Reducing Readmission For Heart Failure: Providing Quality Programs For Patients With Heart Failure in Acute Care, Home, or Outpatient Settings

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Disclosures

• The speakers report that no relevant financial relationship exists
Objectives

• Identify the problems associated with readmission of heart failure patients
• Identify components of an evaluation and treatment plan unique to heart failure including pertinent diagnostic studies and physical therapy examination techniques
• Outline evidence-based recommendations and interventions suitable for the treatment of the patient with heart failure
• Identify appropriate outcome measures for this population
• Identify key components of a self-management and exercise program
Pathophysiology and Impairment in Heart Failure
Cardiac Output

• Cardiac Output = Heart Rate x Stroke Volume

• Heart Rate influences
  – Sympathetic and Parasympathetic
  – Circulating Catecholamines

• Stroke Volume
  – Preload
  – Afterload
  – Contractility
Stroke Volume Determinants

• **Preload:**
  – Volume and tension of filling chamber
  – Blood volume
  – Frank-Starling Law
  – Based on amount of blood pumped to the heart, i.e., End **Diastolic** Volume (EDV) which also corresponds to End **Diastolic** Pressure (EDP)

• **Afterload**
  – Tension on muscle fibers before contraction
  – Load against which the muscle contracts
  – End-**Systolic** Pressure (ESP)
  – Highly correlated to Systemic Vascular Resistance (**SVR**) or Blood Pressure

• **Contractility**
  – Cardiac muscle performance or pathology
Stroke Volume

**Figure 1-24** Components of stroke volume.
Relationship of Stroke Volume and End Diastolic Volume

![Graph showing the relationship between stroke volume and ventricular end-diastolic volume.](image)
Frank Starling Law
Stroke Volume and Afterload
Cardiac Afterload (PVR)
Control of Blood Pressure

• Determinants
  Heart Rate: avg rest = 70 bpm
  Stroke Volume: avg Rest = 72mL
  Blood Volume: avg = 5L
  Peripheral Vascular Resistance***
  Blood Viscosity: does not change much except in pathology (e.g., polycythemia)

• Roughly: BP = CO x SVR
Figure 1-25  Contractility.
Comparison of Stroke Volume and Cardiac Output with Exercise and Heart Failure

Fig 2
Types of Heart Failure

Right Heart Failure
- Failure to pump effectively
- Back up into right atria
- Back up into periphery (liver, abdomen, ankles, hands)
- Frequently due to Pulmonary HTN, Pulmonary embolus, Right ventricular infarction

Left Heart Failure
- Failure to pump effectively
- Back up into lungs
- Frequently due to insult (MI, HTN, Aortic valve disease)

Biventricular: Left ventricular failure with back-up into lungs increases pressures in pulmonary artery → Increased resistance to right ventricle
Types of Heart Failure

**Systolic**
- Impaired contractility of either or both ventricles leads to low stroke volume (SV) and ejection fraction (EF)

**Diastolic**
- Decreased ability of ventricles to accept blood volume from atria during rest or with activity
Risk Factors for Heart Failure

• Major
  – Myocardial Infarction
  – Hypertension
  – Diabetes Mellitus
  – Primary cardiomyopathy

• Others
  – Pulmonary hypertension (>25 mm Hg)
  – Renal failure
  – Age
  – Arrhythmias
  – Alcohol/drug consumption
Signs and Symptoms of Heart Failure

- Chest X-ray evidence of pulmonary edema
- Ejection Fraction (EF) < 30-40%
- Dyspnea and Fatigue **
- Tachypnea/abnormal breathing pattern
- Paroxysmal nocturnal dyspnea (PND)
- Orthopnea
- Peripheral edema
- Cold, pale, cyanotic extremities
- Weight gain
- Hepatomegaly
- Jugular vein distention (JVD)
- Auscultation of crackles in bases of lungs
- Presence of an S3 heart sound
- Sinus tachycardia
- Decreased muscle blood flow, atrophy, poor muscle nutrition
Evaluation of the Heart Failure Patient
Physical Therapy Evaluation

• Chart Review
  – Past Medical History
  – Prior Level of Function
  – Lab Values
  – Medications
  – Diagnostic tests
Past Medical History

• Complications/Co-morbidities
• HF class
  – Type of dysfunction
• Previous interventions
  – Past surgical history
  – Devices
• Last hospitalization
• Chief complaint
Prior Level of Function

• Life style
• Social support
• Exercise program
• DIET
Lab Values

- Hemoglobin/Hematocrit
- BNP
- Creatine Kinase
- Troponin
- Cholesterol levels
Medications

- Types
- Compliance
- Availability
- Patient knowledge
Diagnostic Procedures

• Cardiac Catheterization
• Exercise Testing
• Ventriculography
• Angiography
• Chest Radiograph
• Latest Echocardiogram
• Electrocardiography
• Cardiac MRI/ CT
• Doppler ultrasound
Physical Therapy Exam: Acute Setting

- Overall appearance
- Affect
- Vitals
- Pain level
- Discharge Plans
- Physical Characteristics
  - ROM, strength, sensation
  - Hemodynamics
    - Positional changes
  - Auscultation
  - Edema
  - Peripheral pulses/circulation
  - Cardiac Impulse
- Functional mobility
Physical Therapy Exam: Home/Outpatient Setting

- Overall appearance
- Pain level
- Vitals
- Prior level of function
- Current level of function/vocational status
  - Independence with equipment
- Physical Characteristics
  - ROM, strength, sensation
  - Hemodynamics, Auscultation, Edema, Peripheral pulses, cardiac impulse
  - Exercise tolerance (6MWT, TUG, Gait speed)
Physical Therapy Exam

• Hemodynamics
• Auscultation
  – Heart Sounds
  – Breath Sounds
Physical Therapy Exam

- Cardiac Impulse
- Edema
  - Figure 8 measurements
  - Jugular venous pulse
- Peripheral pulses
Physical Therapy Exam

• Exercise Tolerance
  – 6 MWT
  – Subjective scales
    • Borg RPE
    • Angina Scale
    • Dyspnea scale

• Functional Mobility
  – SPPB
  – TUG
Physical Therapy Exam

• Quality of Life Measures
  – SF-36
  – MLHFQ
  – CHQ
  – KCCQ

• Body Composition
  – BMI
  – Waist Circumference
  – Waist to hip ratio
Physical Therapy Plan of Care

• Goals
  – Short Term Goals
    • Bed Mobility
    • Transfers
    • Ambulation
    • Education
  – Long Term Goals
    • LE Strengthening
    • Balance
    • Strength
    • Progressive Ambulation
    • Home exercise program
    • Return to community activities/work
    • Education
Intervention
Contraindications to Exercise

- Stage D HF, NYHA class IV symptoms
- Unstable angina
- Signs of acute cardiac decompensation such as a 1.8-kg or more increase in bodymass or worsening dyspnea over the previous 1 to 3 days
- Atrial fibrillation with a poorly controlled or uncontrolled ventricular response
- Complex arrhythmia at rest or one that increases in severity with exercise
- Severe pulmonary hypertension
- Uncontrolled HTN
- Symptomatic orthostatic BP drop of > 20 mmHg
Contraindications to Exercise

- Aortic dissection
- Concomitant uncontrolled metabolic disorders
- Moderate to severe aortic stenosis
- Active pericarditis or myocarditis
- Recent embolism
- Thrombophlebitis
- Significant ischemia at \( \leq 2 \) METs of work
- Co-morbidity that prevents exercise participation
Cardiac Intervention

• Vital signs pre-, para-, and post-exercise
  – Blood pressure,
  Heart rate
  – SpO2, FiO2, dyspnea, pain
  – Weight
  – Blood glucose, if applicable
Intervention – Endurance Training

– Warm-up and cool down periods are key
– Increase duration and frequency before intensity
– Goal is to achieve 30-60 minutes of moderate physical activity (RPE 12-14/20), 4-5 days/week
– ACA/AHA recommendations include:
  – Begin at bouts of 2-6 min with 1-2 min rest at 40-60% VO2 max
  – Gradually increase until pt. tolerates 30 min of continuous activity
  – 15-30 minutes, 3-5 days/week at RPE 10-13

– Mode
  – Most studies done with bicycle ergometer
  – Progressive ambulation
  – NuStep
Barriers to Ambulation or Physical Activity

- Slow or fast gait speed
- Physical effort too demanding
- Anxiety
- Poor balance
- Lack of assistive device
- Dyspnea
- Time consuming
- Cost
- Fatigue
Warning Signs of Limited Exercise Tolerance

- Resting tachycardia
- Lack of or excessive HR or BP response to exertion
- > 10 mmHg fall in SBP after initial rise with increase in workload
- Increasing arrhythmias
- Low anginal threshold
- Excessive dyspnea
- Leg claudication or other pain
- Pallor, facial distress
- Lightheadedness, dizziness
- Slow HR recovery
- Excessive fatigue lasting > 1-2 hours
Physiological Benefits Due to Regular Aerobic Exercise

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<td>Increased exercise capacity</td>
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<td>Decrease in sympathetic activity</td>
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<tr>
<td>Improved skeletal muscle chemistry</td>
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</tr>
<tr>
<td>Increase in skeletal muscle strength and endurance</td>
<td>Anti-inflammatory effect</td>
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</table>
Intervention – Resistance Training

– Moderate to slow, controlled speed through complete ROM
– Avoid Valsava
– Should initially be 1 set of 10-15 repetitions at low intensity
  • 30-40% of 1RM for UE
  • 50-60% of 1RM for LE
– Involve major muscle groups of both UE and LE
– Frequency: 2x/week
Intervention – Resistance Training

• Resistance training progression, per literature
  – Intensity to 50-80% of 1RM
  – Frequency to 3x/week
Intervention

• Group exercise can be an appropriate option for resistance training
  – Seated
  – Use of light dumbbells, cuff weights, Therabands
  – Incorporate posture and flexibility exercises
  – Breathing exercises
Intervention

• Group exercise can also incorporate functional and “unconventional” training
  – Sit-to-stand
  – TUG/Dual-task TUG
  – Step-ups
  – Lateral step-ups
  – Tandem walk
  – Toe or heel walk
  – Functional reach
Physiological Benefits Due to Resistance Training

• Increased left ventricular function
• Increased muscle strength
• Increased muscle endurance
Aerobic vs Resistance Training

• Should we exercise patients with endurance training, strength training, or a combination of both?

• Literature is inconclusive. One small study found improvements in cardiac function (EF), VO2max, workload, muscle mass and function, and QOL to be independent of exercise mode
Interval Training

• Studies finding interval training is beneficial to patients with HF by improving:
  – Exercise capacity
  – Oxygen uptake
  – QOL
  – Suppressing oxidative stress
  – Suppressing inflammation

• Typical prescription is 30 sec work:60 sec recovery
Intervention

• Functional mobility
  – Recommend appropriate assistive devices
  – Demonstrate and practice techniques
  – Educate on energy conservation
Intervention

• Patient education
  – Anatomy and physiology of HF
  – Lifestyle changes
  – Medications
  – Self-monitoring of vital signs, especially RPE
  – Energy conservation
  – Medical tests, procedures
  – Sleep Strategies
  – Diabetes
  – Osteoporosis
Intervention

• Patient education
  – Stress management and relaxation techniques
  – Smoking cessation
  – Nutrition, healthy eating, label reading
  – Breathing exercises
  – Laugh therapy
  – Home exercise
Required Equipment

- Track or treadmill
- Stationary bicycles or NuSteps
- Oximeters and oxygen equipment
- BP cuffs
- Doppler
- Dumbbells, cuff weights, Therabands, other strength training equipment
- Ambulatory assistive devices
- Emergency equipment
  - Defibrillator
  - EKG machine
  - Staff members trained in BLS, preferably ACLS
Outcome Measures used in Heart Failure Population
Outcomes for Heart Failure

- $$$ Goals: reduce readmission, reduce health care costs
- Functional Goals:
  - Develop self management of disease
  - Improve function
    - Improve strength to perform ADLS
    - Improve endurance to be mobile and perform ADLS and community activity
- Are the two in conflict or work hand in hand?
Outcomes for Functional Goals
Impairments in HF population

• Skeletal muscle impairment
• Endurance impairment
  – Walk test
  – Walk speed
  – Activity testing
• ADL performance impairment
• Other
  – Balance
  – Pulmonary
  – Need for assistive devices
  – Posture
  – Flexibility
  – Nutrition
  – Depression
  – Quality of life
Skeletal muscle impairment

Skeletal muscle dysfunction characterized by:

– Reduction in muscle mass and strength
– Atrophy of slow twitch oxidative endurance muscle fibers
– Decrease in fiber capillarization
– Decrease in oxidative enzyme capacity
– In effect: *decrease in muscle endurance*
– Lactic acidosis at lower exercise workloads
Strength Assessment Options

- Hand held dynamometer
- Manual muscle test of specific muscle groups
- 1 repetition max
- Multiple repetition max
- Chair Rise test for functional quad strength

*Keep in mind: if impairment is decrease in endurance; outcome measure should be one to measure endurance*
Hand Dynamometry
Grip Strength Norms
Luna-Heredia E 2005

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<td></td>
<td>L</td>
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LE Tests

• Chair Rise
  – Single Chair Rise
  – Multiple chair rise
  – 30 second chair rise

• Short Physical Performance Battery (SPPB)
  – Group of 3 tests:
    • Chair Rise
    • Gait Speed
    • Balance
Chair Rise Test
Chair Rise Test

- **Single Chair Rise**: To test strength in legs in functional position. Test in chair like a dining room chair without arms.

- **Repeated Chair Rise**: Repeat procedure without stopping and without using arms (5 times)

- **30 Second Chair Rise**: Count number of chair rises in 30 seconds

- **Option for acute care**: Single rise from bed: raise height of bed high; measure height from floor; work on lowering height before converting to chair rise
Chair Rise Norms

• 5 times chair rise
  – Worse than average performance if:
    – Age 60-69 >11.4 secs
    – Age 70-79 >12.6 secs
    – Age 80-89 .14.8 secs

Bohannon et al2006
Lower Extremity Function

- **Short Physical Performance Battery:**
  - 3 performance measures scored from 0 to 4 points.
  - **Standing balance test:** subjects must maintain their feet in a side-by-side, semi-tandem stand (heel of one foot next to the big toe of the other foot), or tandem stand (heel of one foot directly in front of the other foot) for 10 seconds.
    - The maximum score of 4 is assigned for maintaining the tandem stand for 10 seconds; a low score of 1 is assigned for side-by-side standing for 10 seconds, with inability to hold a semi-tandem position for 10 seconds.
  - **A test of walking speed requires subjects to walk 4 meters at their normal pace.** Participants are assigned a score from 1 to 4 based on the quartile of length of time needed to complete the test.
  - **The chair stand test,** which reflects lower extremity extensor muscle strength, measures the time required for the subject to stand up and sit down from a chair 5 times with arms folded across the chest. The chair height is standardized for all subjects. Scores from 1 to 4 are assigned based on quartile of length of time to complete the task.

- A summary performance score integrates the 3 performance measures, ranging from 0 to 12. The battery has excellent inter-observer reliability, test-retest reliability, and predictive validity. (Gurainik 1995, 2000)
Impairments: Decreased Activity Endurance

- Decreased ability to perform ADLs
- Decreased walk distance with or without assistive device
- Decreased ability to perform stair climbing, incline walking as well as walking on level surfaces
- Increased symptoms with all activities
How to measure change in endurance

• 6 minute walk distance
• Step Test
• Walk speed test/ comparison to function
• Symptom history with activities
# Six Minute Walk Test

Six Minute Walk Results: 7 laps or 1050 ft.

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<th>BP</th>
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<td>93</td>
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<td>90</td>
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<td>2</td>
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<tr>
<td>4</td>
<td>116</td>
<td>78</td>
<td>9</td>
<td>stopped @ 4:10</td>
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<td>105</td>
<td>82</td>
<td>5</td>
<td>started back 5:30</td>
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<td>6</td>
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<td>Post ex</td>
<td>87</td>
<td>89</td>
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### Six Minute Walk Test - Post

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<td>Post ex</td>
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<td>89</td>
<td>4</td>
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Evidence of 6 Min Walk

- Mean 6 MWD was 524 m (1719 ft) for healthy males (≥ 60 yrs) and 475 m (1558 ft) for healthy females (≥ 60)
  - 1 ft = .3048 meters  Bohannon 2007

- Individual pts with COPD an improvement of more than 70 m (230 ft) is necessary to be 95% confident that improvement was significant.  Redelmeier 1997
Two minute step test norms

- Raise each knee to midpoint between iliac crest and patella for 2 minutes back and forth
- Score is number of times right knee reaches required height
## Two minute norms males

(Rikli RE 2001)

<table>
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<tr>
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Two minute norms females

(Rikli RE 2001)

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# 4 Meter Walk Test

## Quick Gait Speed Test

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<td>4 seconds</td>
<td><strong>1.0 m/s</strong></td>
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<tr>
<td>5 seconds</td>
<td>0.8 m/s</td>
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<tr>
<td>6.7 seconds</td>
<td>0.6 m/s</td>
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## Conversion

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<td>1.3</td>
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<td>2.2</td>
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<td>2.7</td>
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<td>3.1</td>
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Walking Speed
[meter per second (m/s)]

Dependent in ADL’s and IADL’s

More likely to be Hospitalized

Need Intervention to Reduce Falls Risk
Less likely to have Adverse Event

D/C to SNF

D/C to Home more likely

Household Walker
Limited Community Ambulator
Community Ambulator
Cross Street & Normal WS

0 mph 0.4 mph 0.9 mph 1.3 mph 1.8 mph 2.2 mph 2.7 mph 3.1 mph
10 meter walk time 50 sec 25 sec 16.7 sec 12.5 sec 10 sec 8.3 sec 7.1 sec
10 foot walk time 15.2 sec 7.6 sec 5 sec 3.8 sec 3 sec 2.5 sec 2.2 sec
Activity Testing

Mobility measurements:
– Timed up and Go
– Glittre Test
Timed Up and Go

- Start in standard armed chair
- Stand up and walk 3 meters (10 feet)
- Turn around and return to chair
- Sit down
- Independent older adults <12 secs
- 13-16 secs predicts falls in community dwelling older adults
- Avg TUG for 60-99 9.4 secs

Bischoff Age Ageing 2003
Shumway-Cook Physical Ther 2000
Timed Up and Go
Glittre Test

• Standardized test using ADL like activities
  – Chair stand
  – Lifting
  – Bending
  – Minimal stair climb

• Mean time: 4.67 min for pop with mean FEV1 of 48%
  – Range 2.57-14-47 min
Glittre Test

Measuring Change in ADL Performance

- Assess ADL performance measuring HR, BP and dyspnea
- Assess individual’s perception of dyspnea with all activities
- Time the ADL performance pre and post intervention
UE Functional Tests

• Grocery Shelving Test
  – Place 20 items from each of 2 grocery bags onto shelf 15 cm above shoulder ht as fast as possible. Three trials, average final 2. (Hill 2001)

• Measure performance on specific ADL test

• Keep in mind UE tests will show differences in HR BP responses
Grocery Shelving Task

Use 420 g cans: 20 cans

Shelf should be 15 cm above shoulder level,
Table 90 cm tall,

Performs activity standing

Time amt of time to place 20 cans on shelf.
3 trials.
Raise the Roof
Balance Assessment

• Numerous balance assessments
  – Forward Reach
    • A single item test as a quick screen for balance problems with older adults
  – Berg balance
  – Tinetti
  – Romberg
  – Modified Romberg (Guralnik SPPB)
Forward Reach: assessing functional balance
Forward Reach
Balance Assessment

Three Stances

Interpretation

• Maximum possible score is 4 points
• Maintain foot position for 10 seconds
• 1 point for 10 secs, 0 pts for < 10 secs
• Third position of full tandem: 2 pts for 10 secs, 1 pt for 3-9 secs
Single leg stance
Pulmonary

• CHF with fluid in interstitium: restrictive defect
• Often CHF patients were smokers...may also have COPD: obstructive defect
• Need to treat any pulmonary impairments as well as prevent and pulmonary impairments
Incentive Spirometry
Airway Clearance Devices
Inspiratory Muscle Training (IMT)
Assistive Device Needs

• Assess activities and responses to performance with and without assistive device
Rollators
Postural Changes
How to Measure Change In Posture

• Take a picture pre and post
• Use plumb line and measure amount of distance from normal posture line
Flexibility Impairments

• Measure changes in flexibility with
  – Goniometer measurements
  – Functional reach changes
  – Posture evaluation
  – Assess functional activities

• Keep in mind if you use flexibility as an outcome measure: flexibility changes must relate to *function*
Nutritional Impairments:
Obesity vs. Anorexia
Measuring change in Nutrition Impairments

- Weight
- Dyspnea with eating
- Patients perspective of dyspnea with eating
Depression/Anxiety Tools

- Beck Depression Inventory $$$$
- Mood/depression questionnaires
  - Center for Epidemiologic Studies Depression (CESD) Scale
  - Hospital Anxiety Depression Scale (HADS)
Center for Epidemiologic Depression Scale (CESD)

20 questions, rate rarely to most (4 columns)
Score: 0 first column, 1 second column, etc.

• I was bothered by things that usually don’t bother me.
• I did not feel like eating; my appetite was poor.
• I felt that I could not shake off the blues even with help from my family or friends.
• I felt I was just as good as other people.
• I had trouble keeping my mind on what I was doing.
• I felt depressed.
Hospital Anxiety and Depression Score (HADS)

• 12 questions 6 for anxiety, 6 for depression
• Anxiety ? I feel tense or 'wound up':
  – Most of the time 3
  – A lot of the time 2
  – From time to time, occasionally 1
  – Not at all 0
• Depression ? : I still enjoy the things I used to enjoy:
  – Definitely as much 0
  – Not quite so much 1
  – Only a little 2
  – Hardly at all 3
Quality of Life tools

- Kansas City Cardiomyopathy Questionnaire
- Minnesota Living with Heart Failure
- St George Respiratory Questionnaire
- Chronic Respiratory Disease Questionnaire
- SF 36
- SF 12
Other outcome measures/tools

www.rehabmeasures.org
Coding, Documentation, Reimbursement and Resources
Coding issues (outpatient) for Heart Failure

• HF currently is NOT a covered diagnosis for Cardiac Rehab but IS a diagnosis for physical therapy
• Billing using 97000 series
• Can use group code for group exercise that is the SAME for individuals. Document group and time they were in group, as well as document individual time (if using individual codes in addition to group)
Example

• Heart failure: ICD:
  – Initial evaluation 97001
  – Follow-up visits:
    • 97110 for any therapeutic exercise training (strength, aerobic, or other)
    • 97150 for group activity
    • Use 94620 or 97750 for six minute walk test (do not bill these 2 codes on same day as initial eval) OR use 97110 for six minute walk test…

• Patient seen in Physical therapy from 9-11. Patient performed ther ex activities of------ from 9-9:30, education and group activities from 9:30-11:00
  • bill (2) 97110
  • Bill (1) 97150
G codes for functional limitation in HF

Reporting the severity/complexity for that functional limitation:

- **Modifier :Impairment Limitation Restriction**
- **CH** 0 percent impaired, limited or restricted
- **CI** At least 1 percent but less than 20 percent impaired, limited or restricted
- **CJ** At least 20 percent but less than 40 percent impaired, limited or restricted
- **CK** At least 40 percent but less than 60 percent impaired, limited or restricted
- **CL** At least 60 percent but less than 80 percent impaired, limited or restricted
- **CM** At least 80 percent but less than 100 percent impaired, limited or restricted
- **CN** 100 percent impaired, limited or restricted
Category codes

- 4 sets are for categorical functional limitations:
  - Mobility: Walking & Moving Around 68978-80
  - Changing & Maintaining Body Position
  - Carrying, Moving and Handling Objects
  - Self Care

- 2 sets are for “Other” functional limitations:
  - Other PT/OT Primary 68990-92
  - Other PT/OT Subsequent
Examples

- **G8978** Current status of mobility/walking
  - Initial visit and every 10 visits
  - Example: G8978- CM based upon 6 minute walk performance (at least 80% impaired but <100%)

- **G8979** Goal status
  - Initial visit and every 10 visits
  - G8979-CI (at least 1% but < 20%)

- **G8980** discharge status
  - Last visit
  - G8980-CI

- Need your documentation on these visits and on initial evaluation patient’s limitation based upon walk test or other test utilized to assess functional impairment

- Therefore…if using 6 min walk test as basis for functional impairment G coding you will need to perform 6MWT on first session. Otherwise you can use gait speed for functional impairment scales and use 6MWT as test on subsequent day
HF Example

Patient with HF with recurrent hospitalizations, EF 20%, limited ADLs.
Example using gait speed
initial eval: Gait speed: 0.5 m/sec
  your diagnosis: G68978-CM (80-99% limited)
  your gait speed goal: 0.8 m/sec
  your goal: G8979-CK (40-60% limited)
Promoting Self-Care
Exercise

• HF-ACTION
  – Large RCT with 2331 participants (stabile HFrEF) at 82 sites
  – Intervention arm received 36 supervised exercise training transitioning to home-based, self-monitored exercise
    • Began at 15-30 min sessions, 3x/week, 60% of maxHR
    • Goal of 40 min sessions, 5x/week, 60-70% maxHR
  – Initial analysis showed a modest but non-significant benefit to exercise
  – Secondary analysis accounting for prognostic indicators showed a 11% decrease in mortality or hospitalization, 15% decrease in cardiovascular mortality
Exercise

• HF-ACTION
  – Modest but significant improvement in self-reported health status using Kansas City Cardiomyopathy Questionnaire
  – Every 6% increase in peak VO2 associated with
    • 5% lower risk of time to all-cause mortality or all-cause hospitalization
    • 8% lower risk of cardiovascular mortality or HF hospitalization
Medications

• Butler et al found only 80% of patients filled a prescription for an ACE inhibitor within 30 days of discharge

• Barriers
  – Depression
  – Cost
  – Attitude
  – Fear of side-effects
  – Lack of understanding of directions
  – Conflicting directions
  – Cost
  – Not being convinced of efficacy of medication
Medications

• Patients may also be taking medications not prescribed
  – Took previously
  – Lack confidence in new medication
  – Multiple doses (generic vs brand name)
  – Confused medications with others in household

• Adherence of > 88% associated with better event-free survival
Medications

• Incorporate medication taking into daily routine
• Ensure patient is able to obtain initial and refill medications
• Manage changes in routine
Symptom Monitoring

• Patients often delay seeking treatment for several days
  – Routine monitoring
  – Ability to recognize and interpret symptoms
• < 50% weigh daily
• Inability to recognize weight gain as a symptom
  – Misconception of weight gain as evidence of increase in adipose tissue and not fluid
Symptom Monitoring

- Repeated queries
- Explanation of importance of symptoms and how to monitor
Diet – Sodium Restriction

• Recommendations
  – Healthy adults: 2300 mg/day
  – ACC/AHA guidelines: 1500 mg/day for stage A, B; insufficient data for patients in stage C, D but some sodium restriction is warranted
Fluid Restriction

• Current recommendation is 2 L/day
• Must overcome the general perception that drinking water is helpful and to stay hydrated especially when ill
• Holst et al (2008): Fluid restriction based upon body weight (30-35 mL/kg body weight/day) for stable patients
Weight Loss

• Patients with BMI 30-35 kg/m2 have lower mortality rates and hospitalization rates than those with a BMI in the normal range
• Weight loss may reflect cachexia, estimated at 8-15% of patients in class II-IV
• Weight loss encouraged in morbidly obese (BMI > 40 kg/m2)
• All other groups should monitor for loss of appetite, unexpected weight loss, muscle wasting
Other Behaviors

- Alcohol restriction
- Smoking cessation
- General hygiene
  - Hand washing
  - Dental hygiene
  - Maintenance of immunizations
- Discourage use of NSAIDs
- Encourage patients to discuss use of OTC medications and supplements with physician
Strategies to Promote Self-Care

• Skill development
  – Performance
  – Recognize and make decisions regarding signs and symptoms
  – Evaluate decisions
  – Requires “how to” knowledge and “what to do when” knowledge
  – Link symptoms, HF mechanism, cause, and action needed to avert exacerbation
  – Consider medical literacy and cultural background
Strategies to Promote Self-Care

- Utilize motivational interviewing
- Enlist family support
- Individualize treatment based on prognosis and QOL
- Screen for depression and anxiety and refer as appropriate
- Screen for barriers
- Assess cognitive abilities
- Consider referral to social worker or other community resources
Evidence for Self-Care

- Evidence is limited and difficult to establish an effect. Does a poor outcome drive self-care or does self-care drive an improvement in outcome?
- Systematic review of effect of self-care on hospital readmissions found that self-care can help reduce HF readmissions (95% CI 0.27-0.71), all-cause readmissions (95% CI 0.44-0.80)
Evidence for Self-Care

• Decreased rate of hospitalization or death
  – DeWalt et al (95% CI 0.32 – 0.89)
  – Lee et al (95% CI 0.22 – 0.88)

• Decreased cost of inpatient care (Lee et al)

• No definitive conclusion on QOL
Discussion