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Mini Review

Efficacy of Active Cycle of Breathing Technique on Functional Improvement in Post CABG Patient

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Abstract

Purpose: The purpose of this study was to evaluate the efficacy of active cycle of breathing techniques (ACBT) following coronary artery bypass graft (CABG) surgery. Material and methods: 15 patients with CABG were included in this study. Patients were evaluated using 6-minute walk test (6MWT), chest expansion and a 10-cm visual analogue scale for pain perception. Results: sixth and ninth day post-operatively, chest expansion and six minute walk test variables were significantly increased in both groups compared to pre-operative values.

Conclusion: ACBT improves functional capacity from the sixth to ninth day post-operatively. After a 5-day treatment, functional capacity was well preserved with the usage of ACBT. Respiratory physiotherapy methods had similar effects on the rate of atelectasis, pulmonary function, and pain perception.

Keywords: Physiotherapy; Coronary artery bypass surgery; Lung function tests; Exercise

Background

The number of people with CAD have sudden death as their first symptom, 50% of patient are diagnosed as having coronary artery disease in all over the world. Etiology behind this drastic increase is because of poor dietary habits and lack of physical activity. It is due to sedentary life styles and high stressful environment [1]. CAD is invited because of other risk factors like diabetes mellitus, hypertension and personal habits like smoking and alcoholism [2]. Due to lack of physical activity in majority of cases with CAD, diseases of the coronary arteries are due to atherosclerosis [3]. Cardiac arrest is the commonest cause for death in the world, 4.8 million men & 4.4 million women in worldwide die each year because of CAD. When comparing the magnitude of CABG, it is the most common surgery performed in the world [4]. In India, the number of CABG is quite high, but the documented evidence of these official records is unavailable in some hospitals. The incidence of CAD varies greatly between countries and with advent of age correlates well with the mortality. From the past years, aim of the CABG is to relieve pain and to prolong life and also the long term survival depends not only on the operative procedure, but also on the extent of damage of the left ventricle [5].

Role of active cycle of breathing technique in CABG patients

Active cycle of breathing (ACBT) is an active breathing technique performed by the patient to help secretions from the main stem bronchus. This technique incorporated breathing exercises to improve the effectiveness of cough, loosen and clear secretions and improve the ventilation [6].

Objective

The use of anesthesia and blood loss coupled with restricted mobility and pain due to incision primarily affects the oxygen transport [7-9]. This leads to Sub -optimal muco-cilliary escalator, Decrease lung volume and capacities, Mucus retention and plugging in lungs and increased work of breathing. Because of pain, ventilation is further affected. However, pain relieving modalities and air way clearance techniques are available but nevertheless none of the technique so far as been shown to provide improvement [10]. Hence the postoperative treatment still remains in debate and lacks the much-needed practice. The ACBT focus on normalizing respiratory pattern, promoting airway clearance and reducing work of breathing. ACBT important to control the immediate post-operative complications.

Method

The purpose of this study is to record Efficacy of ACBT in reducing post operative co morbidities in CABG patients. The research has been done so that it may serve as a guideline for planning and implementing a study in a way that is most likely to achieve the goal in patients with post operative respiratory

complications in CABG. The study was carried out for duration of 6 months and the treatment duration was carried out for the period of 6 days. The patients were treated daily for 40 minutes once daily and the values of the parameter selected were assessed on the 2nd post operative day to 9th post operative day. Before proceeding with the treatment and recording, self demonstration was performed and to make sure that the patients understand it [11,12].

Data Collection

Table 1-3; Figures 1-3

Table 1: Visual Analogue Scale.

Sl. NO.	Pre test	Post test	$(x_1 - x^1_1)$	$(x_1 - x^1_1)^2$
1	8	1	-0.73	0.5
2	9	2	0.27	0.07
3	10	4	2.27	5.15
4	8	3	0.27	0.07
5	9	0	1.73	2.99
6	6	2	0.27	0.07
7	10	1	1.27	1.61
8	8	1	0.27	0.07
9	9	0	1.73	2.99
10	7	2	0.27	0.07
11	9	1	-0.73	0.53
12	10	3	1.27	1.61
13	8	2	0.27	0.07
14	9	1	-0.73	0.53
15	5	1	-0.73	0.53

Table 2: Chest Expansion.

Sl. No.	Pre-test	Post-test	$(x_1 - x^1_1)$	$(x_2 - x_2{}^1)^2$
1	2	2.8	0.05	0.0025
2	2.5	3	0.25	0.0625
3	2.8	3.2	0.45	0.2025
4	2.5	3.2	0.45	0.2025
5	1.5	2	-o.75	0.5625
6	2	2.7	-0.05	0.0025
7	1.9	2.5	-0.25	0.0625
8	1.5	2	-0.75	0.5625
9	2.8	3.3	0.55	0.3025
10	2.5	3.2	0.45	0.2025
11	2	2.7	-0.05	0.0025
12	1.7	2.2	-0.55	0.3025
13	2.3	2.9	0.15	0.0225
14	1.9	2.7	-0.05	0.0025
15	2	2.7	-0.05	0.0025

Table 3: Six Minute Walk Distance Test.

Sl. No.	Pre-test	Post-test	$X_1 - X_1'$	$(X_1 - X_1')^2$
1	5	1	-0.47	0.2209
2	7	1	-0.47	0.2209
3	6	3	1.53	2.3409
4	4	1	-0.47	0.2209
5	5	1	-0.47	0.2209
6	6	2	0.53	0.2809

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7	5	1	-0.47	0.2209
8	6	1	-0.47	0.2209
9	5	1	-0.47	0.2209
10	4	2	0.53	0.2809
11	6	2	0.53	0.2809
12	4	1	-0.47	0.2209
13	5	2	0.53	0.2809
14	6	1	-0.47	0.2209
15	7	2	0.53	0.2809

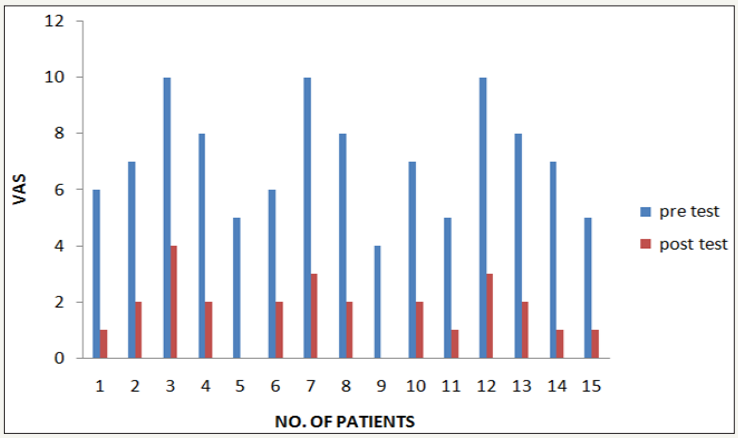

Figure 1: DATA of visual analogue scale.

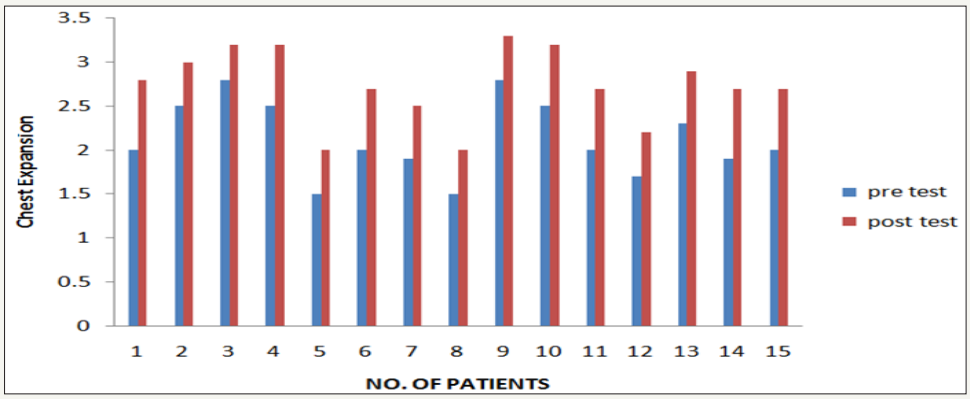

Figure 2: Chest expansion.

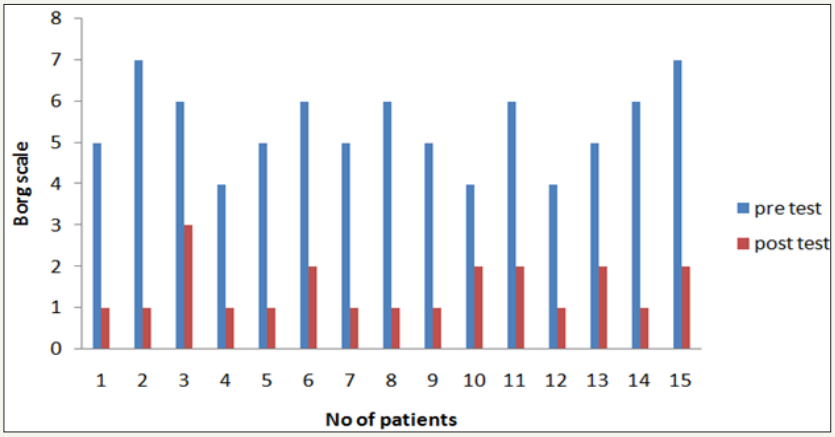

Figure 3: Six minutes walk test.

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Discussion

The purpose of this study is to determine the efficacy of Active Cycle of Breathing Technique. The study was conducted out for a period of 6 months with 28° of freedom. Literature review states that there is significant difference between Active Cycle of Breathing techniques on post operative CABG patients. The result in various parameters was compared.

Early post-operative mobilization has been shown to increase lung volume, improve ventilation/perfusion matching, and mobilize secretion. In post CABG patients, impaired oxygen transport results in a deteriorated functional work capacity, and exercise capacity is one of the major concerns in post-operative recovery. Maximal oxygen uptake measured during a standard treadmill or bicycle test is the best available method to assess aerobic exercise capacity, 6MWT is a reliable alternative for measuring the functional exercise capacity. Because these tests require significant effort or special skills from the patients, walking tests have become a common method to determine functional capacity. To our knowledge, only 4 studies used 6MWT after cardiac surgery to provide reference values for defining disability. In this study, we used 6MWT to assess the efficacy of the ACBT after CABG in terms of effectiveness of functional capacity. Pre- and post-operative 6MWT distances were shown significant difference; chest expansion following CABG has attained a near normal value following ACBT at the end of treatment session

Conclusion

The Active Cycle of Breathing Technique is more effective method of treatment on post operative CABG patients.

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