

Causes & Treatments of Heart Failure

The Basics – For Any Type of Heart Failure

- Usually heart failure is due to a primary cause as well as additional contributing causes
 - Identifying and treating these causes are important in all types of heart failure
- Controlling blood pressure is an important treatment of almost all types of heart failure since blood pressure is pressure the heart has to work against to pump blood throughout the body
 - Goal blood pressure is *usually* $\leq 120/80$ and can be even lower if the “EF” is very low
- Reducing salt (sodium) & water: both sodium and water cause fluid retention, which worsen heart failure symptoms and lead to more frequent hospital visits
 - Fluid intake (any type): generally **<2L a day**
 - Sodium intake: **<2.3 grams per day**
 - See the section on **“Tips for Reducing Fluid and Sodium Intake”**
- Self-Monitoring: important to monitor your blood pressure, heart rate, and daily weight at home
 - If any these are *regularly* abnormal, then call your doctor for additional advice
 - See the section on **“Home Monitoring Sheet”** to help you keep track
- Treatment is focused on these steps:
 - 1) Discovering and treating underlying cause(s)
 - 2) Start medications proven to improve the heart function and help patients live longer
 - 3) Closely monitoring yourself at home for warning signs → seek treatment when needed
 - 4) Make “heart healthy” lifestyle choices
 - 5) Placement of implanted defibrillators (ICD) if heart function is low after optimal treatment to prevent sudden cardiac death
 - 6) If there is still severe disability, then consider more “advanced therapy” options

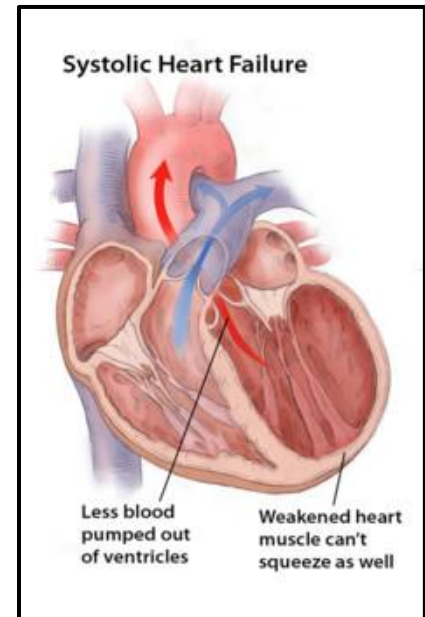
Systolic Heart Failure (weak heart muscle)

- **Facts**

- Accounts for ~50% of heart failure
- Several different causes for “heart weakening”
- Patients with systolic heart failure have a greater risk of sudden death and do not live as long (on average) as patients with diastolic heart failure

- **Underlying Causes**

1. **Coronary Artery Disease** – blockages in the “coronary arteries”, or blood supply to the heart, can lead to inadequate blood supply to the heart. If the artery is completely or almost completely blocked, the term “heart attack” or “myocardial infarction” is typically used.
 - **Treatment:** if the heart muscle is still alive, then returning the blood flow, called revascularization can help – either with a stent or with bypass surgery
2. **Abnormal Heart Rhythms (Arrhythmias):** certain arrhythmias that lead to a fast heart rate, called tachycardia, or abnormal heart beats, such as with premature ventricular contractions (PVCs) can cause heart weakening
 - **Treatment:** slowing heart rate and/or treating arrhythmias can improve heart function
3. **Viral Myocarditis:** certain viral infections can cause the heart to be weak
 - **Treatment:** no specific treatments aside from normal medications / treatments
4. **Cardiomyopathy:** this term describes a *disease* in the heart muscle and can occur due to several underlying causes, including inherited causes. The specific cause is not always found.
 - **Treatment:** treat the underlying cause if know
5. **Valvular heart disease:** stiff (stenotic) valves and leaky (regurgitant) valves can increase pressure on the heart
 - **Treatment:** correct the valve abnormality with surgery or minimally invasive methods.
 - **Note:** certain heart valve problems are actually *due to the heart failure* and can improve with proper heart failure treatment
6. **Endocrine Abnormalities:** most commonly due to thyroid problems as well as others
 - **Treatment:** correct the underlying endocrine problem
7. **Toxins:** certain toxins can make the heart weak. Common toxins are excessive alcohol, cocaine/meth, and certain chemotherapy medications



- **Treatment:** avoiding excess alcohol/drug use; monitoring heart function when taking certain types of chemotherapy medications
- **Standard Medical Treatment** – all types of systolic heart failure should be treated with medications proven to improve heart function, reduce death, reduce hospitalizations, and improve quality of life.
 1. **Angiotensin blocking medication** – helps the heart recover and reduces scarring
 - either an ACE, ARB, or ARNI medication
 2. **Beta blocker** – reduces the work of the heart by reducing heart rate and pumping
 3. **Aldosterone antagonist** – similar effects as the Angiotensin blocking medications
 - Typically, only added after Angiotensin blocking & beta blockers are started
 4. **Hydralazine + long-acting nitrate** – helpful only in African Americans & any patient who cannot tolerate an angiotensin blocking medication
 - Only added on after the using the other medications
- **Additional medications** – not shown reduce death, but may reduce hospitalizations and/or improve quality of life
 1. **Digoxin:** can reduce hospitalizations, but does not reduce deaths
 2. **Water pills (diuretics):** used to keep excess water off
 3. **Inotropic Medications:** force the heart to pump harder
 - Only used for “end stage” heart failure to control symptoms
 - Only given via continuous IV infusion
 - Does not prolong life and may actually lead to earlier death
- **Non-Medical Treatments**
 1. **Implanted Cardiac Defibrillator (ICD):** For patients with an “EF” $\leq 35\%$ despite other treatments, inserting an ICD is normally considered to prevent sudden death by shocking your heart
 2. **Blood pressure control:** blood pressure is the pressure the heart pumps against
 - goal blood pressure **usually $\leq 120/80$** in patient with heart failure
 3. **Weight loss:** in patients who are excessively overweight (obese), weight loss improves quality of life, reduces hospitalization, and may improve heart function
 - Healthy diet is important for any patient with heart disease
 4. **Exercise:** improves both heart and overall function in patients with heart failure
 - **Cardiac rehab** is a monitored & structured exercise program
 - Discuss starting a *strenuous* exercise program with your doctor first
 5. **Quitting tobacco:** tobacco causes several heart problems and should *always* be stopped

Diastolic Heart Failure (heart is stiff and cannot relax)

- **Facts**

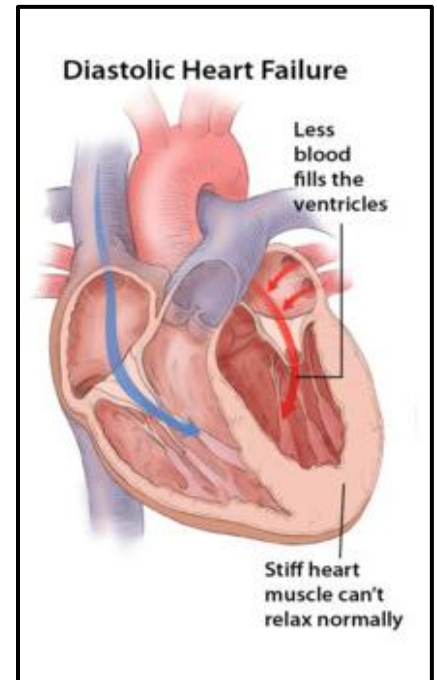
- Due to the heart becoming stiff and not being able to relax
- Accounts for *about* 50% of heart failure
- Does not lead to as many deaths as systolic heart failure, but can lead to early death, frequent hospital visits, and poorer quality of life
- No specific medications have yet been shown to treat diastolic heart failure -unlike systolic heart failure

- **Underlying Causes**

1. **Age:** much more common with increased age
2. **Poorly controlled hypertension:** leads to increased work of the heart and increased thickening, called “hypertrophy”
 - **Treatment:** adequately treating blood pressure – goal $\leq 120/80$ in most patients
3. **Obesity:** being excessively overweight puts increased strain on the heart
4. **Coronary artery disease:** blocked coronary arteries may contribute and should be treated when present
 - **Treatment:** with either a stent or bypass surgery if significant blockage present
5. **Abnormal heart rhythms (Arrhythmias):** any arrhythmia that causes an increased heart rate (most commonly with “Atrial Fibrillation” and “Atrial Flutter”)
 - **Treatment:** prevent the heart rate from going too fast
6. **Poorly controlled diabetes & high cholesterol:** both can increase inflammation

- **Treatment**

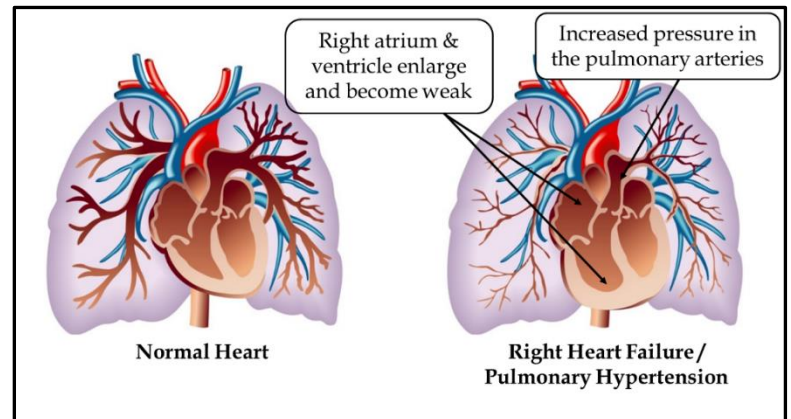
- No specific medication yet has shown to help
- Control blood pressure – ideally $\leq 120/80$
- Control fast heart rates / arrhythmias – ideally $\leq 70-90$ at rest
- Correct coronary artery disease, if present – either a stent or bypass surgery
- Control diabetes and high cholesterol
- Lose weight and stay active



Right Heart Failure

- **Facts**

- Most right heart failure is due to left heart failure
- Right heart failure is *usually* due to increased pressure in the lungs
- Treatment is focused on treating the underlying cause and keeping fluid off



- **Causes**

1. **Left Heart Failure:** fluid backs up into the lungs and then into the right heart. Most common cause of right heart failure
 - **Treatment:** treat the *systolic* or *diastolic* heart failure (as discussed above)
2. **Lung Disease:** several lung diseases such as COPD, blood clots (pulmonary embolism), or lung fibrosis can increase the pressure in the lungs, thereby increasing pressure in the right heart
 - **Treatment:** Treat the lung disease
3. **Idiopathic Pulmonary Artery Hypertension:** a *rare* condition in the lungs that causes increased pressure in the blood vessels of the lungs, thereby increasing pressure in the heart.
 - **Treatment:** several medications can be used to help treat this condition
4. **Coronary artery disease:** just like with *systolic* heart failure, blockages in the coronary arteries (blood supply to the heart) can lead to heart muscle damage. There is *almost always* damage to the left heart as well since it receives most of the heart's blood supply
 - **Treatment:** improve blood flow with either a stent or bypass surgery
5. **Rare genetic causes:** Almost always, people will develop symptoms as a child or in early adulthood. There are several rare, genetic causes that can cause the right heart to become weak.
 - **Treatment:** depends on which rare disease is causing the problem.

- **Treatment**

1. **Treat the underlying cause**
2. **Keep water off:** monitor how much fluid you drink, weigh yourself regularly, take water pills that will help control fluid retention.