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"Efficacy of Interventional Physiotherapy to Improve Lung Capacity and Early Ambulation Care to Avert Post Cabg Complications": A Case Report

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ABSTRACT: Coronary artery bypass grafting[1] is the open cardiac surgery which is life saving procedure after myocardial infarction or cardiac arrest. But in many population after this surgery where the patient needs long time assistance for recovery due to post operative infections, limitation in lung function and daily.incision and leads to post pulmonary complications. In some cases the patient activities. The patient loses their normal lung capacity partially because of median sternotomy which is painful becomes very fatigue and develops muscle weakness joint stiffness and mainly oedema due to prolong bed rest In this case report a 53Y/F known DM,HTN admitted with pyrexia with increase TROP-I after treating the further diagnosis revealed as Triple Vessel Disease after stabilizing, the pt went through CABG. But remains with post operative complications. The early physiotherapy management plays major role in enhancement of regular lung functioning, early ambulation and daily activities

KEY WORDS: Coronary artery bypass grafting, Tripple Vessel Disease, Pyrexia, Cholelithiasis,Lung capacity,Atelectasis,Physiotherapy management, Chest physiotherapy, Sternal instability, Strokings, Ambulation

I INTRODUCTION:

Coronary artery disease is a narrowing or blockage of coronary arteries due to plaque formation. Cholesterol deposition and inflammation in the arteries of heart which leads to poor oxygenated blood which causes severe fatigue, angina and dyspnea. It can be life threatening when complete blockage of blood flow leads to cardiac arrest. CABG is the only traditional technique which arteries are grafted and diverts the blood around narrowed or clogged parts of the major arteries to improve blood flow and oxygen supply to the heart. Post pulmonary complications and functional inability is quite familiar after CABG. The patient needs long time support for recovery. The interference of physiotherapy makes the patient independent in physically as well as psychologically. The present case study focus on improvement on quality of life according to prevent post pulmonary complications, myalgia, weakness and joint stiffness, incision care and early mobilization.

II CASE REPORT:

A 53 years old female with known DM,HTN admitted on the complaint of pyrexia, mild dyspnea with B/L wheezing, coherent, dehydrated, general weakness. Firstly, the patient is kept on Oxygen inhalation and treated with antipyretics, IV fluids, antibiotics and other supportive treatment. The further investigations reveals Dengue IgG weak positive, raised CRP ,Trop – I, ESR. ECG shows ST changes, ECHO shows moderate Mitral Regurgitation with calcification. After stabilizing fever the patient treated with Antiplatelets, Statins, Diuretics, Blood thinners at ICU.As symptoms got better the patient advised for Coronary Angiogram which revealed with Distal LCMA 70% stenosis, Type III vessel Calcified on proximal LAD 30 – 40%, Mid 80 – 90 % , Distal LAD 60 – 70% stenosis. Non dominant, Proximal and Digital LCX 80 – 90 % stenosis OM1 mild disease and OM2 70 – 80% stenosis. Dominent, Ostial RCA 60 – 70% stenosis, Mid RCA 99% followed by distal RCA total cut off. Finally diagnosed as "TRIPPLE VESSEL DISEASE."

After complete recovery from pyrexia, wheezing and other cardinal symptoms the patient had admitted for CABG. The routine pre operative tests are conducted where Carotid Doppler shows calcific atheromatous wall on carotid arteries, clear RFT, US abdomen shows cholelithiasis. On these risk factors the CABG have undergone without any complications on the procedure of OPCAB i.e. CABG 4 grafts (after open heart the surgeon founds one more block)

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LIMA to LAD
SVG to Diagnol
SVG to OM
SVG to Distal RCA

After surgery, the patient moved to SICU on elective ventilator in unconscious. The next day patient was weaned successfully. Due to pre operative and CABG risk factors the patient developed oedema on both upper and lower limbs, mild respiratory distress, pleural effusion, post atelectasis where patient loses lung capacity partially. An emergency ICD's and BiPaP are performed to remove the fluid and inflate the lungs to prevent from lung collapse. The physiotherapy has started simultaneously after conservative management.

III PHYSIOTHERAPY MANAGEMENT:

The pre operative cardiac rehabilitation had been suggested to the patient and advised to maintain saturation by chest physiotherapy and breathing exercises in accordance to CABG for the prevention of post surgical complications. The patient's pre operative lung capacity includes 900 – 1000cc in prior to respirometer.

The post operative physiotherapy started at POD – 1 itself in the form of Chest physiotherapy and General physiotherapy.

CHEST PHYSIOTHERAPY:

CPT is a traditional technique used to mobilize or loose secretions in the lungs and respiratory tract. It is the group of treatment practice on post operative patients. The main aims of CPT includes improve respiratory efficiency, promote expansion of lungs, strengthen the respiratory muscles, remove secretions. The techniques done on patient includes as follows:

STERNAL PRECAUTIONS:

As a part of CABG, the Median Sternotomy is performed to access the heart. After the surgery the median sternotomy incision may induce to sternal instability, infection and wound dehiscence. In this case report the surgeon doesn't prescribe chest blender due to female patient. During Chest physiotherapy, the incision is protected by following measures:

1.The patient is advised to hold a pillow or at least place the hand towards surgical incision when coughing and sneezing
2. The patient is prescribed to use suitable brassiere which supports the breast and can heals faster.
3. No reaching towards the back.
4. Patient is advised in supine position at least 4 – 6 weeks.
5. No lifting, pulling or pushing through arms.
6. Consider button up clothes.

ROTAHALERS:

A rotahaler is a plastic inhalation device which is breath activated. It releases the medication from rotacap which is a capsule of powdered medication (here Duolin capscule is used). Before Chest physiotherapy the patient is advised in TID. As rotahalers aids the secreations in simplified way during treatment.

ACTIVE CYCLE OF BREATHING (ACBT):

ACBT[2,3] is the combination of different breathing techniques that helps to clear mucus from the lungs in three phases. At first the patient asked to perform the controlled breathing then three to four thoracic expansion exercises with slight percussions posteriorly if needed and then forced expiratory technique is done through huffing or coughing. These are performed initially with mid to low lung volume and once the secreations are reached to proximal airway then it is removed by high lung volume through coughing or huffing.

INSPIRATORY MUSCLE TRAINING:

Inspiratory muscle training[4,5] involves breathing exercises by using manual pressure or threshold device to strengthen the inspiratory muscles. IMT is a promising tool to improve lung capacity, functional ability, diaphragmatic thickness. The following techniques includes

1.DIAPHRAGMATIC BREATHING:

It is the manual inspiratory muscle strengthening exercise where the therapist places the hands on the rectus abdominis below the anterior costal margin. Ask the patient to inhale through the nose and exhale through the mouth so that the abdomen bulges out and contracts in inspiratory phase and falls back at expiration.

2.RESPIROMETER:

It is the threshold device called 3 ball lung exerciser which increases the lung capacity by complete expansion of lungs through long inhalation.The patient is asked to place the mouth piece in mouth and seal it with their lips and breath in slowly and deeply and hold for 2 sec until their goal is reached then exhale. This is repeated for 10 times per hourly.

GENERAL PHYSIOTHERAPY:

Due to pre operative risk factors the patient was very fatigue and developed oedema

after surgery. The following therapeutic techniques assisted the patient for early ambulation.

PASSIVE MOVEMENTS:

The patient is immobilized at early POD'S passive movements are performed to lower limb to prevent adhesion formation and promote joint mobility. Due to median sternotomy incision assisted movements are performed at in range.

STROKINGS:

Strokings plays major role on blood circulation and lymphatic drainage.In this case the patient develops edema on both limbs. The stroking techniques mainly effluraege aids the patient in improving the lymphatic drainage from edema. The therapist uses his palmar surface of hand a sustained pressure is applied throughout the stroke in smooth and rhythmical manner towards the heart to encourage the venous return and lymphatics.

SLR & ANKLE TOE MOVEMENTS:

Straight leg raising at 30 - 40 degrees, strong ankle toe movements are advised to prevent from DVT and oedema management. Additionally the crepe bandage is also indicated which compresses the swelling and prevents fluid accumulation.

AMBULATION:

After the surgery it is extremely important in order to reach the patient's goal of ambulation which require assistance of therapist. Ambulating improves blood flow which inturn speed up the process of wound healing and prevents from bed sores.It starts from bed mobility activities like supine to sitting by following instructions of therapist. After sitting the normal exercise regime is done for strengthening of limbs. Gradually the patient undergo in standing posture and ready to ambulate. Early mobilization is done by walking aids by walkers. Later, the patient is able to walk on their own around the room. At last stair climbing is taught with precautions

*Above the treatment plan runs up to 2 – 3 weeks.

*The complete recovery had seen around POD – 30.

IV DISCUSSION:

CABG is a life saving & standard procedure for Coronary artery disease patients which can prevent from further attacks. But after the surgery there are many complexities like stroke, wound infection, prolong ventilator support, atelectasis, pneumonia, respiratory distress, sternal instability, oedema hence these patients require prolong recovery period. The interference of physiotherapy aids the patient to avert these post operative complications and makes independent with quality of life. In this case study, ACBT shows drastic results to remove mucus and allows airway clearance. Simultaneously, the lung capacity is improved by implementing therapeutic breathing exercises like relaxed breathing, diaphragmatic breathing and respirometer. Oedema is managed by stroking manipulations, crepe bandages, SLR and strong ankle toe movements. Passive movements for lower limbs and strengthening exercises was taught to prepare early ambulation. The mobilization is started on early POD's bed mobility - chair sitting - standing – walking.

V CONCLUSION:

The effectiveness of physiotherapy on post CABG patient shows vigorous changes with short recovery period. It also prevented from prolong post operative complications and hospital stay. It also aids to regain the lung functional capacity, early mobilization to make the patient independent and improved the quality of life.

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