



A case report on impact of physiotherapy rehabilitation on post coronary artery bypass graft

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Article History

Received: 27 March 2020

Reviewed: 28/March/2020 to 12/May/2020

Accepted: 12 May 2020

E-publication: 21 May 2020

P-Publication: July - August 2020

Citation

Dhanashri Ghordadekar, Waqar M. Naqvi, Arti Sahu. A case report on impact of physiotherapy rehabilitation on post coronary artery bypass graft. *Medical Science*, 2020, 24(104), 1962-1967

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General Note



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ABSTRACT

Introduction: Peripheral vascular disease (PVD) occludes medium and small size arteries other than heart and brain. It may lead to recurrent fatigue, cramping, intermittent pain sensation, and intermittent claudication. In India, Coronary Artery Disease (CAD) has a prevalence of 11% for non-diabetic and 21.5% for diabetic population. **Case Description:** A 50 years old male patient with coronary artery bypass graft was referred for physical therapy from post operative day 1 to day 10. Ten sessions of physiotherapy were

performed using various exercise programs such as patient education, proper advice, deep diaphragmatic breathing exercises, upper extremity and lower extremity mobility exercises and airway clearance techniques. *Discussion:* The patient reported a decrease in breathlessness and an increase in functional activity following the physical therapy. There was a decrease in rate of perceived exertion score while performing functional activity. We also observed an increase in walking distance in the 6MWT. Monitoring vitals during the exercise is important to look for any abnormal signs and symptoms. *Conclusion:* Patient was reported to have an increase in functional capacity of patient, which led to significant improvement in his quality of life and functional outcome. The positive outcome from this study warrants further studies including large number of patients.

Keywords: physiotherapy, coronary artery bypass graft, physical examination, incentive spirometry, breathlessness.

1. INTRODUCTION

The peripheral vascular disease (PVD) is an occlusive disease of blood vessel distal to aortic bifurcation (Albeyoglu et al., 2006). Peripheral vascular diseases include Raynaud's disease, Buerger's disease, varicose veins and aortic aneurysm. It occludes the medium and small size arteries of the body other than heart and brain. It affects the lower limb more commonly than upper limbs and may lead to recurrent fatigue, cramping and intermittent pain sensation and intermittent claudication. The risk of PAD increases with age (Saujiet al., 2013), prevailing heart disease (Anand et al., 2007), diabetes (Thiruvoipati et al., 2015), smokers (Hiatt et al., 2017). The concurrence of peripheral artery disease (PAD) and coronary artery disease (CAD) is as frequent as 37% - 78% (Albeyoglu et al., 2006). The prevalence of CAD in India is 11% for non-diabetic and 21.5% for diabetic population (Mohan et al., 2001). The purpose of this case report is to describe the necessary physical therapy rehabilitation for patient with coronary artery bypass graft having peripheral vascular symptom of intermittent claudication.

Health care professionals working in rehabilitation program and health fitness should know the necessary precaution need to take during exercise session, how exercise therapy can benefit patient with CAD and PVD. Exercise should be modified when there is coexisting comorbid condition like PVD according to condition of patient.

2. PATIENT INFORMATION

The patient was 50 years old male admitted with a history of chest pain since 3 months, wherein the pain was insidious in onset and gradually progressing. Pain increased on walking and relieved on rest, was situated in right and left supramammary region and radiated towards lower back region. Chest pain was associated with breathlessness and palpitation. Patient was non-diabetic and non-hypertensive. Patient presented with a history of alcohol consumption since 15 years and a history of cigarette smoking since 30 years (8 cigarette/day).

After taking informed consent of the patient physical examination was performed. On general examination, the patient was conscious and of moderate built and well oriented with time, place and person. His pulse rate was 112 beats/minute having regular rhythm, hypokinetic and hypovolemic in nature. Blood pressure was 132/80 mmHg with mean arterial pressure of 101mmHg. Respiratory rate was 25 breaths/ minute, regular with abdomino-thoracic pattern.

A coronary angiogram was performed which showed single vessel disease with 90% occlusion in Left anterior descending artery. Echo revealed normal left ventricle function ejection fraction of 60% with mild Left ventricular hypertrophy and pericardial effusion. 15 days following the diagnosis, he was operated for Coronary artery disease with CABG. After the procedure of CABG, the patient was referred for physical therapy.

3. DIAGNOSTIC ASSESSMENT

When patient was referred to physiotherapy department initially verbal consent was taken from the patient and his close relative, patient was explained about cardiac rehabilitation with its probable risks and dangers. The procedure of evaluation was started once he fully approved for the rehabilitation program.

Physiotherapy evaluation was done at bed side post-operatively, in order to check the prognosis and set treatment goal. Evaluation included examination of vitals, cardiac parameters, range of motion, manual muscle testing. Patient was conscious and well oriented. On auscultation there was a decreased breath sound in lower lobe. Dyspnea assessed using Borg's scale came out as 15- 18. MMT and ROM could not be assessed due to pain. Pain was 8/10 on NPRS. Reflexes and sensation were reported normal. Functional capacity: 6 MWT was done on the 5th day and ambulation was unable to carry out using walker.

Diagnostic challenges

Patient's and his family were not from educated background, due to which they did not co-operated during the test procedure. Patient lacked the willingness to perform fully during diagnostic test but this problem was fixed once he was frequently motivated by the health professionals and his family members. Claudication pain caused during walking interfered with our 6MWT results.

Therapeutic Intervention

Physiotherapy was started from the very next day following the surgery. Initially the patient was given proper positioning with 45degreesof head-end inclination with active ankle toe movements. There was a deceased in air entry and lung expansion in lower lobes, hence the patient was taught deep breathing exercise using incentive spirometry. Care was taken for sternal precaution including sterna support during deep inspiration, avoidance of forward trunk flexion, weight bearing by upper-limb. During POD2, assisted upper limb mobility exercises, high sitting on bed side, and sitting to standing were started. Walking around bed with support was started on POD 3 along with all the above mentioned exercises. An increase in the walking distance was started on POD 4 along with the above mentioned exercises within the ICU unit. Patient was encouraged independent sitting and standing along with an increase in the walking distance up to 25meters was done on POD 5. Patient encountered intermittent claudication with breathlessness on POD 6 while walking for 30meters so he was given upper limb activities and deep breathing exercise on that day. Upper limb mobility exercise and independent sitting, standing and walking were done on POD 7.

Same regime was followed on POD 8 & 9. Gradually walking distance was increased and functional use of upper and lower limb was begun after POD10. Patient was encouraged to make functional use of upper and lower extremities as much as possible. Intermittent claudication was managed by increasing the claudication time and distance with adequate rest interval.

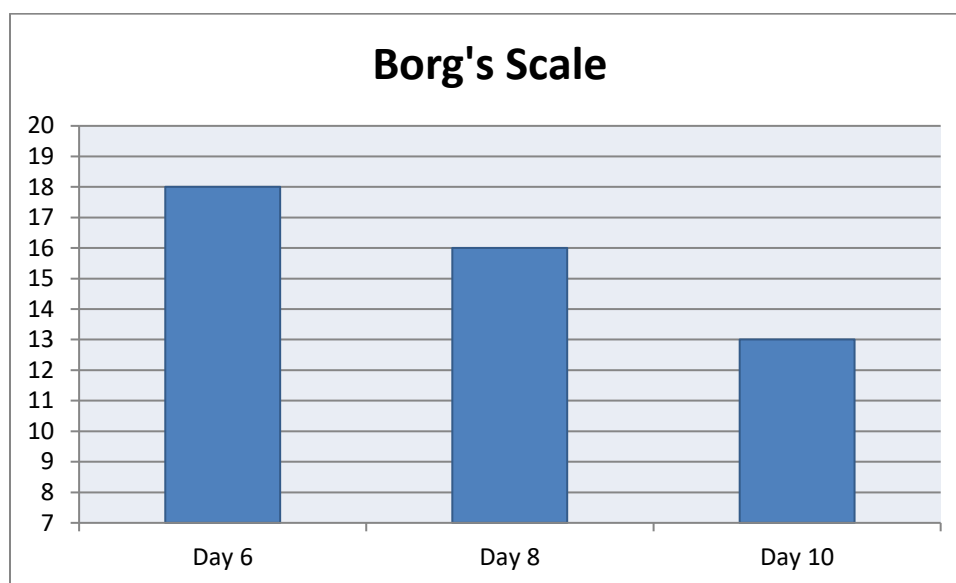


Figure 1 showing incision scar on POD 4.

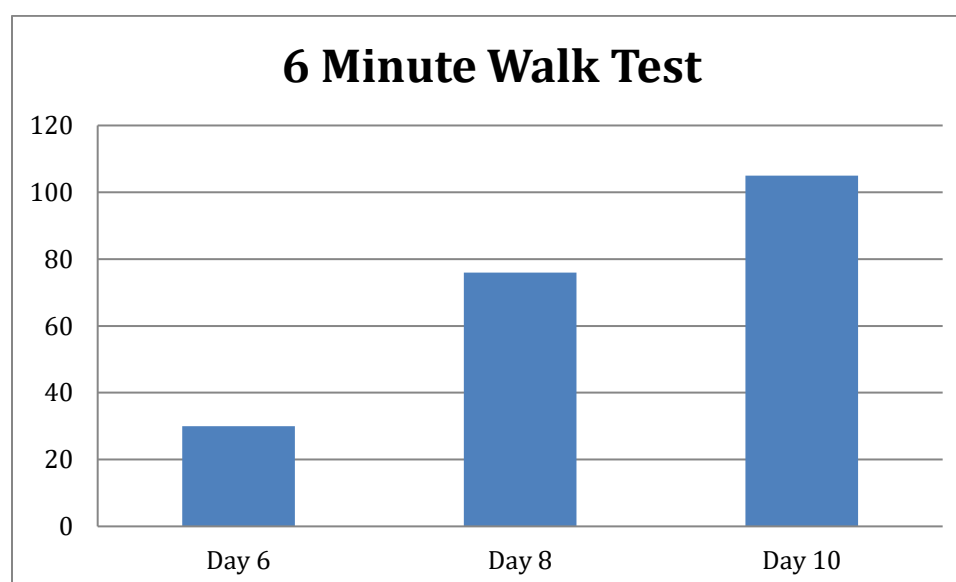
Table 1 Heart Rate and Respiratory Rate before, after and 10 minutes after treatment procedure.

Days of PT	Heart Rate before the treatment	Heart rate after treatment	Heart rate after 10 min of treatment	Respiratory rate before the treatment	Respiratory rate after treatment	Respiratory rate after 10 min of treatment
Day 1	112	126	117	26	31	28
Day 2	107	119	111	24	29	26
Day 3	101	113	103	21	25	22
Day 4	94	101	98	22	24	21
Day 5	87	92	87	20	24	21
Day 6	91	98	93	21	25	20
Day 7	87	93	88	22	26	23
Day 8	84	89	86	23	27	23
Day 9	86	91	87	21	25	21
Day 10	87	95	88	21	25	22

Physiotherapy Outcome Measures Using Borg's Scale and 6 Minute Walk Test



Graph 1 Borg's Scale showing progressive decrease in rate of perceived exertion from day 6 to day10.



Graph 2 6 Minute Walk Test showing increase in walking distance (in meters) from day 6 to day 10

Follow up and Outcome

The patient was asked to come for follow up after 7 weeks and 10 weeks and full physical examination was done. No complaints were reported. The patient returned to his normal work routine after 10 weeks. At that time, the functional recovery was complete. The outcome at the end of the rehabilitation period, i.e. 10 weeks after the surgery included a reduction in breathlessness on Borg's Scale and an increase in walking distance. Pulse rate, respiratory rate and blood pressure were used to assess the quality of recovery. There was no significant difference observed before and after the surgery. The physiotherapy outcomes variables such as 6MWT showed increased walking distance with decrease in claudication pain and Borg's scale showed decrease in dyspnea from 18 to 8 over period of time of 10 weeks (fig. 1, table 1, graph 1 & 2).

Limitations

Patient's and his family member's lack of education caused restrictions during diagnostic procedure especially during 6MWT. Patient's pain was another limitation during ambulation activities. This treatment is specific and varies according to individual's disease condition.

4. DISCUSSION

For this study we have incorporated peripheral artery rehabilitation and there was improvement in haemodynamic variables like respiratory rate and heart rate. Intermittent claudication with or without leg symptoms can cause significant functional impairment in early ambulation. It is seen that there is significant benefit in exercising in mild to moderate claudication pain as it helps in creating physiological adaptive changes necessary for creating training effect. But in our patient due to pain we had to cut activities during ambulation which resulted in worsening in cardiovascular symptoms leading to further deconditioning. Studies and few meta-analyses have shown that there was improvement in quality of life, increase in walking distance and overall functional capacity when patients with intermittent claudication were trained and given supervised exercise program. The functional benefit of exercise is great when training session lasted for 30 minutes or longer, at least three times a week and when the training session is carried out for six months or more (Hamburg & Balday, 2012). Exercise improves cardio-vascular performance thus reducing the risk of cardiovascular disease risk it also improves blood supply and gait pattern (Gielen & Hambrecht, 2001). It is necessary for the physiotherapists to do the functional evaluation including exercise treadmill before prescribing the exercises to a patient. This gives us information about claudication threshold, maximum heart rate, respiratory rate, rate of perceive exertion and blood pressure for exercise prescription.

Patient should be continuously observed for any cardiovascular symptoms during exercise, if any abnormal signs appear immediately Physician should be contacted. 6MWT can be used for functional evaluation but it is less accurate than exercise treadmill. Patient must be instructed to wear proper foot-wear and clothing. Tight belts, cloths can lead to skin irritation and skin breakdown. This may lead to ulcer formation (Hegde et al., 2013)

5. CONCLUSION

It was seen that patient cooperated and performed well when supervised regime program was held as compared to instructed or home program. There was increase in functional capacity of patient, which led to improvement in his quality of life and functional outcome. The positive outcome from this study warrants further studies including large number of patients.

List of Abbreviation

1	PVD	Peripheral Vascular Disease
2	CAD	Coronary Artery Disease
3	6MWT	6 Minute Walk Test
4	CABG	Coronary Artery Bypass Graft
5	ROM	Range of Motion
6	MMT	Manual Muscle Testing
7	NPRS	Numerical Pain Rating Scale
8	POD	Postoperative Day
9	ICU	Intensive Care Unit

Patient consent

Patients inform consent was taken before writing case report.

Author's contribution

All author made best contribution for the concept, assessment and evaluation, data acquisition and analysis and interpretation of the data.

Funding:

This research received no external funding.

Conflicts of Interest:

The authors declare no conflict of interest.

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