

Effect of Post Operative Physiotherapy in Patients with CABG to Improve Cardiovascular Endurance - A Randomised Controlled Trial

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Abstract: ***Background:** Coronary artery bypass graft surgery may be a kind of surgical operation that redirects blood around clogged arteries to extend blood flow and oxygen to the heart. Aerobic is defined as relating to involving or requiring free oxygen and refers to use of oxygen adequately meet energy demands throughout exercise via aerobic metabolism. **Objective:** To extend Aerobic capability, to enhance exercise tolerance and cardiovascular endurance and To enhance respiratory capacity. **Methodology:** during a 3-week intervention study, 30 participants with options of CABG surgery were studied. They were divided into 2 groups by convenience sampling; Group A: Aerobic exercise. Pre and post treatment data was collected and analyzed using SPSS 26.0. Paired and unpaired t test were used to find out the significance difference between pre and post. **Result:** A significant improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and Breathing capacity (p<0.05) after the treatment was found. Greater statistical significant improvement was seen. **Conclusion:** In the experimental conditions used in the study, both the groups showed significant improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and breathing capacity. The use of Aerobic exercises evidenced a significantly greater improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and breathing capacity when compared to pre and post.*

Keywords: CABG, Cardiac capacity, Cardiovascular endurance, Aerobic exercises

1. Introduction

Coronary artery pass graft (cabg) surgical procedure may be a type of surgical operation that redirects blood round clogged arteries to extend blood waft and oxygen to the heart¹. At some stage in cabg surgical procedure, the running health care provider makes use of a some of a healthful vessel (both an artery or vein) from the leg, chest, or arm to make a pass around the clogged artery. All through cabg surgical procedure with cardiorespiratory skip a pump unnaturally keeps blood circulation and oxygenation even as the working surgeon operates at the heart².

CABG surgical procedure may be required in people with coronary artery ailment (cad) blood vessels will become in part or fully blocked therefore the coronary heart doesn't receive sufficient oxygen, resulting to angina (chest pain) or myocardial infarction (coronary heart attack)³.The ache and discomfort following cabg will dissent from patient to patient. Similarly, some sufferers are required to interact in bed rest following cabg that allows you to their situation may be monitored. Following cabg, sufferers often file emotions of despair, a loss of staying power, a loss of preferred nicely-being, and an incapability to carry out on the identical degree as that loved earlier than the manner. These emotions, in isolation or combination, can significantly undermine a patient's satisfactory of lifestyles (qol).⁴while it's extensive commonplace that psychological conditions could have an instantaneous impact at the qol of sufferers who've experienced chronic coronary heart failure, researchers have yet to mainly decide the connection among tension, depression, and qol.⁵

The benefits of coronary artery skip graft (cabg) surgical treatment with respect to survival and progressed ventricular feature is nicely established^{5,6}but as in other numerous cardiac interventions, there's a hazard for postoperative pulmonary headaches (percent) such as pneumonia, atelectasis, respiration failure, pneumothorax or bronchospasm⁷.On this admire, those sufferers have accomplished not simplest aerobic sporting activities but additionally resistance sporting events and this exercise is suggested for growth in practical capacity. The blessings of resistance exercising related to cardio workout include an overall decrease of recurrent cardiac events, increased survival, physical and psychosocial independence, and stepped forward excellent of life⁸.

Therefore, cardiac rehabilitation protocols have been advanced to regain patients' each day sports, emphasizing bodily and academic sports aiming lifestyle modifications. Latest therapeutic strategies permit early clinic discharge with minimum reduction of useful capacity^{9,10}. Put up-operative physiotherapy remedy useful for the patient who have completed cabg¹¹. Submit-operative physiotherapy remedy starts after discharge and/or few days after cardiovascular event. It works with sessions supervised with the aid of the physiotherapist¹¹.Most important goal of this remedy is to the early return of the affected person to social and work hobby, inside the first-rate feasible bodily region and emotional conditions¹².

Aerobic exercising is bodily workout of low to excessive intensity that relies upon more often than not on the aerobic electricity generating process¹².Aerobic is defined as regarding concerning free oxygen and refers to apply the of

Volume 10 Issue 4, April 2021

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oxygen adequately meet energy demands all through exercising through cardio metabolism¹³. Aerobic exercise is executed by means of repeating sequences of light to mild intensity activities for extended durations of time¹².

Aerobic workout (ae) decrease morbidity and mortality for patients following coronary artery skip graft (cabg) surgery. Ae is usually began at the least four weeks following cabgthrough outpatient cardiac rehabilitation. Ae inside the early postoperative period may enhance aerobic and useful ability of sufferers at medical institution discharge. The aim of the existing have a look at became to evaluate the results of early ae following cabg^{14,15}

2. Methodology

The research was approved by ethical committee of Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar. The CTRI registration number is CTRI/2021/03/032270. Participants of female and male whose age was between 40 to 70 years of age, having CABG, Clinically diagnosed patients of CABG, and who were willing to be a part of the study were included in the study. These individuals were informed about the study and the procedure was clearly explained to all. An informed and written consent was obtained from the subjects those who agreed to be a part of the study that was to be conducted. The participants which were selected were then randomly assigned by simple random sampling in to 2 groups A and B. Thirty subjects with mean age of 42.8 ± 7.54 (mean \pm SD) became a part of the study. The participants underwent a detailed pre-evaluation. The pre-evaluation included an Cardiovascular assessment which obtained information about demographic details, medical history, personal history, functional scale, muscle strength and endurance of the subjects. 6MWT and Borg scale was measured. Subjects who fulfilled the selection criteria were informed about the study and requested to sign written informed consent forms. Experiments were conducted on 15 subjects in Group A, 15 subjects in Group B. The participants of Group A were treated with Aerobic exercise and Group B was control Group. The treatment protocol

consisted of 6 sessions of conventional treatment program/ week, and 6 sessions of for 3 weeks. After 6 weeks of treatment the participants of both groups underwent post-evaluation and the pre and post- treatment data were noted and then evaluated further.

Treatment protocol [For 3 weeks (18 sessions / 3 weeks)]

Duration: 30 to 35 min for each session. 6 session/week for 3 weeks.

Protocol:

Week -1:

- Warm up exercise (5 min) - Slow walking
- Resistive training (10 min) – Upper and lower extremity with weight (500 gm)
- Aerobics (10 min.)- Treadmill walk (speed – 2.5 mph)
- Cool down (5 min.) - Gentle body movement
- Ventilatory muscle training – Diaphragmatic exercise & pursed lip exercise and incentive spirometry

Week -2:

- Warm up exercise (5 min) - Slow walking
- Resistive training (10 min) – Upper and lower extremity with weight (1 kg)
- Aerobics (10 min.)- Jogging
- Cool down (5 min.) - Gentle body movement
- Ventilatory muscle training – Diaphragmatic exercise & pursed lip exercise and incentive spirometry

Week -3:

- Warm up exercise (5 min) - Slow walking
- Resistive training (10 min) – Upper and lower extremity with weight (1.5 kg)
- Aerobics (10 min.)- Static cycling
- Cool down (5 min.) - Gentle body movement
- Ventilatory muscle training – Diaphragmatic exercise & pursed lip exercise and incentive spirometry.

Exercise



3. Result

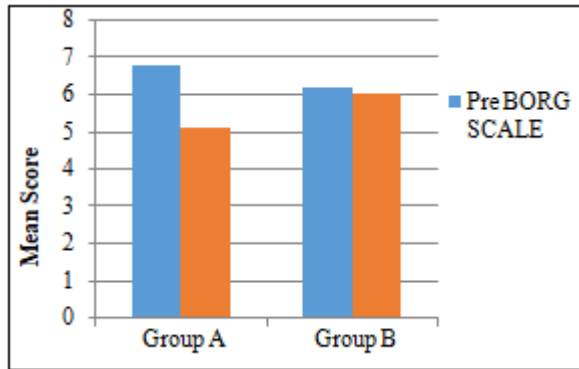
Pre and post-treatment data of the participants of both group were noted. All statistical analysis was done using SPSS 26 software for windows. Descriptive analysis was obtained by using mean & standard deviation. The intergroup comparison between Group A and B of pre-treatment and post-treatment of 6MWT, Borg scale was done by paired t-test. The intragroup comparison of pre-treatment and post-treatment of 6MWT, Borg scale within Group A and Group B was done by unpaired t-test.

Table 1: Pre and Post treatment values of Group A

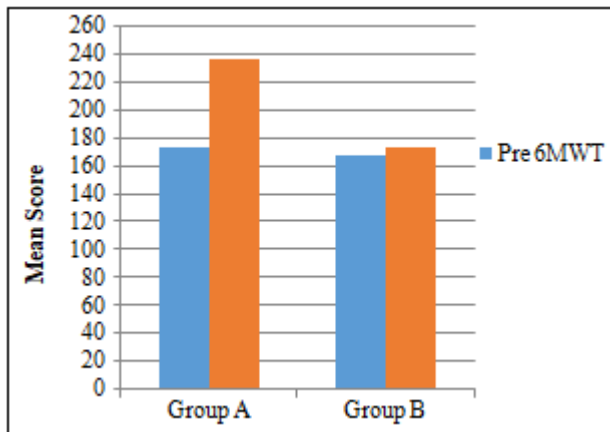
Group A	Pre – Treatment (Mean)	Post Treatment (Mean±SD)	p- value
6MWT	173.13	237.0	0.00
BORG SCALE	6.76	5.1	0.00

Table 2: Pre and Post treatment values of Group B

Group B	Pre – Treatment (Mean±SD)	Post Treatment (Mean±SD)	p- value
6MWT	167.13	172.80	0.00
BORG SCALE	7.00	6.20	0.00



Graph 1: Pre and Post-Treatment values Borg scale for Group A and Group B



Graph 2: Pre and Post-Treatment values 6MWT for Group A and Group B

The results found in this study disclosed that after a Three-week treatment program, both groups, Group A, who received Aerobics exercises and Group B was controlled group attained a significant improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and Breathing capacity. But statistically greater significant

improvement was seen in Group A as compared to Group B (p value < 0.05).

4. Discussion

The most commonplace respiration complications after coronary artery bypass surgical operation are atelectasis, pleural effusion, pneumonia, pulmonary oedema, person respiratory distress syndrome and so on. Following cabg most sufferers' could have little quantities of unilateral left-sided effusions, huge effusions arise in 10% of patients. Late (after 30days) effusions are yellow lymphocytic exudates, most not unusual symptom being dyspnoea. Musculoskeletal headaches also arise postoperatively because of reduced mobility after cabg. Sternal pain can lessen the mobility of neck, least kyphotic posture that could further result in different muscular troubles. Therefore to reduce the headaches postoperatively in cabg section 2cardiac rehabilitation is essential additionally it reduces the common visits to the sanatorium and improves the nice of lifestyles of the cabg affected person.

The minor improvement within the group b changed into seen because of may be home base physical activities. Preceding research has discovered that the blessings of pt aren't restricted to post-surgical operation; as a treatment intervention method, pt can save you the want for invasive surgical treatment with the aid of modulating high blood pressure or enhancing the status of cardiac patients. The publish intervention qol scores revealed that a giant improvement become found within the qol of the patients who underwent a course of pt after optional cabg surgery. This effect regarded to be associated immediately to the treatment because maximum patients reported enhancements in their symptoms after 1 month. Furthermore, in most of the people of cases, the wonderful effect of pt turned into maintained at some stage in the take a look at length.

Foster et al. In 1984, tested a sizeable growth in workout tolerance as compared to the manipulate institution sullivan et al. In 1988, confirmed a decrease in resting and exercising heart fee as well as an growth in vo2 top

This have a look at changed into performed on thirty subjects with suggest age of 6.86 (imply). The subjects had been divided into organizations; institution a experimental institution (cardio exercise) and organization b obtained manipulate institution for six session/week for three weeks. In this have a look at six minute stroll test (6mwt), borg scale the effects showed a substantial improvement within the final results measures in publish-treatment level as compared to the pre-remedy stage. Even though a substantial development was located after remedy in each the agencies, but group a showed more development inside the 6mwt score, borg scale, (p price < 0.05).

The above exposed statement shows that impact of publish-operative physiotherapy in patients with cabg to enhance cardiovascular endurance powerful management of topics with in enhancing 6mwt, borg scale.

5. Conclusion

In the experimental conditions used in the study, both the groups showed significant improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and breathing capacity. The use of Aerobic exercises evidenced a significantly greater improvement in Aerobic capacity, exercise tolerance, cardiovascular endurance and breathing capacity when compared to Controlled group (Group B).

6. Limitations

- 1) Long term follow up was not taken.
- 2) The study includes treatment period of 3 weeks only.
- 3) The study involves small sample size.

Conflict of interest: None

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