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The Influence of Early Mobilization Protocol on Post Open Heart Surgery Patients Length of Stay in Surgical ICU

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Introduction

The early mobilization (EM) of patients in the intensive care unit (ICU) has received considerable attention in clinical and scientific literature over the past several years[1]. The term "early mobilization" refers to the application of physical therapy (for example, passive mobilization, active mobilization, and respiratory muscle training) [2]. It has been recognized as a key component in accelerating recovery post major surgeries. In addition, the EM plays a great role in enhancing muscle strength, physical function, and quality of life in patients admitted to ICU or Surgical Intensive Care Unit (SICU) [3]. It is well-known that ICU is a complicated and difficult environment in which mobilizing post-surgical or the critically sick patients are a challeng[4]. Because post open heart surgery patients are usually having multiple attachments such as life-sustaining catheters and monitors, sedative medication used to calm agitation or reduce energy expenditure, impaired levels of alertness from medications, sleep disturbances, electrolyte imbalances, and tenuous hemodynamic, status all are contributing factors that limit mobilization. Although, mobilizing patients in the intensive care environment is not without risk, evidence verified the important and benefits of early physical therapy and mobilization of post-surgical and non-surgical patients in ICU[5, 6]. Numerous studies reported that early mobilization for ICU patient is feasible and safe, despite that clinicians are often reluctant to mobilize patients arguing that circulatory homeostasis would be impaired as a result of myocardial stunning, fluid shift, and autonomic dysfunction[7, 8]. Several protocols and guidelines are available through the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), British Association for Cardiovascular Prevention and Rehabilitation (BACPR) and others that help to facilitate the early mobilization process in ICU. Usually, the protocol consisted of several levels of activities that go forward one by one, and it also stipulates the time, frequency, duration, and suspended condition of intervention[8] King Faisal Specialist Hospital and Research Center (KFSHRC), is s an internationally recognized tertiary health care organization, with a long tradition of quality patient care. KFSH is a 1500-bed, located in Riyadh, Saudi Arabia. The organization has reached an international standard of excellence equivalent to that of leading global academic medical centers. It includes one of the leading heart center; King Faisal Heart Institute (KFHI), which has been established in 2004, however cardiac surgery has been started as part of the Department of Surgery in 1978. The KFHI preformed more than 500 open heart surgery in addition to ≥ 25 heart transplantation surgery per year. The entire patients have been referred for a post-surgical Cardiac Rehabilitation (CR) Program which started in the CSICU. The Cardiac rehabilitation Section of the Physical Therapy department at KFSHRC is one of the pioneer sections in the field of Cardiopulmonary Rehabilitation in the Kingdome of Saudi Arabia. The CR program is a modified program adopted from the AACVPR Cardiac Rehabilitation Protocols to be appropriate for ICU patients of KFSHRC. It is applied by Cardiopulmonary Rehabilitation Specialists in collaboration with the high qualified Medical and Nursing in ICU team as a multidisciplinary approach. The CR protocol at KFHI is applicable for all ICU patients especially those post open heart surgery patient (Coronary Artery bypass Graft and valves replacement or repair). **The Content of the protocol**: this protocol is a five days program usually started first post-operative day, four to five hours post extubation

(removal of the endotracheal tube) and patient's condition must be hemodynamically stable, alert, and oriented in order to inter act with the clinician during the CR session. The protocol generally consists of assailment of the current situation, pre-operative function level, subjective and objective measures in addition to the goals, exercise program of the five days and criteria for discharge from the hospital after completing phase CR (see appendix 1).

Although, each case is a unique case and each patient might have a different post-operative status, the program is tailored to fit each patient individually through achieving the allocated goals for each patient single day. **Goals of the EM protocol:** the early intervention of this protocol which support early mobilization (early breathing and AROM exercise, out of bed mobility and gait training) for post cardiovascular surgery patients, displayed its important by reporting a rapid recovery, short ICU length of stay, and subsequently early hospital discharge. Consequently, this protocol was able to prove to the multidisciplinary team at KFHI the important of the early mobilization intervention and become one of the crucial goals alongside with other medical and clinical services approach. **The take home message** her is that; the earlier the intervention of EM protocol, the faster the recovery and shorter ICU length of stay.

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APPENDIX I

CARDIAC REHABILITATION PROTOCOL POST POST OPEN HEART SURGERY, PAGE 1

Diagnosis: _____

History:_____

_____

_____

_____

Pre-operative.status_____

Surgery: _____**Date:**_____

Subjective: (Patient's complaints) _____

Pain: Yes ( ) No: ( ) Location: _____ **Pain Level: 0 1 2 3 4 5 6 7 8 9 10**

Objectives: (Skilled techniques and services, patients' progress):

Consciousness _____ **Orientation** _____ **Communication/ Speech** _____

Vision: _____ **Hearing:** _____ **Ability to follow commands:** _____

Wounds: Sternal: _____ _____ leg (R / L) _____ _____

Edema :(UL) _____ (LL) _____

Chest: Breathing _____Cough: Strong ( ) Weak ( ) Productive ( ) Non productive ( )

Chest Tube_____ Telemetry _____ Pacemaker _____ IV's _____

Vital Sign: HR: _____ BP: _____ O2 _____ L Spo2 _____%

Strength :(R) UE _____ (R) LE _____ (L) UE _____ (L) LE _____

ROM :(R) UE _____ (R) LE _____ (L) UE _____(L)LE _____

Mobility: Bed Mobility: Ind. _____ Min Ass_____ Mod Ass _____ Max Ass _____

Transfer: Independent _____ Min Ass _____ Mod Ass _____ Max Ass _____

Balance: (Static): Sitting: _____ Standing: _____ (Dynamic): Sitting: _____ Standing: _____

CARDIAC REHABILITATION PROTOCOL POST POST OPEN HEART SURGERY, PAGE 2

First Day Post-OP Goals:

Patient should be extubated and stable (Endotracheal tube has been removed)

- **To maintain good breathing pattern (Diaphragmatic, and localized basal expansion breathing)**
- **To maintain good inspiratory volume and respiratory fitness.**
- **To maintain good rang of motion (ROM) for both upper and lower extremities.**
- **To prevent the circulatory complications.**
- **To encourage bed and out of bed mobility.**

First Post – OP Exercises Program:

- ☐ **Breathing exercises diaphragmatic, localized and basal breathing (X 10).**
- ☐ **Intensive Spirometry Exercises (Instruction on the proper Use).**
- ☐ **Cough: by holding a pillow to support the incision and then cough strongly (X 10).**
- ☐ **ROM Exercises: lower limbs: Ankle pump, hip, knee flexion and extension (X10).**
- ☐ **Upper limbs: shoulder flexion, abduction and adduction exercises (X 10).**
- ☐ **Sitting at the edge of the bed and dangling both legs down for few minutes (5 -10) mints.**

Up On Chair: Able ( ) Not able ( ) Assistance: ___ _____ Assisted device: _____

ASSESSMENT: (Patient's overall performance & Problems):

_____

_____

_____

PLAN: _____

_____

EDUCATION: _____

_____

Therapist signature/date: _____

CARDIAC REHABILITATION PROTOCOL POST POST OPEN HEART SURGERY, PAGE 3

Second Post Operative Day Goals:

- **To increase exercise tolerance.**
- **To increase endurance level.**
- **To achieve early independency & activity of daily living (ADL).**

Subjective: (Patient's complaints) _____

Pain: Yes ( ) No: ( ) Location: _____ Pain Level: 0 1 2 3 4 5 6 7 8 9 10

Objectives: Second Post Operative Exercise Program:

- ☐ **Breathing exercises and using Intensive Spirometry ( ) ml.**
- ☐ **Active range of motion exercises for all 4 limbs X 10.**
- ☐ **Bridging Exercise (with both knee flexed pelvic raising) X 5**
- ☐ **Up on Chair for one hour or more if possible.**
- ☐ **Monitored Ambulation (If no wires attached, check for O_2 saturation):**

Distance: _____ Walking aids: _____ Assistance: _____ Deviations: _____

ASSESSMENT:

_____

_____

_____

PLAN:

_____

_____

EDUCATION:

_____

_____

THERAPIST/ DATE: _____

CARDIAC REHABILITATION PROTOCOL POST POST OPEN HEART SURGERY, PAGE 4

Third post Operative Day Goals:

- **Maintain good endurance and exercise tolerance.**
- **To strengthen the patient's heart function and improve fitness.**
- **To encourage more independency in bed and out of bed mobilities.**
- **To increase the waking distance: (increased distance 100 - 200 feet):**

Subjective: (Patient's complaints) _____

Pain: Yes ( ) No: ( ) Location: _____ Pain Level: 0 1 2 3 4 5 6 7 8 9 10

Objective: Third post Operative Day(Exercise):

- ☐ **Active range of motion exercises for all 4 limbs X 10.**
- ☐ **Set to stand exercises independent or with support (5 -10 Times).**
- ☐ **Gait training:**

Distance: _____Walking aids: _____Assistance:_____ Deviations: _____

ASSESSMENT:

_____

_____

_____

PLAN:

_____

_____

EDUCATION:

_____

_____

THERAPIST/ DATE: _____

CARDIAC REHABILITATION PROTOCOL

POST OPEN HEART SURGERY, PAGE 5

Fourth post Operative Day Goals:

- **To continue strengthen the patient's heart function and improve fitness.**
- **To increase waking distance (increased distance 200 – 300 feet)**
- **To be completely dependant in activity of daily living.**

Subjective: (Patient's complaints) _____

Pain: Yes ( ) No: ( ) Location: _____ Pain Level: 0 1 2 3 4 5 6 7 8 9 10

Objectives: Fourth post Operative Day(Exercise:

- ☐ **Biking (Seat height to be adjusted)**
- ☐ **Up and down stairs 10 steps with ease.**
- ☐ **Gait training:**

Distance:_____ Walking aids:_____ Assistance: _____ Deviations: _____

ASSESSMENT:

_____

_____

PLAN:

_____

_____

EDUCATION:

_____

_____

THERAPIST/ DATE: _____

CARDIAC REHABILITATION PROTOCOL POST POST OPEN HEART SURGERY, PAGE 6

Discharge Summary:

1) **Patient seen for _____visits for post cardiac surgery rehabilitation protocol.**
2) **Patient status/compliance:**

_____

_____

_____

Achieved discharge criteria: Yes____ No____

Regain normal muscle strength and full range of motion: Yes_____ No_____

Independent in functional activities ____ , including ambulation for 300 feet ____ , and ability to climb up and down

10 steps with ease: ____.

If not specify:_____

Discharge Criteria:

Patient achieved goals	**( )**
Patient non-compliant with treatment	**( )**
Patient reached a plateau in treatment	**( )**
Patient transferred to another facility	**( )**
Patient did not attend / referred treatment	**( )**
Patient discharged from the hospital	**( )**
Patient deceased	**( )**

Education:

1) **Physical Therapy handout of home exercise program is given**
2) **Home exercise program reviewed with and understood by patient/ family.**
3) **Special education, or precautions: NO ( ) Yes ( ):**

_____

This patient has met the above-mentioned criteria and was discharged on

( ) OP follow up **( ) No OP follow up**

Signature / Date: _____.

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