

# Heart Failure Assessment

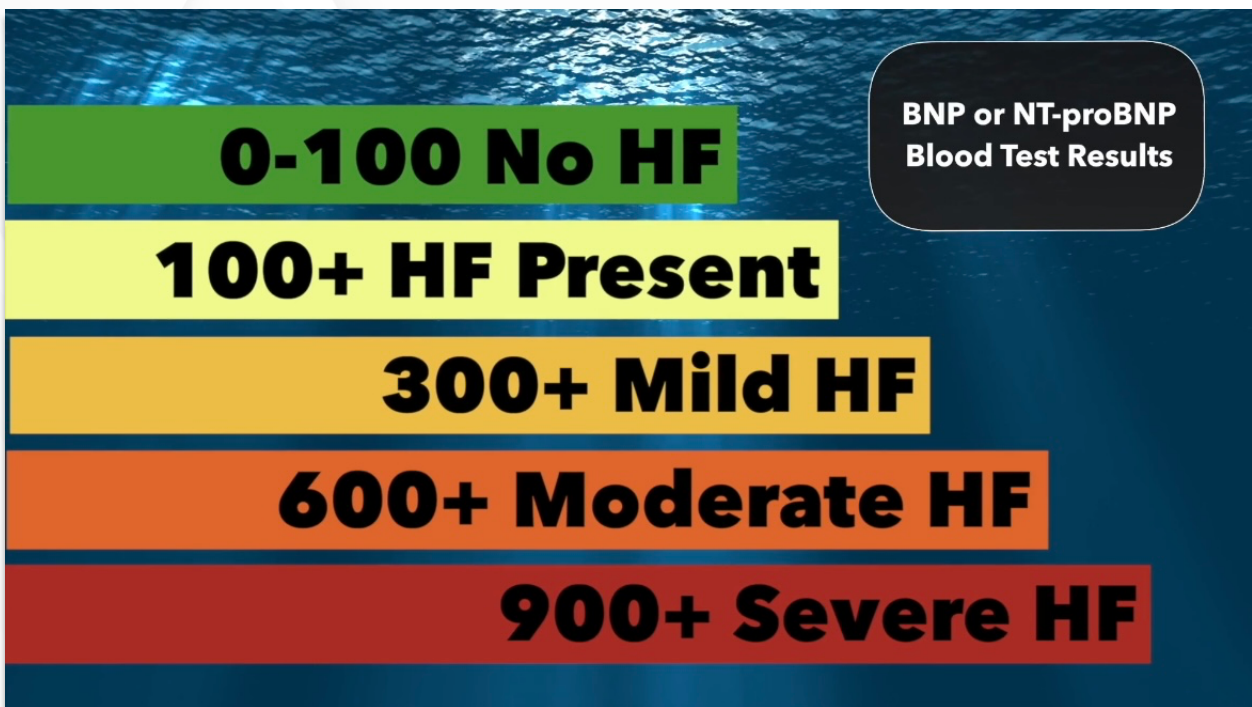
## Acute Decompensation

1. Compensated Heart Failure:
  - a. Symptoms are well-controlled
  - b. No signs of fluid overload
  - c. Cardiac output is sufficient for metabolic needs
2. Decompensated Heart Failure:
  - a. Symptoms of heart congestion present
  - b. Signs of fluid overload present
  - c. Cardiac output is insufficient to meet metabolic needs

## Acute Decompensation Assessment: Symptoms for Both Right- and Left-Sided Heart Failure

1. **Sudden weight gain**
  - a. **First sign of fluid overload**
  - b. Definition of sudden weight gain:
    - i. 2 pounds in 1 day (or)
    - ii. 5 pounds in 1 week
2. **Symptoms of poor cardiac output**
  - a. **Tired and S.A.D. Symptoms:**
    - i. **Tired**
    - ii. **Syncope (lightheaded, dizzy, faint, orthostatic hypotension)**
    - iii. **Angina**
    - iv. **Dyspnea**
3. Signs of poor cardiac output:
  - a. **Central cyanosis**
    - i. **Tongue or lips are blue**
    - ii. **Associated with inadequate oxygenation and is a SERIOUS symptom**
      - **More serious than peripheral cyanosis** (where hands/feet are blue)
    - iii. Indicates that oxygen levels are < 80%

4. Elevated BNP blood test
  - a. When the ventricles are overstretched due to blood volume overload, BNP messengers are released from the ventricles
    - i. BNP messengers tell the brain to tell the kidneys to get rid of extra fluid
    - ii. Kidney then release sodium and water to reduce volume overload
  - b. BNP messengers work well during compensated heart failure
  - c. BNP become less effective during decompensated heart failure
  - d. **During decompensated heart failure, blood test will show very elevated BNP levels**



## **Decompensation Assessment: Specific to Left-Sided Heart Failure**

1. **Congestion in the LEFT side of the heart will cause back-up congestion in the pulmonary vasculature**
2. **Symptoms will be pulmonary related**
3. Pulmonary congestion signs and symptoms:
  - a. **Dyspnea**
    - i. Different types:
      - Dyspnea on exertion
      - Orthopnea (shortness of breath when lying flat)
      - Paroxysmal Nocturnal Dyspnea (wakes up feeling like they are suffocating)
      - Dyspnea at rest
    - ii. Dyspnea is progressive:
      - Dyspnea starts with shortness of breath with just exertion and progresses to shortness of breath at rest
  - b. **Crackle sounds in lungs**
  - c. **Hypoxia**
  - d. **Non-productive cough**

## **Decompensation Assessment: Specific to Right-Sided Heart Failure**

1. Congestion in the RIGHT side of the heart will cause congestion in the venous system
2. **Right-sided heart failure causes an increase in central venous pressure**
3. The superior and inferior cavas feel this volume overload and have a difficult time returning blood to the heart
  - a. Superior vena cava congestion leads to **Jugular Vein Distention (JVD)**:
    - i. Normal jugular veins:
      - The jugular vein should look flat/“invisible” when patient is supine with head of bed at a 45 degree angle
    - ii. Congested jugular veins:
      - The jugular veins bulge/“visible” when patient is supine with head of bed at a 45 degree angle
      - **Jugular vein distention (JVD) is a sign of increased central venous pressure due to reduced blood return to the heart**
  - b. Inferior vena cava congestion leads to lower extremity **Edema**:

- i. Congestion in the inferior vena cava will congest the preceding veins in the legs
  - ii. Gravity causes the volume overload to pool in the legs
  - iii. Volume overload in the veins puts pressure on the vessels, causing them to leak fluid to surrounding tissue
  - iv. **Congestive Heart Failure (CHF) edema will always be bilateral in both legs**
    - Unilateral edema is indicative of a *different* medical problem, not fluid overload from congestive heart failure (CHF)
    - CHF edema spreads evenly to BOTH legs, so it is BILATERAL edema, not unilateral or just in one leg
  - v. **A 10lb weight gain is 5L of fluid and precedes visible edema**
  - vi. Assessing edema:
    - Press firmly for 5 seconds over dorsum of the feet, shins, and behind medial malleolus
    - Grade edema on a 5-point scale from 0 to 4
      - ♥ 0 = no edema
      - ♥ +1 = 2mm depression and the skin rebounds immediately
      - ♥ +2 = 4mm depression and skin rebounds in a few seconds
      - ♥ +3 = 6mm of depression and skin rebounds in 4-10 seconds
      - ♥ +4 = 8mm of depression and skin rebounds in 11-20 seconds
  - vii. Fluid can also congest digestive organs and the liver
    - Can cause abdominal distention
    - Symptoms:
      - ♥ Abdomen feels full
      - ♥ Nausea
      - ♥ Poor appetite
- c. Nocturia is another symptom of right-sided congestive heart failure
- i. Nocturia: awakening to urinate 2 or more times during the night
  - ii. *Cardiac output slightly improves during sleep* because of the elimination of gravity when laying down
    - Blood volume return to heart increases
    - Kidneys then receive more blood volume and then able excrete some of the excess

## EKG Changes

1. Cardiac remodeling changes electrical pathways
2. This can cause electrical changes in ECG waves

### Atrial Enlargement ECG Changes

1. The p-wave represents electricity moving through the left and right atrial simultaneously
2. **Left atrial enlargement:**
  - a. **Notched p-waves in lead II**
3. Right atrial enlargement:
  - a. Tall and peaked p-waves

### Ventricular Hypertrophy

1. The QRS represents electricity moving through the left and right ventricles simultaneously
2. **Left ventricular hypertrophy** (left ventricle wall is thick):
  - a. Tall and deep QRS waves
  - b. Best detected in leads V1 through V6
  - c. **To calculate:**
    - i. **Measure the DEEPEST QRS wave in V1 or V2**
    - ii. **Measure the TALLEST QRS wave in V5 or V6**
    - iii. **If the combined measurement is MORE than 35mm (35 small boxes), then the patient has left ventricular hypertrophy**

## Heart Failure Testing

1. **Gold standard for diagnosing and evaluating heart failure is an echocardiogram**
  - a. Ultrasound of the heart
  - b. Gives information about the:
    - i. Heart shape
    - ii. Heart size
    - iii. Heart motion
    - iv. Blood flow through heart chambers
    - v. Measures ejection fraction of left ventricle
2. **TTE: Transthoracic Echocardiogram**
  - a. **Most common type of echocardiogram used**
  - b. **Transducer is on top of the chest wall**
  - c. **Non-invasive**

# Heart Failure Classifications (Staging Progression)

## Classifying Heart Failure

1. Classifying heart failure helps determine which treatments and interventions are needed
2. Two main methods that physicians use:
  - a. New York Heart Association method (most popular)
  - b. American Heart Association method

## New York Heart Association

1. Most popular method
2. Assesses patient's functional capacity
  - a. **Classification is based on a patient's symptoms**
  - b. How does heart failure affect *this* person?
3. 4 Classes:
  - a. Class I: ASYMPTOMATIC
    - i. No limitations of physical activity
    - ii. **No symptoms**
  - b. Class II: Moderate Exertional Symptoms
    - i. **Symptoms with major activity**
    - ii. **No symptoms at rest**
  - c. Class III: Minimal Exertional Symptoms
    - i. **Symptoms with minor activity**
    - ii. **No symptoms at rest**
  - d. Class IV: Always Symptomatic
    - i. **Symptoms at rest**
    - ii. No relief ever
4. A patient can go up or down between classes as they improve with interventions

## American Heart Association

1. 4 stages:
  - a. Stage A:
    - i. Patient is at risk for heart failure
    - ii. Risk factors:
      - Hypertension
      - Genes
      - Diabetes
      - Obesity
      - Hyperlipidemia
    - iii. **Goal: reduce and control modifiable risk factors**
  - b. Stage B:
    - i. Some cardiac remodeling
    - ii. No symptoms yet
    - iii. **Goal: prevent further remodeling with medications**
  - c. Stage C:
    - i. Symptoms of heart failure
      - **Dyspnea is usually first symptom**
    - ii. **Goal: control symptoms**
    - iii. This is the stage that a patient is receiving aggressive medical treatments like medications and an ICD if their ejection fraction is less than 35%
  - d. Stage D:
    - i. End-stage
    - ii. **Treatments are no longer helpful**
      - Patient doesn't stabilize with treatment
    - iii. **Patient options:**
      - **Heart transplant (best long term solution)**
      - **LVAD (Left Ventricular Assist Device)**
      - **Palliative care**
        - ♥ **Symptoms will still be treated for patient comfort, not cure**
        - ♥ This is not hospice care, which withdraws treatment and prepares the patient for their death
        - ♥ Palliative care continues to treat symptoms for comfort
    - iv. Cardiac Cachexia
      - Unintentional and severe weight loss from end-stage heart failure
      - Loss of muscle mass
      - A very, very bad sign and means poorer prognosis



## HEART FAILURE: ASSESSMENT

2. Stages are progressive, unlike the NYHA stages
  - a. When a patient progresses to new stage, there is no return to the previous stage