Cardiac Rehabilitation
An Underutilized
Class I Treatment
for Cardiovascular Disease
What is Cardiac Rehabilitation?

• Cardiac rehabilitation is a comprehensive exercise, education, and behavior modification program designed to improve the physical and emotional condition of patients with heart disease.

• Prescribed to control symptoms, improve exercise tolerance, and improve overall quality of life.

• The primary goal of cardiac rehabilitation is to enable the participant to achieve his/her optimal physical, psychological, social and vocational functioning through exercise training and lifestyle change.
Core Components of Cardiac Rehabilitation

- Prescribed exercise to improve cardiovascular fitness without exceeding safe limits
- Education about heart disease along with counseling on ways to stabilize or reverse heart disease by improving risk factors
  - Reduction/Cessation of Smoking
  - Lipid Management
  - Controlling High Blood Pressure
  - Weight Loss/Control
  - Improve/Manage Diabetes
  - Increasing Physical Activity
- Encourage Healthy Eating Habits
- Improve Psychological Well Being
ACC/AHA Guideline Recommendations
Referral to Cardiac Rehabilitation

• Class I indication in clinical guidelines for
  – Myocardial Infarction
  – Percutaneous Coronary Intervention
  – Coronary Bypass Grafting
  – Chronic stable angina
  – Heart failure
  – Peripheral arterial disease
  – Cardiovascular prevention in women
Evidence Supporting the Guidelines

- Decreases Mortality at up to 5 years Post Participation
- Decreases Cardiovascular Events
- Improves Modifiable Risk Factors
- Improves Adherence with Preventive Medications
- Improves Function and Exercise Capacity
- Improves Quality of Life
- Fosters Lifelong Healthy Behaviors
Cardiac Rehabilitation and Survival in Older Coronary Patients

- Mortality Benefit of Cardiac Rehabilitation
- Methods
  - Examined 1-5 year mortality in 601,099 Medicare beneficiaries hospitalized with diagnoses eligible to participate in cardiac rehabilitation in 1997
  - Used propensity based analysis of 70,040 matched pairs to compare up to 5 year mortality in those who participated in cardiac rehabilitation compared to those who did not
  - Additionally, analysis was performed on a subgroup (n=17,298) of high-dose CR users (>25 sessions) and matched low dose users (1-24 sessions)

Cardiac Rehabilitation and Survival in Older Coronary Patients

- **Results**
  - Overall Group (n=601,099)
    - Crude Mortality Rate at 5 years: **Relative risk reduction 59%**
  - Propensity Based Matched Pairs (70,040 pairs).
    - Mortality at 1 year: users 2.2%; non-users 5.3% **(relative risk reduction 58%)**
    - Mortality at 5 years: users 16.3%; non-users 24.6% **(relative risk reduction 34%)**
  - Regression Modeling Mortality Rate at 5 years (adjusting for patient and hospital characteristics)
    - 26% **relative risk reduction**
  - Instrumental Variable Modeling
    - Mortality Rate at 5 years: Users 29.8%; Non-users 37.8% **(21% relative risk reduction)**
  - High Dose versus Low Dose (n=17,298)
    - Mortality at 1 year: high dose 1.1%; low dose 2.6% **(relative risk reduction 58%)**
    - Mortality at 5 years: high dose 14.0%; low dose 17.2% **(relative risk reduction 19%)**
Impact of Cardiac Rehabilitation on Mortality Following PCI

- A retrospective analysis from a prospectively collected registry of 2,395 consecutive patients who underwent PCI in Olmsted County, Minnesota, from 1994 to 2008

- The association of cardiac rehabilitation with all-cause mortality, cardiac mortality, myocardial infarction, or revascularization was assessed

- Follow-up of 6.3 years
  - 503 total deaths (199 cardiac)
  - 394 total myocardial infarctions
  - 755 total revascularization

Impact of Cardiac Rehabilitation on Mortality Following PCI

- Participation in CR (40% (964 of 2395) of the cohort) was associated with
  - a significant decrease in all-cause mortality (hazard ratio, 0.53 to 0.55; P<0.001).
  - A trend toward decreased cardiac mortality was also observed in CR participants;

- No effect was observed for subsequent myocardial infarction or revascularization.

Relationship between cardiac rehab & long-term risks of death & MI among elderly Medicare beneficiaries

- Dose dependent reduction in mortality and recurrent MI after cardiac rehabilitation
- Methods
  - 30,161 elderly Medicare patients who attended at least 1 cardiac rehabilitation session between January 1, 2000, and December 31, 2005.
  - Used a Cox proportional hazards model to estimate the relationship between the number of sessions attended and death and myocardial infarction (MI) at 4 years.
  - The cumulative number of sessions was a time-dependent covariate.

Hammill BG, Curtis LH, Schulman KA, Whellan DJ. Relationship Between Cardiac Rehabilitation and Long-Term Risks of Death and Myocardial Infarction Among Elderly Medicare Beneficiaries. Circulation. 121(2010); pp 63-70.
Results

- After adjustment for demographic characteristics, comorbid conditions, and subsequent hospitalization, patients who attended 36 sessions had a
  - 14% lower risk of death (hazard ratio [HR], 0.86; 95% confidence interval [CI], 0.77 to 0.97) and a 12% lower risk of MI (HR, 0.88; 95% CI, 0.83 to 0.93) than those who attended 24 sessions
  - 22% lower risk of death (HR, 0.78; 95% CI, 0.71 to 0.87) and a 23% lower risk of MI (HR, 0.77; 95% CI, 0.69 to 0.87) than those who attended 12 sessions
  - 47% lower risk of death (HR, 0.53; 95% CI, 0.48 to 0.59) and a 31% lower risk of MI (HR, 0.69; 95% CI, 0.58 to 0.81) than those who attended 1 session
• Among Medicare beneficiaries, a strong dose-response relationship existed between the number of cardiac rehabilitation sessions and long-term outcomes.

• Attending all 36 sessions reimbursed by Medicare was associated with lower risks of death and MI at 4 years compared with attending fewer sessions.

Hammill BG, Curtis LH, Schulman KA, Whellan DJ. Relationship Between Cardiac Rehabilitation and Long-Term Risks of Death and Myocardial Infarction Among Elderly Medicare Beneficiaries. *Circulation*. 121(2010); pp 63-70.
Additional Studies Showing Reduction in Cardiac Endpoints after Cardiac Rehab

- **Cochrane Database on Exercise-Based Rehabilitation for Coronary Artery Disease**: Joliffe JA, Rees K, Taylor RS, et al. 2001;1:CD00180
  - Total mortality decreased by 13% to 27%
  - Exercise based rehab was associated with lower all-cause (OR 0.80) and cardiac mortality (OR 0.74)
  - Also lowered lipids, systolic blood pressure, smoking, QOL
  - Reduced recurrent MI by 17%, 47% mortality benefit at 2 years
  - Decreased hospitalizations, recurrent MI, and mortality
Despite Evidence Showing Benefit, Cardiac Rehabilitation is Underutilized

- Of eligible patients, only 14-35% of heart attack survivors and approximately 31% of patients after CABG participate in cardiac rehabilitation.

- Participation is lowest in women, minorities, socio-economically disadvantaged patients, and the elderly.

Healthcare Team Interventions to Improve Participation in Cardiac Rehabilitation

- Use of quality improvement processes that incorporate the Referral to Cardiac Rehabilitation Performance Measures

- Facilitated referral processes to encourage participation
  - Include referral to cardiac rehab in discharge orders
  - Endorsement of benefit to patients by providers
  - Mended Hearts chapters provide peer endorsement
  - Provision of sufficient information to patient and cardiac rehabilitation program to allow enrollment
For More Information About Cardiac Rehabilitation: www.aacpvr.com
References

Core Components of Cardiac Rehabilitation

Class I indication in Clinical Guidelines


Evidence Supporting the Guidelines

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