Heart Failure Background

What is heart failure?
Heart failure is a condition in which the heart cannot pump enough oxygen-carrying blood to meet the body's needs. Heart failure occurs gradually over time and begins when the heart is weakened due to damage (e.g., heart attack or persistent high blood pressure). Over time, the heart no longer contracts as strongly or as coordinated as before. As a result, the heart gradually loses its ability to carry out its primary function, which is to pump enough blood to supply the body's need for oxygen. When the heart muscle is weakened, the heart needs to work harder to keep blood flowing to the body. This stresses the heart and, to compensate for this additional strain, the heart muscle becomes enlarged. The enlargement of the heart further weakens it and makes the problem worse.

What causes heart failure?
Although the cause of heart failure differs from patient to patient, the risk of developing heart failure increases with age and several other factors. Heart failure can strike at any age, but is most often seen in people over age 65. Risk factors for heart failure include:

- Heart attack (myocardial infarction)
- High blood pressure (hypertension)
- Clogged arteries (atherosclerosis)
- Diabetes
- Chronic lung diseases, such as emphysema
- Family history of heart disease or heart failure

How is heart failure diagnosed and treated?
One of the most commonly used tools for diagnosis of heart failure is an echocardiogram (echo), which uses sound waves to produce images of the heart. An echo is used to measure the size of the heart and the ejection fraction (EF). The ejection fraction is a measurement of how well and how strongly the heart is pumping. According to HFSA, people with a healthy heart typically have an EF of more than 50 percent, while people with heart failure have, among other symptoms, an EF of less than 35 percent. Initially, heart failure is usually treated pharmacologically. The most commonly used drugs (often in combination with each other) are:

- **ACE inhibitors**: inhibit the production of a hormone that is responsible for the constriction of blood vessels and the retention of water and salt.
- **Beta-blockers**: reduce the heart size, increase the ejection fraction and slow down the heart rate.
- **Digoxin**: increases the ejection fraction and improves exercise tolerance.
- **Diuretics**: remove excess fluid in the body and reduce swelling in legs and ankles.

It is recommended that all patients diagnosed with heart failure adopt lifestyle changes, such as dietary changes and supervised exercise. After initial drug therapy, patients may require surgical or other medical procedures, including valve replacement; defibrillator implantation; left ventricular assist devices; and, in severe cases, heart transplant.

What are the symptoms of heart failure?
Heart failure can be difficult to diagnose because the symptoms may be subtle and are often mistaken for normal signs of aging. To help people understand and identify the symptoms of heart failure, the Heart Failure Society of America (HFSA) developed the acronym **FACES**:

- **Fatigue**: caused because muscles and other tissues are receiving less oxygen and nutrition from the blood.
- **Activities limited**: difficulty participating in ordinary activities. Limitations in activities are dependent upon disease severity.
- **Chest congestion**: raspy breathing or wheezing.
- **Edema**: fluid build-up in the lungs, feet, legs or abdomen, which can lead to swelling.
- **Shortness of breath**: resulting from excess fluid in the lungs. Breathing difficulties may occur at rest or during exercise and, in severe cases, can prevent or interrupt sleep.

What is ejection fraction?
Ejection fraction (EF) is an indicator of how well the heart is pumping. An echocardiogram is used to determine the heart's ejection fraction. People with healthy hearts usually have an ejection fraction of 50% or greater.

What is QRS?
The major electrical impulse in the heart that causes the heartbeat and is recorded in an electrocardiogram. More specifically, the impulse comprises the Q, R, and S waves, which represent the ventricular activity of the heart.