UNIT 19

CARDIAC REHABILITATION

Cardiac rehabilitation is the process of restoring psychological, physical and social functions in people with manifestations of coronary artery disease (CAD)

Cardiac rehabilitation is a progressive program with a goal of helping patients restore and maintain optimal health while helping to reduce the risk of future heart problems.

Cardiac rehabilitation is defined as sum of activity and interventions required to ensure the best possible physical, mental and social conditions so that patients with Chronic or post acute CVD may regain their proper place in society and lead an active life.

Recent major evidence-based guideline from the American Heart Association (AHA) and the American College of Cardiology Foundation regarding the management and prevention of coronary heart disease provides a class 1 level recommendation (ie, procedure/treatment should be performed/administered) for referral to a CR programfor those patients with recent myocardial infarction (MI) or acute coronary syndrome, chronic stable angina, or heart failure, or for those patients following coronary artery bypass surgery or percutaneous coronary intervention. CR/SP programs are also indicated for those patients following valve surgery or cardiac transplantation

Contraindications to beginning of Cardiac rehabilitation

- Unstable angina
- Recent embolism
- Active pericarditis or myocarditis
- Uncontrolled diabetes
- Uncontrolled atrial or ventricular arrhythmias
- Acute systemic illness or fever
- Resting systolic BP > 200mmHg or diastolic BP > 100 mmHg
- Orthostatic BP drop 20mm Hg or more

Guidelines for exercise prescription

Prescription	Phase 1 (inpatient phase)	Phase II (discharge to 3months)	Phase III (after 3months)	Phase IV
Frequency	2-3times/day	1-2times/day	3-5times/per week	3-5times/per week
Intensity	MI: Resting heart rate + 20bpm CABG: Resting heart rate + 20bpm	MI: Resting heart rate + 20bpm, RPE 13 CABG: Resting heart rate + 20bpm, RPE 13	60-85% OF HRmax Or 55-70% of Heart rate reserve	60-85% OF HRmax Or 60-70% of Heart rate reserve
Duration	MI: 5-20min CABG: 10-20min	MI: 20-60min CABG: 20-60min	30-60min	30-60min
Activity(mode)	ROM, stair climbing (one flight), treadmill	ROM, TREADMILL WLKING, ARM ERGOMETER, WEIGHT TRAINING (IRM)	Walking, ergometry, jogging, swimming, weight training (IRM), endurance sports	Walking, running, ergometry, jogging, swimming, weight training, (IRM) endurance sports

Phases of cardiac rehabilitation

Phase 1 (Inpatient Phase) (5-7days (upto discharge))

- ☐ This phase involves immediate inpatient exercise rehabilitation that emphasizes patient education and counseling and exercises to prepare patient to counter the effects of deconditioning.
- ☐ Thorough assessment including review of medical records (admission, conservative/operative and progress notes and reports of investigations).
- ☐ For surgical patients (CABG or other surgey), an important aspect of physical therapy assessment is the condition of the sternum and the incisions. When there is evidence of sternal instability (clicking or grating movement on palpation) or infection, exercises should be avoided.

Step 1(1.5 METS) Twice daily

Passive ROM to major joints, active ankle exercises, 5repitions

Deep breathing (Supine)

Step 2(1.5 METS) Twice daily

Active assistive ROM to major muscle groups, active ankle exercises, 5repitions

Deep breathing (Supine/ sitting)

Now patient can self feed, partial morning care(washing hands and face, brushing in bed), Bedside commode.

Patient at this stage can answer TO RPE scale

Step 3 (1.5 METS) Twice daily

Active ROM to major muscle groups, active ankle exercises, 5repetitions

Deep breathing (sitting)

Now patient can be made to sit in chair for short periods as tolerated 2 times daily, bedside commode

Step 4(1.5 METS) Twice daily

Active ROM to major muscle groups, active ankle exercises, 5repitions

Deep breathing (standing)

Now patient can be made to sit in chair for short periods as tolerated 3 times daily, Sit up in chair for meals, and can also dress, comb in sitting

Step 5 (1.5-2 METS) Twice Daily

Active ROM, active ankle exercises; 5 repetitions.

Monitored ambulation of 100-200ft with physician approval.

Now patient can sit up in chair as tolerated, bathroom privileges, stand at sink to shave and comb hair, bathe self and dress

(IMPORTANT: Ambulation may start as early as first day in CABG and after 2-4 days after uncomplicated MI(myocardial infarction treated conservatively)

Step 6 (1.5- 2 METS) once daily

Standing, active exercises 5-10 repetitions

Monitored ambulation for 5 minutes (440ft)

Stair climbing (2-4 stairs) with physician approval

Further progression can be ambulation upto 20 minutes as tolerated, stair climbing,

Stationary cycling or treadmill walking)

In phase 1 exercise intensity is maximum upto 2-3 METS

Monitor BP, heart rate, ECG, Respiratory rate and SPO_2 regularly at each level

(Generally patient advances by one step each day)

(For Conservative MI patients exercises in phase one include shoulder flexion, abduction and rotations , elbow flexion , hip flexion, abduction and rotations, knee extension, ankle dorsi/ plantar flexion, inversion , eversion)

(When ambulating the patient check the vitals, orthostatic hypotension)

<u>Phase II (outpatient cardiac rehabilitation) (from day of discharge to 12 weeks ieupto 3 months</u>)

The main purpose of this phase is to progressively improve patients functional capacity and prepare the patient to return to work

Exercise training include light to moderate aerobic and strength training activities

Calculation of exercise intensity (refer to exercise intensity from table above)

1. Heart Rate
   (A) Exercise heart rate= (HRmax) X % Of exercise intensity
   (B) HEART RATE RESERVE METHOD (by Karvonen formula)
   Heart rate reserve= HRmax -Resting Heart Rate

(HRR)

Exercise heart rate (Target heart rate) = {(HRmax -Resting Heart Rate) X exercise intensity} + Resting heart rate

Example

Maximum Heart Rate (HRmax)= 220- Age (eg 220-50 years)=170bpm

Resting Heart Rate (eg 70bpm)

Exercise Intensity (eg 50%)

Exercise heart rate= {(170-70)X50%} + 70= {(100)x 50/100} + 70= {(100)X 0.5} + 70= 50 +70 = 120bpm

2. RPE
3. VO_2 Max
   - Warm up period of 10-15 before proper exercise protocol
   - Cool down period of 10-15min at the end of exercise protocol

Phase III and IV (community based or home based rehabilitation) (3months onwards) (refer to exercise intensity from table above)

- The main purpose of phase III is to allow the patient to continue to improve his or her physical status. There should be emphasis on patient education and risk factor modification
- The main purpose of phase IV is to provide patients with a means to monitor and maintain the results achieved during earlier phases of rehabilitation.
- Warm up period of 10-15 before proper exercise protocol
- Cool down period of 10-15min at the end of exercise protocol
- Exercise intensity can be calculated by any of the following methods

(Calculation of exercise intensity (refer to exercise intensity from table above)

Heart Rate

✓ Exercise heart rate= (HRmax) X % Of exercise intensity

- ✓ HEART RATE RESERVE METHOD (by Karvonen formula)

Heart rate reserve= HRmax -Resting Heart Rate

Exercise heart rate (Target heart rate) = {(HRmax -Resting Heart Rate) X exercise intensity} + Resting heart rate

RPE

VO_2 Max