

The cardiovascular system

Heart failure

Heart failure is a condition in which the heart can't pump enough blood to meet the body's needs. In some cases, the heart can't fill with enough blood. In other cases, the heart can't pump blood to the rest of the body with enough force. Some people have both problems.

The term "heart failure" doesn't mean that the heart has stopped or is about to stop working. However, heart failure is a serious condition that requires medical care.

Overview

Heart failure develops over time as the heart's pumping action grows weaker. The condition can affect the right side of the heart only, or it can affect both sides of the heart. Most cases involve both sides of the heart.

Right-side heart failure occurs if the heart can't pump enough blood to the lungs to pick up oxygen. Left-side heart failure occurs if the heart can't pump enough oxygen-rich blood to the rest of the body.

Right-side heart failure may cause fluid to build up in the feet, ankles, legs, liver, abdomen, and the veins in the neck. Right-side and left-side heart failure also may cause shortness of breath and fatigue.

Causes

Conditions that damage or overwork the heart muscle can cause heart failure. Over time, the heart weakens. It isn't able to fill with and/or pump blood as well as it should. As the heart weakens, certain proteins and substances might be released into the blood. These substances have a toxic effect on the heart and blood flow, and they worsen heart failure.

Causes of heart failure include:

- Coronary artery disease.
- Diabetes.
- Hypertension.
- Other heart conditions or diseases.

Risk factors

- Age: Older people also may have had diseases for many years that led to heart failure.
- Race: Blacks are more likely to have heart failure than people of other races.
- Overweight: Excess weight puts strain on the heart.

- Previous heart attack: Damage to the heart muscle from a previous heart attack can weaken the heart muscle.

Signs, symptoms and complications

The most common signs and symptoms of heart failure are:

- Shortness of breath or trouble breathing.
- Fatigue.
- Swelling in the ankles, feet, legs, abdomen, and veins in the neck.

All of these symptoms are the result of fluid buildup in the body. When symptoms start, the patient may feel tired and short of breath after routine physical effort, like climbing stairs.

As the heart grows weaker, symptoms get worse. Patient may begin to feel tired and short of breath after getting dressed or walking across the room. Some people have shortness of breath while lying flat.

Fluid buildup from heart failure also causes weight gain, frequent urination, and a cough that's worse at night and when the patient lies down. This cough may be a sign of acute pulmonary edema. This is a condition in which too much fluid builds up in the lungs. The condition requires emergency treatment.

Treatment

Early diagnosis and treatment can help people who have heart failure live longer, more active lives. Treatment for heart failure depends on the type and severity of the heart failure.

The goals of treatment for all stages of heart failure include:

- ✓ Treating the condition's underlying cause, such as coronary heart disease, hypertension, or diabetes.
- ✓ Reducing symptoms.
- ✓ Stopping the heart failure from getting worse.
- ✓ Increasing your lifespan and improving your quality of life.

Effect of gravity on the body

The following changes occur when an individual moves from a supine to standing position:

1. A significant volume of blood pools in the lower extremities because of high compliance of the veins. Muscular activity would prevent this pooling.
2. Increase venous pressure in legs, increase filtered fluid into interstitium. Edema may occur.
3. Decrease venous return, both stroke volume and COP decrease (Frank-Starling relationship).

4. If COP decrease, cerebral blood pressure becomes low, fainting may occur.

Compensatory mechanisms will attempt to increase blood pressure to normal: The carotid sinus baroreceptors respond to the decrease in arterial pressure by decreasing the firing of the carotid sinus nerves. Vasomotor center then increases sympathetic outflow to the heart and blood vessels and decreases parasympathetic outflow to heart. As a result, heart rate, total peripheral resistance and blood pressure increase toward normal.