ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 10 | October - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARISON BETWEEN AEROBIC EXERCISE AND DEEP BREATHING EXERCISE WITH POSITIVE EXPIRATORY PRESSURE BREATHING EXERCISE IN POST CABG PATIENT IN RECOVERY PHASE.

Cardiology

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ABSTRACT

Background: Coronary artery bypass graft (CABG) Surgery is Known to induce significant muscle wasting. Thus, vast no of patients is facing reduces endurance after surgery with the help of this study. The resultant significant treatment can be beneficial to help vast no of patients with endurance problems. **Methodology:** Participants' subjects meeting inclusion criteria will be included in the study. The sample will be initially selected then randomly divided into 2 groups, group A and group B Treatment with aerobic exercise group A n=30 patients. Treatment with deep breathing exercise with positive expiratory pressure breathing exercise group B n=30 patients. consent form will be signed by both groups. **Result:** The research was performed on 60 participants between the age of 35-65 years. There were group(A) 30 patients between age 35-55, group(B) 30 patients between age 35-60. The statistical software SPSS 25.0 version was used to analyze the data. Before taking statistical data, outcome measure by the six-minute walk test. All outcome measures were analyzed using suitable statistical analysis at baseline and after (4to8) weeks of intervention level ofsignificance was kept at 95% changes in the outcome measures were analyzed within group as well as between. **Conclusions:** Aerobic exercise is better than deep breathing exercise with positive expiratory pressure breathing exercise in post CABG patients in recovery phase.

KEYWORDS

Aerobic exercise, CABG, Deep breathing exercise, spirometry, positive expiratory pressure breathing (PEEP)

INTRODUCTION-

It is a surgical procedure in which the chest is opened, and surgery is performed on the heart. The term "open" refers to the chest, not to the heart itself. Two types of cardiac surgery are closed and open-heart surgery. (1) (2) The heart is a muscular organ that pumps blood throughout the circulatory system. It is situated between two lungs in the mediastinum. It is made up of four chambers, right atrium, right ventricle, left atrium, left ventricle. Heart beats 72/min. CABG (coronary artery bypass grafting) is done when there is multiple severe coronary stenosis associated with unstable or uncontrolled angina. CABG is a surgical procedure used to treat coronary artery disease. The blocked or narrowed coronary arteries are simply bypassed, replacing the blocked portion of the coronary artery with a piece of patent blood vessels taken from any other less sensitive area of the body. Such vascular grafts may be pieces of a vein taken from the legs or mammary artery in the chest. One end of the graft is attached above the blockage and the other end is attached below the blockage through the new graft to reach the heart muscle. CABG can also be performed off pump and on pump. (3)(4)(5) Aerobic exercise is submaximal, rhythmic, repetitive exercise of large muscle groups, during which the needed energy is supplied by inspired oxygen. Aerobic exercise training is augmentation of the energy utilization of the muscles by means of an exercise program. The improvement of the muscles ability to use energy is a direct result of increased levels of oxidative enzymes in the muscles, increased mitochondrial density and size and an increased muscle fiber capillary supply. Training is dependent on exercise of sufficient intensity, duration, and frequency. Training produced cardiovascular and /or muscular adaptation and is reflected in an individual's endurance. Aerobic exercise is any type of cardiac conditioning. It can include activities like brisk walking, swimming, running, or cycling. Aerobic exercise can be effective in increasing endurance of cardio-respiratory system by improving stroke volume at rest, lowering resting heart rate, lowering blood pressure, aerobic exercise is critical component of cardiac rehabilitation following cardiac rehabilitation.

Aerobic exercise traditionally commenced two to six weeks following hospital discharge and most commonly includes stationary cycling or treadmill walking. (6)(7)(8) INTRODUCTION 4 Deep breathing exercise is a fundamental intervention for the prevention or comprehensive management of impairments related to acute or chronic pulmonary disorders and Post Surgical patients. Deep breathing exercises come in many forms including diaphragmatic, breathing, segmental breathing, inspiratory resistance training incentive spirometry, pursed-lip breathing. (9) When the diaphragm is functioning effectively in its role as the primary muscles of inspiration, ventilation is efficient and the oxygen consumption of the muscle of ventilation is low during relaxed (tidal) breathing. When a patient relies substantially on the accessory muscles of inspiration the mechanical work of breathing (oxygen consumption) increases and the efficiency of ventilation decreases. Although at an involuntary level, a patient with primary or secondary pulmonary dysfunction can be taught how to control breathing by optimal use of the diaphragm and decreased use of accessory muscles. Diaphragmatic breathing is designed to improve the efficiency of ventilation, decrease the work of breathing, increase the excursion (descent or ascent) of the diaphragm, and improve gas exchange and oxygenation. (10) (11). Pursed-lip breathing is a strategy that involves lightly pursing the lips together during controlled exhalation. Many therapists breathing and controlled expiration is a useful procedure, particularly to relieve dyspnea if it is performed appropriately. Pursed-lip breathing decreases the respiratory rate and the work of breathing (oxygen consumption), increases the tidal volume, and improves exercise tolerance. (12)

Positive expiratory pressures breathing is a technique in which resistance to airflow is applied during exhalation, similar to what occurs during pursed-lip breathing, except that the patient breathes through a specially designed mouthpiece or mask that controls resistance to airflow. This breathing technique is used to hold airways open during exhalation to mobilize accumulated secretions and improve their clearance. Positive expiratory pressure breathing provides an alternative or adjunct to postural drainage which a patient can perform independently. (13) Following coronary artery bypass graft (CABG), the main cause of postoperative morbidity and mortality are postoperative pulmonary complications, respiratory dysfunction, and arterial hypoxemia. Incentive spirometry is a treatment technique that uses a mechanical device (an incentive spirometry) to reduce such pulmonary INTRODUCTION 5 complications during postoperative care. An incentive spirometry is a device that measures the volume of the air inhales into the lungs during inspiration when breathing in through an incentive spirometry, a piston rises inside the device and measures the volume of the inspired air. Here we used flow-oriented incentive spirometry (Tri-flow device) has three chambers with one ball in each chamber capacity up to 1200ml. (14) (15) (16) The 6-minute walk test (6-MWT) is an assessment that a

doctor may use to determine a person's exercise tolerance. It may be useful for measuring the functional ability and fitness of people with certain health conditions. (17) The Borg rating of perceived exertion (RPE) scale is an objective reassure of fatigue. This scale can also be used to monitor exercise intensity. (18)

METHODOLOGY

Study Design And Setting

Study Design: Comparative Study

Source Of Data: Zydus Hospital, and Trisha Heart Care and Physiotherapy center.

Population: Post CABG Patients in Recovery Phase.

Sampling Method: Random Sampling (fish bowel method)

Sample Size: 60 Patients (Treatment with Aerobic Exercise n=30 Patients, Treatment with Deep Breathing exercise With Positive expiratory pressure breathing exercise n=30 Patients)

Duration Of the Study: One Year.

MATERIAL & TOOLS USED:

Paper Pen
Assessment sheet Consent Form Incentive spirometry
Positive expiratory pressure breathing device. Cycle ergometer
Stopwatch Pulse oximeter
Blood pressure instrument

DATA COLLECTION PROCEDURE:

Participants who were meeting the inclusion and exclusion criteria have been selected for the study followed by the signature of participants on their consent form. The sampling was done randomly followed by convenient allocation within 2 groups: group A and group B. Treatment of aerobic exercise was given to the participants of group A (n=30 patients). Treatment of deep breathing exercise with positive expiratory pressure breathing exercise was given to the subjects of group B (n=30 patients).

GROUP-A

Treatment with aerobic exercise:

Figure-3 Cycle Ergometer

Group- B

Treatment with diaphragmatic breathing procedure:

Figure-4 Treatment with diaphragmatic breathing procedure

Pursed lip breathing procedure:

Figure-5 Pursed lip breathing procedure

Incentive Spirometry Procedure

Figure-6 Incentive spirometry procedure

Positive Expiratory Pressure Breathing Procedure:

Figure-7 Positive Expiratory Pressure Breathing Procedure

Outcome Measures

6-minute Walk Test:

Figure-8 *6-minute Walk Test*

RESULT

Table -1 Age Distribution

Demographic Details	Group- A	Group - B
AGE	35-55	35-60
NUMBERS	30	30

Table-2 Gender Distribution

GENDER	GROUP-A	GROUP-B	TOTAL
MALE	15	15	30
FEMALE	15	15	30
TOTAL	30	30	60

Table-3 Pre-treatment

	Group-A		Group-B		P-value
6MWD	MEAN	SD	MEAN	SD	
	367	43.5	322	49.2	>0.05

Table-4 MWD (Six Minute Walk Distance) Pre And Post

Group	PRE		POST		P - Value
	MEAN	SD	MEAN	SD	
GROUP - A	367	43	383	37.7	< 0.05
GROUP - B	322	50	332	47.3	> 0.05

Table-5 Comparison Between Group A- B

GROUP	MEAN	SD	P- Value
GROUP - A	367	43.13	
GROUP - B	322	49.2	<0.05

CASE STUDY

Worldwide approximately 400,000 people have undergone CABG in 2021-2022. Thus, vast numbers of patients are facing reduced endurance after surgery. With the help of this study, the resultant significant treatment can be beneficial to help vast number of patients with endurance problem. (4)(5)(6)

CONCLUSIONS

According to this study, Aerobic exercise is better than deep breathing exercise with positive expiratory pressure breathing exercise in post CABG patients in recovery phase. SUMMARY This study compared aerobic exercise and deep breathing exercise with positive expiratory pressure breathing exercise in post CABG patients in recovery phase. They were randomly allocated into groups or outcome was measured pre and post after 4 to 8 weeks of intervention. Both treatments were significantly effective in post CABG patients in the recovery phase but, more effective was in group A.

Limitations Limited age group may be applicable to larger age group. Limited sample size. Before recovery phase further study done with different age group geriatric group population. Future recommendation Further study can be done with large sample size. Study can be done with long term follow up.

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