COPD & CHF for Acute Care Rehab Professionals

Learning Objectives

- Understand disease processes of COPD and hearty failure
- Identify effective assessment and treatment strategies
- Effectively educate patients on self-advocacy and disease symptom management
- Complete appropriate chart review to identify pertinent information or lab values related to COPD and heart failure

Chronic Obstructive Pulmonary Disease (COPD)

- Prevalence: In 2020, 12.5 million people, or 5.0% of adults, reported a diagnosis of COPD
  - More than 50% of adults with low pulmonary function were not aware that they had COPD, so the actual number may be higher
- In 2019, there were close to 536,000 COPD hospitalizations
- Third leading cause of hospital re-admission
- 6th leading cause of death
- Cost: $29.5 billion for direct health care expenditures

COPD

- Refers to a group of diseases that cause airflow blockage and breathing-related problems
  - includes emphysema and chronic bronchitis
- Diagnosed with spirometry and medical case history
- Chronic, progressive disease
- Treatable but not curable
  - Early detection may change course and progress

Classification of COPD

GOLD Grades and Severity of Airflow Obstruction in COPD (based on post-bronchodilator FEV1) Table 2.6

In COPD patients (FEV1/FVC < 0.7):

GOLD 1:	Mild	FEV1 ≥ 80% predicted
GOLD 2:	Moderate	50% ≤ FEV1 < 80% predicted
GOLD 3:	Severe	30% ≤ FEV1 < 50% predicted
GOLD 4:	Very Severe	FEV1 < 30% predicted

Causes of COPD

- Smoking
  - 85-90% of all cases
- Environment
  - Long-term exposure to air pollution, secondhand smoke and dust, fumes and chemicals (often work-related)
- Alpha-1 Deficiency
  - Genetic condition that affects the body's ability to produce Alpha-1 protein that protects the lungs
  - Rare

Risk Factors for COPD

- **Smoking**
- Exposure to air pollution
- Breathing secondhand smoke
- Working with chemicals, dust, and fumes
- Alpha-1 deficiency (genetic condition)
- A history of childhood respiratory infection

Symptoms of COPD

- Chronic cough
- SOB while doing everyday activities
- Frequent respiratory infections
- Blueness of the lips or fingernail beds (cyanosis)
- Fatigue
- Excess mucus production
- Wheezing/chest tightness
- Cognitive impairment

Treatment for COPD

- Preventative methods
  - Smoking cessation
  - Avoid continued exposures to potential irritants
  - Vaccination
- Self-management education
  - Exercise program
  - Sleep
  - Healthy diet
  - Breathlessness/energy conservation management
  - Stress management

Treatment for COPD

- Pulmonary Rehabilitation
- Pharmacological therapy
  - Most treatments are inhaled
- Long-term oxygen
- Lung transplant

Heart Failure

- Prevalence: 6.5 million individuals have HF
- Incidence: 600,000 new cases each year
- 50% of patients with HF die within 5 years of diagnosis
- 1 million hospitalizations per year
- Cost CMS 24 billion
- The most frequent diagnosis for hospital admission/readmissions in patients over 65
  - High readmission rates- 24% within 30 days

Heart Failure

- Occurs when the heart is unable to pump enough blood to meet the body's demand
- Chronic disease
- Can affect both the left and right side of the heart

Classification of HF

AHA/ACC Stage	Description	NYHA Class	Description
Stage A	At high risk for developing HF. No identified structural or functional abnormality, no signs or symptoms of HF.	N/A	
Stage B	Structural heart disease that is strongly associated with the development of HF but no signs and symptoms of HF.	I	No limitation in physical activity; ordinary physical activity does not cause fatigue, palpitations, or dyspnea.
Stage C	Symptomatic HF, associated with underlying structural heart disease.	I	No limitation in physical activity; ordinary physical activity does not cause fatigue, palpitations, or dyspnea.
		II	Slight limitation of physical activity; comfortable at rest but ordinary activity results in fatigue, palpitations, or dyspnea.
		III	Marked limitation of physical activity; comfortable at rest but less than ordinary activity results in fatigue, palpitations, or dyspnea.
		IV	Symptoms at rest; unable to do any physical activity without symptomology.
Stage D	Advanced structural disease with marked symptomatology at rest despite maximal medical therapy.	IV	Symptoms at rest; unable to do any physical activity without symptomology.

Causes of HF

- Certain chemotherapy
- Coronary artery disease
- Drug/alcohol abuse
- Heart attack
- High blood pressure
- Irregular heart rhythms
- Heart valve disease
- Infection of the heart muscle or valves
- Inherited or genetic conditions
- Sleep apnea
- Other diseases: diabetes, HIV, hyper/hypothyroidism, buildup of iron or protein

Modifiable Risk Factors

- High blood pressure
- Coronary artery disease
- Diabetes
- High cholesterol
- Smoking
- Obesity
- Physical inactivity

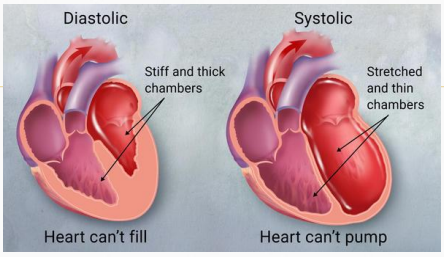
Systolic vs. Diastolic Heart Failure

Systolic

- Heart failure with reduced ejection fraction (HFrEF)
- Heart muscle is weak and unable to contract normally
  - EF is low
- Left ventricle loses ability to contract

Diastolic

- Heart failure with preserved ejection fraction (HFpEF)
- Heart muscle is stiff and unable to relax normally
  - EF remains normal
- Left ventricle loses ability to relax



Complications from Heart Failure

- Kidney damage/failure
- Heart valve problems
- Arrhythmias
- Liver damage
- Edema
- Pulmonary edema
- Dyspnea
- Fatigue
- Weight gain
- Persistent cough/wheezing
- Lack of appetite
- Impaired cognition

Medical treatment of heart failure

- Medication management
- Surgery
- Cardiac Rehab
- Advanced heart failure:
  - LVAD and transplant

COPD and CHF

- Chronic diseases, can co-occur
- Appropriate management requires multi-disciplinary approach
- Treatment options do overlap – not always discipline specific
- Similar treatment for both diseases

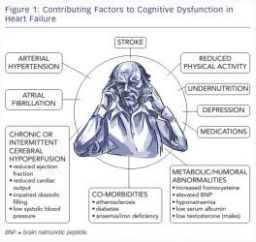
Therapy's Role

- Understanding the diseases
  - Long term management
- Energy conservation
- Cognitive impairments/Health literacy
- Dysphagia management
- Adaptive equipment
- Physical activity
- Breathings strategies
- Coping strategies
- Self-efficacy
- Caregiver involvement

Cognitive Decline in Heart Failure

- Up to 80% of patients hospitalized due to acute decompensation of HF experience cognitive decline
- **"Assessment of cognitive function, even by simple screening test, should be part of routine clinical examination of heart failure patients"**

Figure 1: Contributing Factors to Cognitive Dysfunction in Heart Failure



BNP = brain natriuretic peptide.

Cognitive impairment and COPD

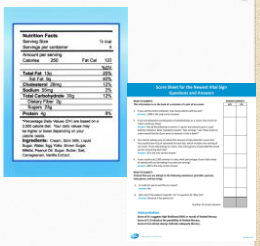
- Obstruction of lung airflow ⇨ decrease in blood oxygen levels ⇨ cognitive dysfunction
- Prevalence of cognitive impairment in COPD patients ranges from 16% to 57%
- Patients with COPD are 2.11 times more susceptible to MCI and 1.16 times more susceptible to dementia
- COPD can lead to pulmonary encephalopathy, hypoxemia, and inflammation
- May see attention, motor, memory, and executive function deficits
  - Disease self-management may be impacted by impaired insight/executive functioning

EFPTe medication management task

- Frequent changes in medication regimen
- Challenge overall cognition and fine motor strength/coordination
- Also educate on importance of medication adherence
- Developing compensatory strategies
  - Plan for refilling of medication
- Caregiver involvement is important

The Newest Vital Sign

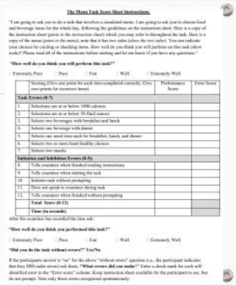
- Screening tool of health literacy
- Applicable to HF patients who frequently have dietary/fluid restrictions



Menu Task

Menu Task

- Correct performance:
  - https://www.youtube.com/watch?v=uVfQ_WfMjCA
- Performance with errors:
  - https://www.youtube.com/watch?v=BspsDtdlHLo



The Menu Task Score Sheet Instructions

"How well do you think you will perform this task?"

☐ Extremely Poor ☐ Poor ☐ Fair ☐ Well ☐ Extremely Well

	Scoring (Give one point for each item completed correctly. Give zero points for incorrect items)	Performance Score	Error Score
Task Errors (0-7)			
1.	Selections are at or below 1800 calories		
2.	Selections are at or below 50 fluid ounces		
3.	Selects two beverages with breakfast and lunch		
4.	Selects one beverage with dinner		
5.	Selects one meal item each for breakfast, lunch, and dinner		
6.	Selects two or more heart healthy choices		
7.	Selects two snacks		
Initiation and Inhibition Errors (0-5)			
8.	Tells examiner when finished reading instructions		
9.	Tells examiner when starting the task		
10.	Initiates task without prompting		
11.	Does not speak to examiner during task		
12.	Tells examiner when finished without prompting		
	Total Score (0-12)		
	Time (in seconds)		

After the examiner has recorded the time ask:

"How well do you think you performed this task?"

☐ Extremely Poor ☐ Poor ☐ Fair ☐ Well ☐ Extremely Well

"Did you do the task without errors?" Yes/No

Dietary Restrictions

Diet

- 1,500-2,000mg sodium restriction
  - *Light or reduced sodium*-food contain a quarter less sodium than the food usually would
  - *Low sodium*- 140 mg or less of sodium per serving
  - *Very low sodium*- 35mg or less of sodium per serving
  - *Sodium free*- less than 5 mg of sodium per serving
  - *Unsalted*- food may contain sodium but not any added salt

Foods to avoid

- 2000 Milligrams (2 Gram) Sodium Diet NUTRITION FOCUS (ohiohealth.com)
  - Prepared frozen food
  - Gravies/sauces/casseroles
  - Box mixes- breads/muffins
  - Canned soup
  - Processed/breaded meat
  - Processed cheese (also yellow cheese)
  - Gatorade/V8 juice

Dietary Restrictions

Fluid Restriction

- 1.5-2 liters a day
- Track consumption
- Portion out fluids- plan fluid for each meal
- Track weight
- Eat water-heavy or frozen fruit
- Alternatives
  - Swish water and spit
  - Sugar free candy/gum

Dysphagia and COPD

- Respiratory-swallow discoordination
- Muscle weakness and fatigue associated with carbon dioxide retention
- Prolonged oral transit time
- Longer pharyngeal transit times
- Increased time of the laryngeal vestibule closure (LVC) and longer duration of hyoid movement
- Incomplete LVC
- Delayed LVC
- Pharyngeal residue
- Decreased sensation in the oral cavity, pharynx, and larynx

Dysphagia and COPD

- Recent study showed aspiration of thin liquids occurs in 20% of patients with stable COPD and presents risk for COPD exacerbations over the next 12 months
- People with COPD who have dysphagia are generally unaware of their difficulty swallowing – attribute coughing and SOB with intake to be a symptom of their COPD
- Decreased laryngeal sensation is common – instrumental exams may be warranted
- GERD/LPR

Dysphagia assessment for COPD

Chart review and intake interview:

- COPD symptoms?
- Recent exacerbations?
- GERD or LPR?
- Supplementary oxygen?
- Chest X-rays?

Dysphagia assessment for COPD

- Oxygen saturation at baseline
- Respiratory rate at baseline (rapid RR is >25 bpm)
- Dyspnea with speech or swallowing
- Respiratory muscle strength

Strategies for Dysphagia with COPD

- Sit upright
- Take breaks to conserve energy
- Pursed lip breathing to open airway
- Make sure you catch your breath before you start a meal (especially if walking to get up to chair or to the table)
- Small bites/sips to allow more time for breathing
- Slow pace
- Use an oral hold
- Avoid talking while eating/drinking

Dysphagia and Heart Failure

Heart failure symptoms that may lead to dysphagia symptoms:

- Dyspnea
- Fatigue
- Persistent cough/wheezing
- Kidney damage/failure
- Impaired cognition
- Poor appetite

Dysphagia and Heart Failure

- Similar management to COPD:
  - Breathing/swallowing coordination techniques
  - Fatigue management
  - May need instrumental swallow studies, particularly in patients where you are trying to tease out pneumonia cause (heart failure vs aspiration)
- Consider fluid restriction

Physical Effects of COPD/CHF

- Changes in muscle fibers types in COPD
- Respiratory and limb muscle weakness
- Impaired muscle function
- Reduced endurance
- Poor exercise capacity
- Reduced health status

Physical Activity

- Walking program
- Endurance training
- Resistance training
  - Closed chain
  - Open chain
- Interval training
- Intensity based on BORG and patient ability

Breathing Strategies

- "Air trapping" results in dyspnea during activity
- Respiratory/inspiratory muscle training leads to improvements in
  - Inspiratory muscle force
  - Endurance
  - Functional exercise capacity
  - Dyspnea
  - Quality of life
- Incentive Spirometer
- Diaphragmatic Breathing Techniques
- Pursed Lip Breathing Techniques

Incentive Spirometer

- Sit upright and hold device at eye level
- Exhale fully
- Put mouthpiece in mouth and slowly inhale as deeply as possible
- Hold breath for 5 seconds
- Breathe out slowly
- Repeat x10 each hour

Diaphragmatic Breathing

- "Air trapping" leads to a weakened diaphragm
- Diaphragm is the most efficient muscle for breathing
- Increases ability to empty lungs

- **Diaphragmatic breathing, or belly breathing,** helps your lungs expand so that they take in more air. It also helps strengthen your diaphragm. Your diaphragm is a large muscle that separates your lungs from your belly. It helps draw air into your lungs as you breathe.
  - Lie on your back, or prop yourself up on several pillows. You can also sit in a chair.
  - Put one hand on your belly and the other on your chest. Breathe in through your nose. Let your breath push your belly out as far as possible. You should feel the hand on your belly move out, while the hand on your chest does not move.
  - Breathe out through pursed lips. You should feel the hand on your belly move in.
  - When you can do this type of breathing well while lying down or leaning on pillows, learn to do it while sitting or standing.

Pursed Lip Breathing

Pursed Lip Breathing

Pursed lip breathing is one of the simplest ways to control shortness of breath. It provides a quick and easy way to slow your pace of breathing, making each breath more effective.

Pursed lip breathing will bring many benefits, including:

- improving ventilation
- releasing trapped air in the lungs
- keeping the airways open longer and decreasing the work of breathing
- prolonging exhalation to slow the breathing rate
- relieving shortness of breath
- promoting general relaxation

Pursed lip breathing technique

1. Relax your neck and shoulder muscles.
2. Breathe in (inhale) slowly through your nose for two counts, keeping your mouth closed.
3. Pucker or "purse" your lips as if you were going to whistle or gently blow a candle flame.
4. Breathe out (exhale) slowly and gently through your pursed lips while counting to four. Let the air escape naturally. Do not force the air out of your lungs.
5. Relax. Repeat the pursed lip breathing until you no longer feel breathless. If you get dizzy, rest for a few breaths.

Outcome Measures

Borg Scale
Rate of Perceived Exertion

6 Minute Walk Test

- Equipment needed:
  - Stopwatch
  - Measuring wheel
  - Cones to mark 30 meters/100 feet
  - Chair at the start
- *"The aim of this test is to walk as far as possible in six minutes.*
- *You will walk back and forth in the hallway. Six minutes is a long time to walk, so you will be exerting yourself. You may get out of breath or become tired. You are allowed to slow down, to stop, and to rest as necessary. You may stand and rest, but resume walking as soon as you are able. Are you ready to do that?"*
- *"Walk to the turnaround point at each end. I am going to use this counter to keep track of the laps you complete. Remember the aim is to walk as far as possible, but do not run or jog."*

6MWT

- Standardized
  - Standing rest breaks
  - Assistive device or brace
- Non-standardized
  - Seated rest break
- Other Considerations
  - Therapist positioning
  - Level of assistance

Five Times Sit to Stand Test

- Equipment needed
  - Standard chair
  - Stopwatch
- The score is the amount of time it takes a patient to transfer from a seated to a standing position and back to sitting five times.
- *"I want you to stand up and sit down five times in a row, as quickly as you can, when I say 'Go'. Be sure to stand up fully and try not to let your back touch the chair back between each repetition. Do not use the back of your legs against the chair."*
- If the patient cannot perform five stands to complete the test without use of arms, a score of 0 seconds should be documented

Quality of life

- Questionnaire used to identify the impact of heart failure on the patient's daily life and activities.
- Aide in developing a plan of care that is patient centered
- Used to identify areas in need and develop coping strategies.


MINNESOTA LIVING WITH HEART FAILURE® QUESTIONNAIRE

How to take the COPD Assessment Test™ (CAT)

At Home Strategies

- Walking program
- Home exercise program
- Energy Conservation techniques
  - Assistive devices
- Cardiac/Pulmonary Rehabilitation

Energy Conservation

Walking Program


Walking Program Tracking Sheet

- Start walking 2 times per day
- Slowly increase time of walk to improve endurance
- Complete warm up/cool down exercises
- Rate exertion on Borg Scale
- Track progress

Pulmonary Rehab

Eligibility

- Obstructive Disease
  - **COPD**
  - Emphysema
  - Chronic Bronchitis
  - Asthma
  - Cystic Fibrosis
- Restrictive Disease
  - Pulmonary fibrosis
  - Interstitial lung disease
  - Parkinson's Disease
  - Post Polio Syndrome
  - Sarcoidosis
  - Kyphoscoliosis
- Other Conditions
  - Lung Cancer
  - Pulmonary hypertension
  - Post-thoracic sx
  - Lung transplant
  - Multiple Sclerosis
  - Diaphragm disfunction

Cardiac Rehab

Eligibility

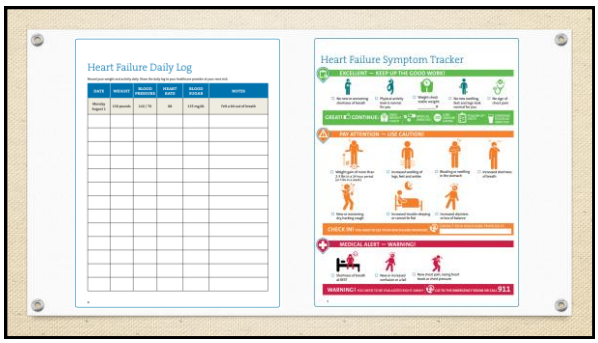
- MI within the last year
- CABG
- Stable angina
- Valve repair (including TAVR)
- PCI
- Heart transplant
- **Chronic systolic HF**
  - **LVEF 35% or less & NYHA II to IV symptoms despite being on optimal heart failure therapy for 6 wks**
  - **Stable patients are defined as patients who had recent (<6 weeks) or planned (<6 months) major cardiovascular hospitalization or procedure**

Cardiac and Pulmonary Rehab

- Supervised exercises plan
  - Aerobic, resistance training, and stretching
- Nutrition plan
- Tobacco cessation program
- Weight management
- Stress/disease management
- Support groups

Self Efficacy

- A patient's confidence in their abilities
- Important determinant of health outcomes and includes uptake of self-care like exercise initiation and maintenance
- Leads to improved consistency in
  - Taking daily medication
  - Managing fluid intake and weight
  - Low sodium diet
  - Routine exercise
  - Attending medical appts
- Leads to fewer deaths and hospitalizations
- Ways to improve self efficacy:
  - Direct involvement in exercise
  - Self-care education classes
  - Caregiver training/Social Support
  - Activity logs



Additional Resources for Patient Education

Life's Essential 8 Fact Sheet | American Heart Association

Living with COPD | American Lung Association

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Questions?