

Rehabilitation Perioperative Cardiac Surgery

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Abstract: Cardiac rehabilitation is a multidisciplinary program of exercise program, education, risk factor modification, and psychosocial counseling resulted in reduces mortality and hospital stay, improves quality of life in patients with heart disease. In Indonesia, 1.5% Indonesian suffer from coronary heart disease and approximately one million of patients worldwide underwent revascularization program every year. Perioperative cardiac rehabilitation helps patients to overcome the stress of surgery, prevention of complication caused by prolonged bed rest. It also promotes physical and psychological readiness for surgery, reduces length of stay, and improves the transition from the hospital to the community. In most current guidelines of cardiovascular societies, cardiac rehabilitation is a class I recommendation.

1 INTRODUCTION

National Heart Lung and Blood Institute (NHBI) defined coronary heart disease as a condition caused by the buildup of plaque in the arteries that supply oxygen-rich blood to the heart (National Heart Lung dan Blood Institute, 2012). In Indonesia, 1.5% Indonesian suffer from coronary heart disease. According to Survey Sample Registration System in 2014, deaths due to coronary heart disease were accounted for 12.9%. The highest prevalence of heart disease in Indonesia is at the age of 75 years old (Kementrian Kesehatan RI, 2018).

Approximately one million of patient worldwide underwent revascularization program every year, with the distribution between operation and catheterization almost equal. Recent reports suggest that more than half of cardiac surgeries are being performed on older adults who are more likely to be frail and have multiple comorbidities. Cardiac surgery has been shown to improve the outcomes of these patients (Kehler DS et al, 2017).

The recovery period for each individual was affected by age, gender, premorbidity status and operation technique. The recovery period varied from a few days to weeks caused by clinical and nonclinical effect from cardiac surgery. At the beginning of postoperative period, depression is more likely to develop, but as time goes, depression rate will be lower due to the recovery process and

social support that was given. Initiation of cardiac rehabilitation program for patients underwent cardiac surgery should start as soon as possible after patient condition was stabilized (Tedjasukmana and Putra, 2016).

2 DISCUSSION

Cardiac rehabilitation is a multidisciplinary program of exercise program, education, risk factor modification, and psychosocial counseling that reduces mortality and hospital stay, improves quality of life in patients with heart disease (Beatty et al, 2017). The first objective of cardiac rehabilitation is to improve regular physical activities and control the modifiable risk factors (smoking cessation, blood pressure, diabetes, cholesterol). Another objective is therapeutic education that emphasizes the importance of the healthy lifestyle. Lastly, helping manage psychosocial and professional problems of the cardiac patients because depression is quite frequent following after coronary events. Thus, depression was associated with lower exercise capacity, fatigue, reduced quality of life and sense of wellbeing (Mampuya, 2012). Cardiac rehabilitation are consist of breathing exercises, early mobilization, and strength exercises. Research conducted by Maines et al, showed that exercise therapy improves exercise capacity by around 16%.

The improved exercise capacity will lower the mortality by 12% for every one metabolic equivalent improvement. In addition, regular exercise decreases mortality by 28% which is associated with improvements in quality of life (QoL) (Seo et al, 2017).

2.1 Cardiac Rehabilitation Perioperative

Cardiac rehabilitation perioperative consist of preoperative, intraoperative and postoperative. Prehabilitation helps patients to overcome the stress of surgery by improving functional capacity. Preoperative exercise decreases sympathetic overreactivity, improves insulin sensitivity, and increases the ratio of lean body mass to body fat. It also promotes physical and psychological readiness for surgery, reduces postoperative complications and length of stay, and improves the transition from the hospital to the community. Patient who were given education regarding postoperative mobilization before surgery will respond more positively and enthusiastically to the program (Kementrian Kesehatan RI, 2018).

2.2 Cardiac Rehabilitation After Surgery

After the surgery was perform, there is no place for "bedrest" in the management of patient with cardiovascular disease. Early mobilization of patient after cardiac surgery shown to be beneficial for patient's recovery. Initiating physical activity in the early period after cardiac surgery, especially walking exercise is recommended since it can prevent complications. Phase 1 begins after the patient has been considered clinically compensated due to the optimization of the clinical treatment and/or the use of an interventional procedure. In this phase, a combination of low-intensity physical exercise is indicated as well as stress management techniques, and education in relation to risk factors. The duration of this phase has decreased in recent years, due to shorter hospitalizations (Alexiey et al, 2017; Priscila et al, 2017).

Cardiac rehabilitation contributes to the prevention of lung complication and decondition caused by prolonged bedrest after cardiac surgery. Exercise-based cardiac rehabilitation decreases hospital stay, speeds returns to work and reduces costs in public health. Exercise training can partially reverse activation of the neurohormonal system and reduce levels of pro-inflammatory cytokines,

reduces skeletal muscle fatigability, improve skeletal muscle metabolism, increase blood flow within the active muscles, and reduce dependence on anaerobic metabolism. Exercise also has some other benefits such as lessen the intensity of breathing and muscle discomfort, improve quality of life, attenuate or reverse skeletal muscle atrophy and increase endothelium activation. Therefore, it believes that exercise training prolongs exercise duration, lowers cardiovascular demand, lowers ventilator requirement, allows higher exercise intensity, and reduces symptoms of dyspnoea and leg discomfort. This is in turns lead to increase independence and improvement in general sense of wellbeing (Mampuya, 2012; Priscila et al, 2017; Price et al, 2016; Seo et al, 2017).

2.3 The Role Of Cardiac Rehabilitation

In most current guidelines of cardiovascular societies worldwide, cardiac rehabilitation is a class I recommendation. (Tedjasukmana and Putra, 2016). Coronary artery bypass grafting (CABG) is a procedure which artery or vein are use as graft to revive the coronary artery (bypass) which is occluded partially or totally caused by atherosclerotic process. The procedure explain as making a new route around the occluded coronary arteries with the aim of expediting blood flow so the intake of oxygen and nutrients to the myocardium is maintained. CABG usually uses saphena veins or internal mammary veins, in addition to the radial arteries and gastroiliac arteries although its rarely use (Tedjasukmana and Putra, 2016).

CABG usually needs an in-hospital stay for a week and, after discharge, patients usually need a 2- to 6-week recovery period, necessary to recover and adapt to daily activities, including return to work. A significant proportion of patients need to overcome some problems, like heart failure, anemia, atrial fibrillation, pulmonary abnormalities, and thoracotomy- and saphenectomy-related pain. Cardiac rehabilitation is important considering the facts that patient's need to achieve a full and prompt physical recovery to allow a fast adaptation of daily life activities (including return to work), the need of healthy lifestyle and specific pharmacological regime for a lifetime (Mendes, 2016; Tedjasukmana and Putra, 2016; Priscila et al, 2017).

2.4 Cardiac Rehabilitation Program

There is no differences perioperative cardiac rehabilitation program between patients underwent coronary artery bypass graft and valve cardiac surgery. Exercise training before preoperative are (Tedjasukmana and Putra, 2016) :

- Breathing exercise, consist of deep breathing and diaphragm breathing 10 times each
- Incentive spirometry exercise and effective cough
- Mobilization of neck and shoulder along with chest extension
- Stretching exercise of extremity
- Shoulder muscle exercise for flexion and extension

Postoperative patient can begin cardiac rehabilitation sooner which resulted in faster recovery. The exercise focus on flexibility prioritizing the upper limb. During exercise, symptom of stenosis or occlusion need to be evaluated. The limitations during exercise are borg scale and resting heart rate which increases more

than 30 times/minutes. Walking is the most recommended exercise for postoperative program, where the post CABG as well as post valve surgery have several characteristic which need special attentions to the range of motion (Tedjasukmana and Putra, 2016).

After the operation, exercise recommendations for patient are (Tedjasukmana and Putra, 2016):

- Breathing exercise and pulmonary expansion
- Cough exercises
- Range of motion exercise for upper and lower extremity
- Spirometry
- Mobilization exercises as recommendation shown in table 2.

According to Krusen's Handbook of Physical Medicine and Rehabilitation (1990), rehabilitation for postoperative cardiac surgery shown in table 2. Patients who have undergone cardiac surgery are recommended to avoid strenuous upper extremity exercise until the wound is stable (Seo et al, 2017).

Figure 1: Rehabilitation Postoperative Cardiac Surgery

STEP	POD	NURSING ACTIVITY	OCCUPATIONAL THERAPY ACTIVITIES	PHYSICAL THERAPY ACTIVITIES	EDUCATION
I	1	Up in chair	Introduce self and program	Introduce self and program	Cardiac Rehabilitation
II	2	Self-feeding Bedside commode Walking short distances	Lifestyle assessment Work simplification Energy conservation	Walking short distances, active assisted range of motion, or 1-3 MET calisthenics	Risk factor
III	3	Walk in hall 3x Bathroom privileges Partial self-bath in bed	Activity precautions Pulse monitoring Smoking cessation	Walk in hall x3 1-4 MET lv calisthenics	METs level
IV	4	Walk ad lib Partial self-bath Out of bed 3-4 hours	ADLs and METS Smoking cessation	Walking ad lib 2-4 MET lv calisthenics	Phase II
V	5	Walk ad lib Increasing distances	Relaxation training Smoking cessation Work equivalents as appropriate	Walk ad lib 3-5 MET lv calisthenics Stair climbing	Discharge planning

3 CONCLUSIONS

modification, and psychosocial counselling that reduces mortality and hospital stay, improves quality of life in patients with heart disease. Cardiac rehabilitation perioperative consist of preoperative, intraoperative and postoperative phase. The programs of cardiac rehabilitation are breathing exercises, early mobilization, and strength exercises. Prehabilitation helps patients to overcome the stress of surgery and reduces postoperative complications. Initiating physical activity in the early period after cardiac surgery shown to be beneficial for patient's recovery. Phase 1 begins after the patient has been considered clinically compensated due to the optimization of the clinical treatment and/or the use of an interventional procedure. Patients who have undergone cardiac surgery are recommended to avoid strenuous upper extremity exercise until the wound is stable. In most current guidelines of cardiovascular societies, cardiac rehabilitation is a class I recommendation.

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