Cardiac Rehabilitation

Diagnostic Tests for Cardiac Dysfunction

- **Cardiac Catheterization**
  - Measures pressures and blood gases to determine cardiac output

- **Electrocardiogram (ECG)**
  - Surface electrodes record the electrical activity of the heart, assesses cardiac rhythm

- **Exercise Stress Test**
  - Used with ECG & BP readings, to assess exercise capacity

- **Pharmacologic Stress Test**
  - Non-invasive assessment for those unable to achieve adequate cardiac stress with exercise

Additional Vital Sign

- **Ankle–Brachial Index (ABI)**
  - A test using a Doppler unit
  - Blood pressures measured in UE (brachial artery) and LE (dorsalis pedis or tibialis posterior artery) while in supine
  - The LE systolic pressure is divided by the brachial systolic pressure
  - The ratio of normal blood flow is 1.0
  - ABI of 0.9 at rest or 0.85 after exercise indicates PAD
  - 0.5–0.9 = arterial occlusion, impairment with wound healing, therefore is beneficial
  - <0.5 = severe arterial occlusion, exercise is unrealistic, poor to no wound healing
Research

- Two research groups performed meta-analysis of randomized, controlled studies to determine if cardiac rehab had a beneficial effect on patients...
- Results??

- Patients who participate in cardiac rehab die at a lower rate.
- Both groups experience re-infarction at the same rate, but non-participants are more likely to die from the event.
- Exercised patients have fewer cardiac events and hospital readmissions.

Think-Pair-Share

- Are the results surprising to you?
- Did the researchers find “the obvious”?
- Why do you think the researchers tested this hypothesis?
**Definition of Cardiac Rehab**

“Coordinated, multifaceted interventions designed to optimize a cardiac patient’s physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality.”

Bandy, p323

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**Cardiac Rehab Includes…**

- Baseline patient assessments
- Nutritional counseling
- Aggressive risk factor management (lipids, hypertension, weight, diabetes, smoking, etc)
- Psychosocial and vocational counseling
- Physical activity counseling and exercise training

Bandy, p323

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**Indications for Cardiac Rehab**

- Myocardial infarction
- Stable angina
- Coronary artery bypass surgery
- Compensated heart failure
- Cardiac surgery
- High risk of coronary artery disease
- High risk for high blood pressure
- End-stage renal disease
- Status post pacemaker insertion
- Cardiomyopathy
- Peripheral vascular disease
- Heart transplant
- High risk for diabetes
Contraindications for Cardiac Rehab

- Uncontrolled atrial/ventricular arrhythmias
- Recent diagnosis of embolism
- Resting diastolic pressure > 110 mmHg
- Thrombophlebitis
- Orthostatic blood pressure (>20 mmHg drop) with symptoms
- Acute infection, systemic illness or fever
- Unstable angina
- Resting systolic pressure > 200 mmHg
- Uncompensated congestive heart failure
- Uncontrolled tachycardia (>120 bpm)
- Uncontrolled diabetes (elevated resting glucose > 200 mg/dL)
- Active pericarditis or myocarditis

Stop Exercise during Cardiac Rehab

- Abnormal heart rate that increases > 50 bpm with low-level activity
- BP that increases > 210 mmHg systolic during exercise
- BP pressure that increases > 110 mmHg diastolic during exercise
- Decrease in systolic pressure > 10 mmHg during low-level exercise
- Severe lower extremity claudication
- Angina: chest, left arm, jaw, back or lower neck pain or pressure
- CNS symptoms: vertigo, ataxia, gait problems, confusion
- Extreme fatigue or SOB
- Pallor, cyanosis, cold and clammy skin
- Abnormal diaphoresis

Cardiac Rehab

- "Medicare guidelines state that a physician must be in the exercise program area and immediately available and accessible for an emergency at all times during which the exercise program is conducted."
- Life support equipment must also be available:
  - Oxygen
  - CPR equipment
  - Defibrillator

Bandy, p304
Bandy, 2013, p323
Inpatient Cardiac Rehab Exercise

- **Intensity**
  - RPE < 13
  - Post myocardial infarction HR < 120 bpm or resting HR + 20 bpm
  - Postsurgery HR: resting HR + 30 bpm

- **Duration**
  - Start with intermittent bouts 3–5 minutes in length
  - 2:1 exercise:rest ratio

- **Frequency**
  - Start with 3–4 X/day for days 1–3
  - Beginning on day 4, 2X/day with increased duration

- **Progression**
  - When continuous exercise 12–15 minutes, increase intensity as tol

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Rating of Perceived Exertion

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Cardiac Rehab Program

- **Phase I**
  - Pts must be medically stable
  - Goals: patient & family education, self-care evaluation, monitoring of vitals, group discussion, low–level exercise

- **Phase II**
  - Goals: increasing functional capacity through exercise, education on risk factor modification, & developing independence in self monitoring
Cardiac Rehab Program Cont.

- **Phase III**
  - Goals: exercise training, physical fitness, increasing endurance, risk factor modification

- **Phase IV**
  - Lasts throughout the patient’s lifetime
  - Designed to promote optimal health

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Cardiac Rehab Phases

- Early cardiac rehab programs utilized all 4 phases
- The current model involves only phases I & II because phases III & IV have joined together and become a maintenance program, in which patients are encouraged to participate on a regular basis.

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Sternal Precautions

- No lifting > 10 lb
- No lifting of both hands above the head at the same time
- No placing of both hands behind the back at the same time
- No driving for 6–8 weeks or until surgeon provides clearance
- No pushing or pulling anything > 5–10 lb
- Encourage splinted coughing techniques

Cameron, 2011, p394
Questions??