was identified as a risk factor for the development of frozen shoulder.15

In the present study, SPADI is evaluate the incidence of adhesive capsulitis which show that 80.9% post CABG patients show minor (0-20%) incidence of adhesive capsulitis while remaining post CABG patient show mild (21%-40%) incidence of adhesive capsulitis. SPADI has two parts first is disability and the other is pain scale so the SPADI also evaluate the disability and pain score individually. In the present study the disability score in post CABG patients is divided into five categories according to the severity of adhesive capsulitis. The patient which show 0-20% disability is 2.5%, the patients which shows 21-40% disability is

46.52%, the patients which shows 41-60% disability is 48.35%, the patients which shows 61-80% disability is 2.5% while the patients which show 81-100% disability is zero. The second part of SPADI is pain score. In the present study the pain score in post CABG patients is divided into five categories according to the severity of adhesive capsulitis. The patient which show 0-20% pain is 8.7%, the patients which shows 21-40% pain is 71.79%, the patients which shows 41-60% pain is 17.58%, the patients which shows 61-80% pain is 1.83% while the patients which show 81-100% pain is also zero.

The result of the study concluded that incidence of adhesive capsulitis in post CABG patients is very high, more than three-quarter of the patient show symptoms of adhesive capsulitis. SPADI evaluate that almost three-quarter patient experience shoulder pain after CABG, the disability of shoulder in post CABG patients is also three-quarter but according to the severity of pain and disability there is no significance findings in severe pain and disability. There is mild to moderate pain and disability is seen in post CABG patients.

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