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Effect of Physiotherapy Management of Patients with Coronary Artery Disease: A Study on Current Practice in Kanpur, U.P

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Abstract
Coronary artery disease (CAD) is worldwide health problem with an increase prevalence in Kanpur Nagar with is situated in Uttar Pradesh. Physiotherapist is involved in the care of these patients from the acute stage following a cardiac event until phase III cardiac rehabilitation is complete. The purpose of this study was to determine the current physiotherapy management of patients with CAD in Kanpur.

Material and Methods: -
*The total 40 Patient suffering from coronary Artery disease was randomly allocated into two groups, Group A (n= 20) treated with Cardio pulmonary physiotherapy techniques along with medical treatment and Group **B**(n=20) treated with only General physiotherapy techniques and medical treatment. In hospital physiotherapy treatment was mostly provided once a daily which is deep breathing exercise, circulatory exercise and manual chest mobilizing exercise with chest clearance technique were mostly used physiotherapy treatment.*

Result: -
Result shows that more cardio-pulmonary physiotherapy provide care (60%)than Group B who didn't received advance cardio pulmonary treatment (32%).Patient in both groups reported significant improvement after 3 weeks of treatment program compared to baseline on all outcome measure. Compared to Group B, Group A showed more improvement. It was three time better results over the Group B.

Conclusion: -
Advance cardio pulmonary physiotherapy techniques along with medical treatment are more effective in Coronary artery disease then medical treatment alone. Evidence based practice was consistent regarding early mobilization but was inconsistent with regard to the use of manual chest clear techniques.

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I. Introduction

Coronary artery disease (CAD), Also Known as coronary heart disease or ischemic heart disease, involves the reduction of blood flow of the heart muscle due to build up of plaque in the artery of the heart.[2,9,13]its a most common of the cardiovascular diease.[4] CAD is a health problem worldwide. It's a leading cause of death internationally and accounts for a third of deaths globally. Types include stable angina, unstable angina, myocardial infarction and sudden cardiac death.[5]A common symptoms is chest pain or discomfort which may travel into the shoulder, Arm, back, neck, or jaw.[1]Occasionally it may feel like heart burn. Usually symptoms occur with exercise or emotional stress, last less than a few minutes, and improve with rest.[1] Shortness of breath may also occur and sometimes no symptoms are present.[1] In many cases first sign of heart 'attack.[1] Other complication include heart failure or an abnormal heartbeat.[2]

Risk factors include high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, depression, and excessive alchohal.[3,6,11] About half of the cases are linked to genetics.[7] Smoking and obesity are associated with about 36% and 20% of cases, respectively.[10] Smoking just one cigarette pr day about doubles the risk of CAD.[14] A number of test may help with diagnosis including: ECG, cardiac stress testing, coronary computed tomography angiography, and coronary angiogram, among other.[8]

Chest pain that occurs regularly with activity, after eating, or at other predictable times is termed stable angina and is associated with narrowing of the arteries of the heart. Angina that changes in intensity, character or frequency is termed as unstable. Unstable angina may precede myocardial infarction. In adult who go to emergency department with the unclear cause of pain, about 30% have pain due to coronary artery disease.[12]

The number of categories of adverse childhood experiences (psychologically, physical, or sexual abuse: violence against mother: or living with household member who were substance abusers, mentally ill, suicidal or incarcerated) showed a graded correlation with the presence of adult disease including coronary artery disease.

Nationally, physiotherapist treat patient with CAD in the acute stage following a coronary event/or following coronary artery bypass grafting (CABG) surgery. These patients are than subsequently followed up as out-patient during cardiac rehabilitation in order to improve function and quality of life and to delay occurrence of coronary events.

II. MATERIAL AND METHOD

There was carried out 40 patients with 20 patients in each group. Both of the study Group received medical treatment but one group (Group A) received advance cardio pulmonary physiotherapy techniques along with medical treatment. The trial duration was 14 days.

The patients enrolled in the study on the following eligibility criteria 1) male and female patient 20 45to 60 year age 3) hospitalized patients diagnosed by a medical 4) patient with pronounce symptoms of sputum retention and coughing 5) Ability to tolerate advance cardio-pulmonary physiotherapy technique 6) well oriented patients. The patients were excluded on the following criteria 1) severe attack with longer expected hospital stay up to 2 weeks 2) Severe cardiac heart attack or any other condition that contra-indicated for chest physiotherapy 3) pain with more than 2 point on visual analogue scale while doing active technique 4) patient with history of any thoracic surgery 5) any other pathological condition.

The patients were assessed on inclusion and exclusion criteria by a medical doctor who was the part of the study. The entire patient was treated at cardiac medical ward. A previous medical history was taken for previous problems and associated with length of hospital stay. There was outcome measure used in this study.

The group A was treated with advance cardio-pulmonary physiotherapy along with medical treatment. The technique was delivered to the patients in the sitting comfortable position or half lying or lying position on the hospital bed. The technique was applied in the following steps.

1. Deep breathing exercise includes segmental breathing or relaxed breathing exercise followed by huff and cough.
2. Circulatory exercise which helps improve circulation or flow of blood throughout our bodies is good for health. These include ankle toe movement or ankle pump, knee isometric exercise, active SLR and range of motion exercise.
3. Manual chest clearance techniques include airway clearance techniques, facilitating airway clearance technique with effective coughing techniques, technique to facilitate ventilation pattern and chest mobilization exercise.

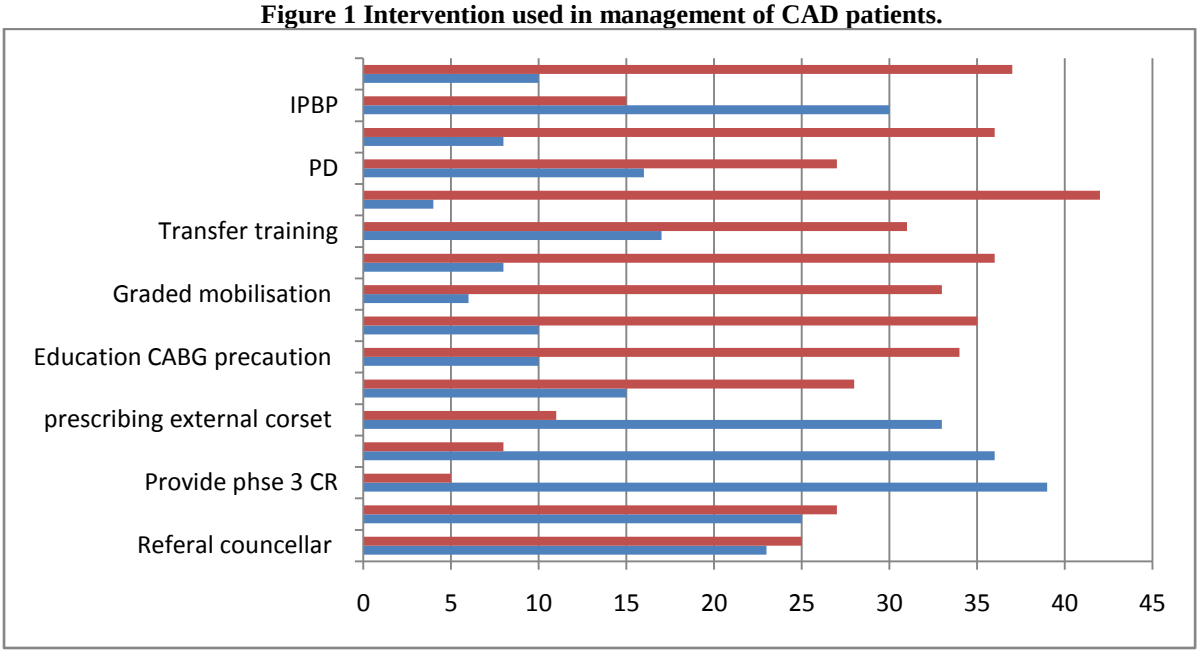
The patient allotted in to 2 groups randomly by making computer sequences. An observational cross-sectional study was conducted. A questionnaire was developed following a literature review of chest clearance and rehabilitation methods used in the management of patients with coronary artery disease. A review of the cardiac procedure performed in individual diagnosed with CAD was also done. It was discussed with both groups to verify its contents, to establish the time require to complete the whole procedure.

III. RESULT

The intervention used by the physiotherapist when treating patient with coronary artery disease. It is important to note that deep breathing exercise, circulatory exercise, manual technique with postural drainage, graded mobilization and education components (home exercise program, exercise guidance and CABG precaution) were commonly included as treatment modesties. Intermittent positive pressure breathing was not commonly used as chest clearance technique. Only 5 physiotherapist referred patient to a phase III out-patient cardiac rehabilitation program 5 cardiopulmonary physiotherapists offered such program at the hospital.

Most patient received treatment in hospital once or twice daily. Physiotherapists who did provide physiotherapy intervention to patients in an outpatient capacity did so once weakly. **(Table 1)**

Figure 1 Intervention used in management of CAD patients.

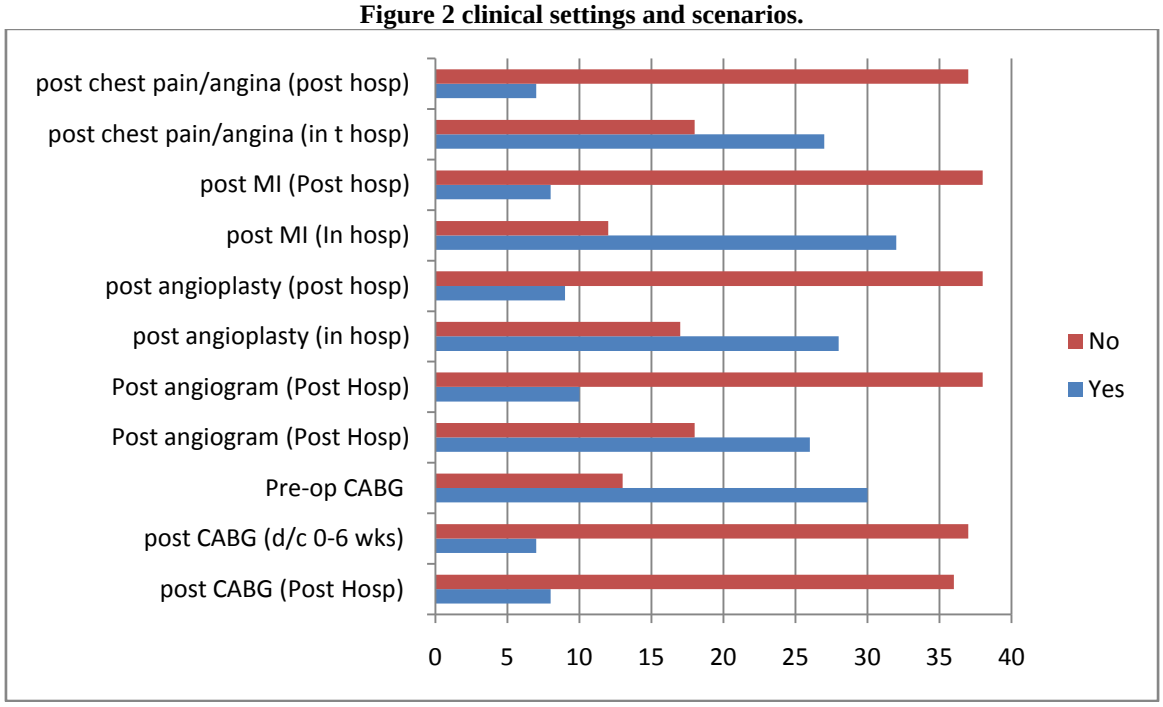


- Red = NO
- Blue= Yes

Data expressed as number of physiotherapist using intervention. CR, cardiac rehabilitation; PD, postural drainage; IPBP, intermittent positive pressure breathing; ACBT, Active cycle of breathing technique.

Most patients were most commonly seen in hospital prior to and following CABG surgery and after myocardial infarction. Following physiotherapist treated patients following admission for chest pain/ angina pain or angioplasty intervention. (Figure 2) The reason for the referral of these patients to physiotherapy is unknown. Few physiotherapists continued with patient's care following discharge from the hospital.

Figure 2 clinical settings and scenarios.



Data expressed as number of physiotherapist working in clinical setting scenarios. MI, myocardial infarction; CABG, coronary artery bypass graft.

The mean improvement found significant in both group A and B. Result shows that more cardio-pulmonary physiotherapy provide care (60%)than Group B who didn't received advance cardio pulmonary treatment (32%).Patient in both groups reported significant improvement after 3 weeks of treatment program compared to baseline on all outcome measure. Compared to Group B, Group A showed more improvement. It was three time better results over the Group B.

IV. DISCUSSION

Coronary artery disease is a projected to be the leading cause of death in developing countries by $2030_{1.}$ This study investigated the current level of involvement of cardiopulmonary physiotherapist in the management of patient with CAD in Kanpur, India. It was encouraging to note that more cardiopulmonary physiotherapists provided care to patients living with CAD then those who did not. Primary prevention strategies such as education concerning living a healthy lifestyle and secondary management for reoccurrence of cardiac event such as cardiac rehabilitation are important component in attempting to decrease the burden of CAD.[15] Education consisting of preoperative precaution of CABG (wound care and temporary restriction in physical activity), exercise guidelines (including frequency, intensity, time and type of exercise and red flags), general CAD pathophysiology and risk factors modification was done by physiotherapists in the acute care sitting. This is commendable because of motivation of patients with CAD to be active appears to be greatest in the early post discharge period.[16] Physical activity in patients are reported to decline two to six months following hospital discharge after a CAD event.[16] Intervention to assist with increasing physical activity level during the period, such as phase III cardiac rehabilitation, should be encouraged.

Manual technique was frequently used by physiotherapist in the current study. Postural drainage was also commonly used. Head down postural drainage is considered a relative contraindication in patient with severe cardiovascular disease.[17] A short term 30 degree head down postural drainage session in healthy adult resulted in decrease heart rate, mean arterial blood pressure, diastolic duration.[18] in healthy adult these changed may have no serious consequence but in individual with known CAD and reduce cardiac it could result in significant side effect. This research found no significant differences in respiratory response in participants when position in a modified or head down PD position. There were significant a difference in CVS response the two positions were compared and modified PD was better tolerated. It is therefore advisable to use a modified PD position is patient with CAD if indicated. Close monitoring of the patients response while the specific position should be maintained.|

Activity based intervention such as circulatory exercise and graded mobilization were commonly used by physiotherapist in this study. Mobilization exercise includes percussion, hacking, clapping, rib spring and range of motion exercise of the limb to prevent CABG. Circulatory exercise includes upper and lower extremity exercise may be useful for people with musculoskeletal problems in their extremity. Walking simple and low impact exercise that can help the patients create a more active and healthy lifestyle and may promote proper circulation of the body. Walking at any pace is beneficial to increase blood flow throughout the body, as it the best way to the lower the blood pressure and increase and increase muscles circulation in the legs. Early mobilization in hospital is encouraged following CABG surgery and acute coronary event if patients are medically stable. In this study patients with CAD were most commonly seen physiotherapist once or twice daily while in the hospital.

V. CONCLUSION

The study confirmed that most physiotherapists working in the cardiopulmonary field involved in the management of patients with CAD during hospitalization. However the use of evidence based intervention in the clinical care of patient with CAD was inconsistent. There is currently limited involvement of physiotherapist in outpatient cardiac rehabilitation in Kanpur. This is just because of limited awareness of the patient and also the poor population who lived in Kanpur. Most of the patients come here to treat such cardiac problems from outside from the Kanpur or villagers surrounding to the city. The main focus of the physiotherapists should be on prevention of risk factors such hypertension through education and exercise as well as implementation of programmes (cardiac rehabilitation) for the long term management of individuals diagnosed with CAD.

Chest physiotherapy is more effective in improving breathlessness and pain, remove secretion from the chest with standard medical treatment than medical treatment alone. The estimate effect of cardiac rehabilitation program in CAD patients are about three times more pronounced with medical treatment compared to medical treatment alone.

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