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Congestive Heart Failure

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Congestive Heart Failure

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Introduction

- The heart balances the supply and demand of oxygen in the body by pumping oxygenated blood through the vasculature.
- Congestive heart failure (CHF) is the heart's inability to eject blood in sufficient amounts to maintain the oxygen needs of bodily tissues (Nagelhout et al., 2022)
- CHF results in various complications resulting from excess fluid retention.
- The New York Heart Association (NYHA) and the American College of Cardiology/American Heart Association provide classifications and stages of heart failure (see Figure 1)

Risk Factors

- Coronary artery disease (CAD) – weakens the heart as the narrowed arteries cannot supply oxygen-rich blood to meet myocardial oxygen demands
- Heart attack – a form of CAD that occurs acutely; may result in damage to the heart muscle leading to impaired contractility
- Heart valve disease – improper valve function such as aortic stenosis can impede blood flow.
- Hypertension – increases the workload of the heart
- Structural heart disease – congenital deformities from birth can cause impaired heart function.
- Irregular heartbeats – chronic arrhythmias such as atrial fibrillation can increase the workload of the heart and lead to heart failure
- Diabetes – increases the risk of CAD and hypertension
- Sleep apnea – inadequate supply of oxygen can cause arrhythmias
- Obesity – overweight people have a higher risk of developing diabetes, hypertension, and heart complications
- Viruses – certain viruses can damage cardiac muscle
- Unhealthy behaviors - excessive alcohol use, smoking, and an unhealthy diet all can lead to heart failure

(Mayo Clinic, 2022)

Sings & Symptoms

- Shortness of breath with activity or when lying down
- Fatigue and weakness
- Swelling in the legs, ankles, and feet
- Rapid or irregular heartbeat
- Exercise intolerance
- Cough, wheezing,
- White or pink-tinged mucus
- Swelling of the abdomen
- Rapid weight gain from fluid retention
- Decreased alertness and problems concentrating
- Chest pain if heart failure is caused by a myocardial infarction

(Mayo Clinic, 2022)

Clinical Significance

- Around 5.4 million people in the United States have CHF (Wang et al., 2021)
- Prevalence of HF is about 1-2% and increases to around 10% in people over 70 years old (Altukhays et al., 2022)
- 40% of people over the age of 85 have heart failure (Nagelhout et al., 2020)
- It is estimated that 8 million people will have heart failure by 2030 (Nagelhout et al., 2022)
- Yearly national healthcare costs associated with CHF are nearly \$31 billion (including health care services, medications, and missed work) (Altukhays et al., 2022)
- Worldwide yearly healthcare costs associated with CHF are estimated to be around \$160 billion (Zhang et al., 2022)
- 5-year mortality rate with CHF diagnosis is 50% (Zhang et al., 2022)
- In 2018, 379,800 death certificates in the United States mentioned heart failure (CDC, 2020)

Prevention

- Don't smoke
- Regular physical exercise
- Reducing and managing stress
- Eating healthy foods
- Controlling conditions such as hypertension and diabetes
- Adhering to prescribed medications

(CDC, 2020)

CONGESTIVE HEART FAILURE

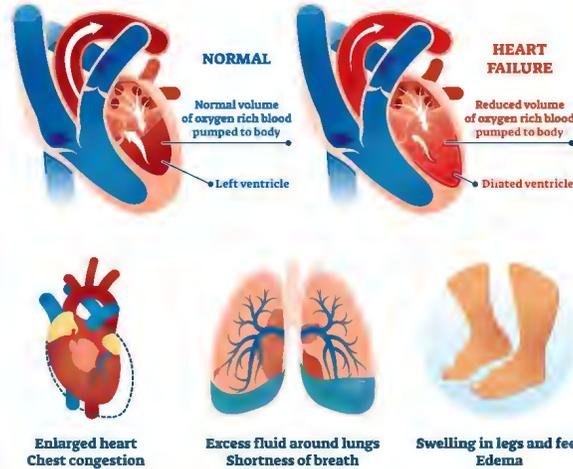


Figure 2 – acquired from <https://www.istockphoto.com>

Pathophysiology

- Heart failure is a complex syndrome that results from any heart dysfunction that causes either an inadequate amount of filling or ejection of blood to meet the oxygen demands of the body (Malik et al., 2022)
- Heart failure can be diastolic or systolic and classified based on left ventricular ejection fraction (LVEF):
 - Diastolic heart failure results from stiffened ventricles that cannot relax enough for adequate filling, while systolic heart failure results from impaired left ventricle contraction resulting in decreased perfusion (see Figure 3) (Banner Health, 2022).
 - Heart failure is usually classified “according to left ventricular ejection fraction (LVEF) into heart failure with reduced ejection fraction (LVEF 40% or less), known as HFrEF, and heart failure with preserved ejection fraction (LVEF greater than 40%); known as HFpEF.” (Malik et al., 2022 p. 1)
- The final stage of cardiac problems is usually CHF, when fluid backs up from the heart's inability to pump sufficiently (Altukhays et al., 2022)
- CHF is “an abnormality of the myocardial function responsible for failure of the heart to pump blood at a rate commensurate with the requirements of the metabolizing tissue...a condition in which the heart fails to maintain an output sufficient for the needs of the body and the cellular respiration becomes impaired” (Dhadwad et al., 2020, p. 37).

Complications

- Heart failure increases the risk of atrial fibrillation 10-fold, 1/3 of CHF patients have atrial fibrillation (Farmakis et al., 2020).
- Patients with CHF have higher rates of pulmonary edema and effusions that are mainly caused by left ventricular diastolic function (Li et al., 2022)
- Reduced renal perfusion from heart failure can cause kidney injury, leading to kidney failure and dialysis if untreated (CDC, 2020)
- “Heart failure is a major independent predictor of adverse perioperative outcomes in noncardiac surgery...in patients with CHF and renal failure undergoing emergency surgery, mortality rates as high as 76% have been reported” (Nagelhout et al., 2022, p. 195)

Treatment

- Diuretics, Beta-blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, angiotensin receptor neprilysin inhibitors, hydralazine plus nitrate, digoxin, and aldosterone antagonists all have documented survival benefits (Malik et al., 2022)
- Medication compliance, reducing sodium in the diet, and fluid restrictions.
- In septic patients with heart failure, utilizing a ≥ 30 mL/Kg fluid bolus may reduce hospital stay mortality (Acharya et al., 2021).
- Device therapy such as an implantable cardioverter-defibrillator (ICD) to prevent sudden death resulting from fatal arrhythmias (Berlinger et al., 2020)

Nursing Care

- Relieving symptoms of fluid retention
- Alleviating anxiety and decreasing fatigue
- Promoting physical exercise
- Encouraging medication compliance
- Identifying and decreasing adverse effects of treatments
- Education about dietary restrictions and modifications
- Education about patient self-monitoring of symptoms
- Education about daily weight monitoring
- Education on when to seek help: worsening symptoms of fluid overload and hypoxia, uncontrolled tachycardia, sustained irregular heart rhythm, change in mental status, and decreased urine output despite diuretics

(Malik et al., 2022)

Conclusion

- CHF affects millions of people in the United States and across the globe.
- CHF is a complex pathophysiological process that results in various complications related to excess fluid retention.
- Classifications and stages of heart failure provide a framework for orienting syndrome progression.
- Patients may take actions to lower their risk of CHF, such as diet modifications and exercise.
- “Treatment with ACE inhibitors and beta-blockers has led to a significant improvement in the prognosis of heart failure patients” (Berlinger et al., 2020, p. 380)
- Nursing implications and interventions focus on fluid retention education, management, and treatment.

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NYHA functional classification	Description	ACC/AHA stage of heart failure	Description
Class I	No limitation of physical activity; ordinary physical activity does not cause undue fatigue, palpitation, dyspnea	Stage A	At high risk for the development of HF; no identified structural or functional abnormality; no signs or symptoms
Class II	Slight limitation of physical activity; comfortable at rest; ordinary physical activity results in fatigue, palpitation, dyspnea	Stage B	Developed structural heart disease that is strongly associated with the development of HF, but without signs or symptoms
Class III	Marked limitation of physical activity; comfortable at rest; less than ordinary activity results in fatigue, palpitation, or dyspnea	Stage C	Symptomatic HF associated with underlying structural heart disease
Class IV	Unable to carry on any physical activity without discomfort; symptoms of HF at rest; if any physical activity is undertaken, discomfort increases	Stage D	Advanced structural heart disease and marked symptoms of HF at rest despite maximal medical therapy

ACC = American College of Cardiology; AHA = American Heart Association; HF = heart failure; NYHA = New York Heart Association.

Figure 1 (Georgilis, 2017)

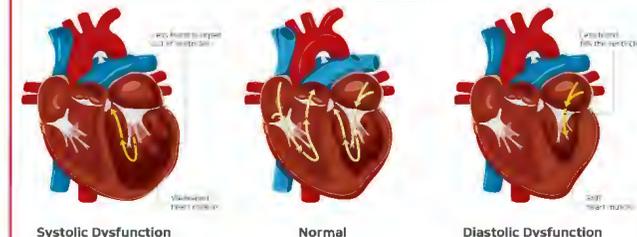


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