Cardiac Rehab and the Effects of Exercise Post STEMI

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No relevant financial relationship exists

Overview

- Significant Statistics
- Risk Factors for Cardiovascular Disease
- Reduction in Risk Factors Through Exercise
- Cardiac Rehab
- Cardiac Rehab and the Effects of Exercise Post STEMI
- Questions?

Significant Statistics

Significant Statistics

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2008

- Cardiovascular Disease (CVD) accounts for almost 50% of all deaths in the U.S.
- CVD affects 13 million Americans each year
  - 7.1 million men
  - 5.9 million women

Significant Statistics

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2008

- 1.5 million Americans sustain a myocardial infarctions (MI) each year
  - 500,000 are fatal
  - 5% of MIs occur before age 40
  - 45% of MI occur before age 65
- MI is the single leading cause of death in America
  - 41% of MIs will result in death

Risk Factors for Cardiovascular Disease

Risk Factors for Cardiovascular Disease

American College of Sports Medicine Tenth Edition 2016

- Non-Modifiable Risk Factors
  - Family History
    - Myocardial Infarction, coronary revascularization, or sudden death before:
      - 55 yrs in father or other male first-degree relative
      - 65 yrs in mother or other female first-degree relative
  - Age
    - Men ≥ 45 yrs
    - Women ≥ 55 yrs

Risk Factors for Cardiovascular Disease

American College of Sports Medicine Tenth Edition 2016

- Modifiable Risk Factors
  - Cigarette Smoking
    - Current cigarette smoker or those who quit within the previous 6 months or exposure to environmental tobacco smoke
  - Physical Inactivity
    - Not participating in at least 30 minutes of moderate intensity physical activity (40%-59% VO2R) on at least 3 days of the week for at least 3 months
  - Obesity
    - Body Mass Index (BMI) ≥ 30 kg*m
      - Or waist girth >102 cm (40 in) for men
      - Or waist girth > 88 cm (35 in) for women

Risk Factors for Cardiovascular Disease

American College of Sports Medicine Tenth Edition 2016

- Modifiable Risk Factors Cont.
  - Hypertension confirmed by measurements on at least two separate occasions
    - Systolic BP ≥ 140 mm Hg
    - Diastolic ≥ 90 mm Hg
  - Dyslipidemia
    - LDL ≥ 130
    - HDL < 40
    - Total Cholesterol ≥ 200
  - Diabetes
    - Fasting plasma glucose ≥ 126 mg * dl
    - Or HbA1C ≥ 6.5%

Risk Factors for Cardiovascular Disease

American College of Sports Medicine (JAMA 2003:891)

- 87 to 100% of pts who experienced a fatal coronary event had exposure to 1 of these 4 risk factors
  - Hyperlipidemia
  - Hypertension
  - Smoking
  - Diabetes

Reduction in Risk Factors Through Exercise

Reduction of Risk Factors Through Exercise

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Modifiable Risk Factor

1. Physical Inactivity
2. Obesity
3. Hypertension
4. Dyslipidemia
5. Diabetes

Benefit of Exercise

1. Significant health benefits can be recognized with a minimum of 150 minutes of exercise per week
2. Reduces total body fat and intra-abdominal fat
3. Reduces resting systolic/diastolic pressure by 10-15 mm Hg
4. Increases HDL to decrease serum triglycerides and detrimental effects of LDL on arterial health
5. Reduce insulin needs, improved glucose tolerance

Reduction of Risk Factors Through Exercise

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- Exercise to reduce the risk of cardiovascular disease
  - Reducing the risk of total cholesterol by 40 mg/dl confers a significant reduction in relative risk of developing cardiovascular disease
  - For each 1 MET increase in exercise capacity confers an 8-17% reduction in mortality
  - Normalization of weight to BMI <25 with regular exercise can contribute to a 90% reduction in cardiovascular disease events
  - Significant health benefits can be recognized with a minimum of 150 minutes of cardiovascular exercise per week
  - A progressive increase in activity to 200-300 minutes per week (3.3 to 3.5 hours) may facilitate long-term weight control

Reduction of Risk Factors Through Exercise

American College of Sports Medicine Tenth Edition 2016

- Other Benefits of Exercise
  - Decreased Anxiety and Depression
  - Improved cognitive function
  - Enhanced physical function and independent living in older adults
  - Enhanced feelings of well-being
  - Enhanced performance of work, recreational, and sport activities
  - Reduced risk of falls and injuries from falls in older adults
  - Prevention or mitigation of functional limitations in older adults
  - Effective therapy for many chronic diseases

Cardiac Rehabilitation

Cardiac Rehabilitation

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2020

- Medically supervised secondary prevention program for patients diagnosed with cardiovascular disease
  - Physician/FNP/PA referral required
  - Education for lifestyle modification and exercise
  - Supervised by a variety of healthcare professionals
    - Clinical Exercise Physiologists (CEP), RN, RT, PT, ext..
- 3 phases of Cardiac Rehab
  - Phase I: In patient setting
  - Phase II: Outpatient setting
  - Phase III: Maintenance

Cardiac Rehabilitation

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2020

- Who is eligible with Medicare coverage?:
  - MI
  - CABG
  - Heart Valve repair or replacement (including TAVR)
  - Angina
  - Stent
  - Heart Transplant
  - Congestive Heart Failure
  - PAD
- Private insurances vary in coverage for eligible diagnoses

Cardiac Rehabilitation

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2020

- Core Program Components
  - Baseline patient Assessment
  - Nutritional counseling
  - Pharmacological counseling
  - Psychosocial management
  - Physical activity counseling
  - Exercise prescription

Cardiac Rehabilitation

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2020

- Common Program Components
  - Initial and on-going evaluation includes
    - Medical History
    - Risk factor Identification and lifestyle education assessment
    - Functional assessment
    - Psychosocial and quality of life indicators
  - Monitored Sessions
    - ECG, HR, and BP are closely monitored
    - Signs/symptoms of exercise related physiologic parameters
    - Muscular-skeletal status
      - Wound healing/sternotomy integrity
    - Case Management (hypo/hypertension, diabetes management, medication management

Cardiac Rehabilitation

American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 2010

- Underutilization of Cardiac Rehab
  - Nearly 12.5 million Americans are eligible for secondary prevention
  - On average only 15% of these eligible candidates received cardiac rehab
    - Ranges between 11% to 38% depending on area of the country
- Sooner is Better!!!
  - Scheduling first apt soon after they leave the hospital is key
  - Median time from hospital discharge to CR enrollment is 35 days
  - Enrolling patients into cardiac rehab only **10 days** after discharge significantly improves attendance

Cardiac Rehab and the Effects of Exercise Post STEMI

Cardiac Rehab and the Effects of Exercise Post STEMI

American College of Sports Medicine Tenth Edition 2016

- Myocardial Infarction: Complete blockage of blood flow to cardiac tissue
  - Commonly caused by blood clot that is unable to pass through blockage and becomes lodged in existing occlusion
  - If blockage is not reversed permanent tissue necrosis occurs and may be fatal
  - ST segment elevation found on ECG indicates an acute MI (STEMI)

Cardiac Rehab and the Effects of Exercise Post STEMI

American College of Sports Medicine Tenth Edition 2016

- Secondary Prevention
  - Cardiovascular and all-cause mortality are reduced in patients with post-myocardial infarction (MI) who participate in cardiac rehab, especially as a component of multifactorial risk factor reduction
  - Reduced Risk of fatal MI (≥25%)
- Increase capillary density in skeletal and cardiac muscle
  - Improved delivery of O2 and nutrients to skeletal and cardiac muscle
  - High red blood cell mean transit time
  - **IMPROVED CARDIAC OUTPUT**

Cardiac Rehab and the Effects of Exercise Post STEMI

American College of Sports Medicine Tenth Edition 2016

- Increase exercise threshold for the onset of disease signs or symptoms (angina pectoris, ischemic ST-segment depression, claudication)
  - Reduced need for anti-angina meds
- Reduce blood platelet adhesiveness and aggregation
  - Decreased risk of thrombotic even
  - Protect against cardiovascular disease

Cardiac Rehab and the Effects of Exercise Post STEMI

American College of Sports Medicine Tenth Edition 2016

- Other Benefits of Cardiac Rehabilitation post STEMI include:
  - Reduced inflammation
  - Improved quality of life
  - Increase knowledge of disease process and prevention strategies
  - Improved compliance with medical regimen
  - Improved metabolic profile
  - Decreased cost of physician office visits and hospitalizations (≤35%)
  - Decrease ER visits

Cardiac Rehab and the Effects of Exercise Post STEMI

American College of Sports Medicine Tenth Edition 2016

Cardiac Arrest	Myocardial Infarction	Fatal Events
1 / 169,344 pt exercise hours	0 / 338,638 pt exercise hours	1 / 338,638 pt exercise hours

Past 5 Year Average Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

- % Diagnosis
  - NSTEMI: 29%
  - STEMI: 16.1%
  - PCI: 37.4%
  - CABG: 13.1%
  - CHF: 4.4%

Past 5 Year Average Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

- Quality Metrics
  - Mean Completed Session: 24
  - Mean Program Duration (days): 90
  - Mean wait time (days): 10
  - Attendance rate: 81%

Past 5 Year Average Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

- % Risk Factors
  - Tobacco Status (Intake)
    - Current (≤ 30 days): 7.9%
    - Former (>6 months): 36%
    - Never Smoker: 51.9%
  - Hypertension: 76%
  - Hyperlipidemia: 83.4%
  - Diabetes: 29.2%

Past 5 Year Average Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

- % Risk Levels
  - Low: 28.5%
  - Intermediate: 59.8%
  - High: 10.3%
  - Unknown: 0.5%

Past 5 Year Average Outcomes Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

Outcome Measures on Initial Day

- SBP (mm Hg): 118
- DBP (mm Hg): 67
- Total Cholesterol: 165
- Triglycerides: 156
- HDL – Cholesterol: 42
- LDL – Cholesterol: 92
- Non – HDL Cholesterol: 122
- FBG (mg/dl): 131

Outcome Measures on DC Day

- SBP (mm Hg): 113
- DBP(mm Hg): 64
- Total Cholesterol: 159
- Triglycerides: 138
- HDL – Cholesterol: 43
- LDL – Cholesterol: 89
- Non – HDL Cholesterol: 116
- FBG (mg/dl): 124

Past 5 Year Average Outcomes Report for CHI St. Alexius Cardiac Rehab
AACVPR Data based on 428 patients

Outcome Measure on Initial Day

- Max METs: 2.7
- 6-Minute Walk Distance: 1,165.6 ft
- Peak METs during CR: 2.9
- Pre Rate Your Plate Score: 50
- Pre PHQ (Psychosocial) Score: 1.4
- Pre Dartmouth COOP Score: 22.0

Outcome Measure on DC Day

- Max METs: 3.1
- 6-Minute Walk Distance: 1,399.7 ft
- Peak METs during CR: 4.5
- Post Rate Your Plate Score: 54
- Post PHQ (Psychosocial) Score: 1.0
- Post Dartmouth COOP Score: 17.5

Subsequent
Extensive Analysis to Control for Potential Confounding:

Coronary Artery Disease Cardiac Rehab and Survival in Older Coronary Patients. Suaya, JA., et al. J AM Coll 2009:54:25-33

- Attendance is in cardiac Rehab is key
  - Post 1-year, cardiac rehab participants (≥24 sessions) had a 58% relative risk reduction for mortality
  - After 5 years, cardiac rehab participants had a 34% relative risk reduction for mortality
  - "Mortality reductions extended to all demographics and clinical subgroups including patients with acute myocardial infarction, those receiving revascularization procedures, and those with congestive heart failure."

Dose Response Relationship for CR Sessions and Risk of Death/MI

Relationship Between Cardiac Rehabilitation and Long-Term Risk of Death and Myocardial Infarction Among Elderly Medicare Beneficiaries. Hammill, BG, et al. Circulation. 2010;121:6370

36 vs 24 Sessions Attended	36 vs 12 Sessions Attended	36 vs 1 session Attended
14% reduction of death	22% reduction of death	47% reduction of death
12% reduction of MI	23% reduction of MI	31% reduction of MI

Questions???