

Otterbein University

Digital Commons @ Otterbein

Nursing Student Class Projects (Formerly MSN)

Student Research & Creative Work

Summer 2022

Perioperative Risks of the Patient with Heart Failure

Gabrielle Metoyer
metoyer1@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn



Part of the [Cardiovascular Diseases Commons](#), [Cardiovascular System Commons](#), [Medical Anatomy Commons](#), [Medical Education Commons](#), [Medical Pathology Commons](#), [Medical Physiology Commons](#), [Pathological Conditions, Signs and Symptoms Commons](#), and the [Perioperative, Operating Room and Surgical Nursing Commons](#)

Recommended Citation

Metoyer, Gabrielle, "Perioperative Risks of the Patient with Heart Failure" (2022). *Nursing Student Class Projects (Formerly MSN)*. 505.

https://digitalcommons.otterbein.edu/stu_msn/505

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.

Perioperative Risks of the Patient with Heart Failure

Gabrielle Metoyer, RN, BSN, CCRN
Otterbein University, Westerville, Ohio

Underlying Pathophysiology

- Heart failure has many causes mainly being volume overload, inflammation, ischemia, valvular dysfunction, or genetic derangements (Prinzen et al., 2022).
- Following a cardiac injury such as myocardial infarction, increased preload or afterload, cellular, structural, and neurohumoral modulation occur that affect the phenotype being present (Schwinger, 2020).
- These processes influence cell function intracellularly and extracellularly leading to the activation of sympathoadrenergic and renin-angiotensin-aldosterone-systems (Schwinger, 2020).
- This leads to adaptive mechanisms accompanied by volume overload, tachycardia, dyspnea, and further cell deterioration (Schwinger, 2020).
- Because of cellular dysfunction, the level of neurohormones (norepinephrine) and natriuretic peptide (NT-pro BNP) increase (Schwinger, 2020).

Signs and Symptoms

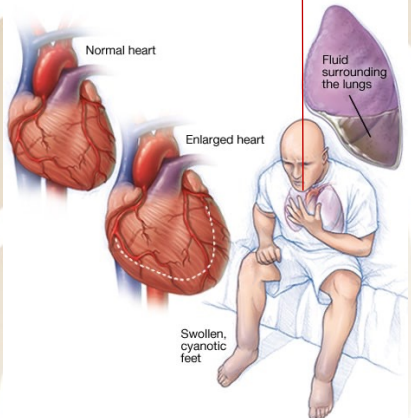
The presenting symptoms of patients with heart failure can depend on which type of heart failure they have been diagnosed with and whether it is acute or chronic (Lerman, et al., 2019b).

According to the CDC (2020) and Mayo Clinic (2022) the most common side effects of heart failure include:

- shortness of breath during daily activities
- having trouble breathing when lying down
- weight gain with swelling in the feet, legs, ankles, or stomach
- generally feeling tired or weak
- rapid or irregular heartbeat
- persistent cough or wheezing with white or pink blood-tinged mucus
- nausea or lack of appetite
- difficulty concentrating or decreased alertness
- chest pain if the heart failure is caused by a heart attack.

Clinical assessment may also include: elevated jugular venous pressure, pulmonary crackles, peripheral edema (Schwinger, 2020)

Figure 1. Heart Failure, Mayo Clinic, 2022



Diagnosis and Treatment

Diagnosis requires demonstration of one or more underlying causes of cardiac dysfunction such as:

- Cardiac abnormality (myocardial infarction) causing systolic and/or diastolic ventricular dysfunction
- Abnormalities of the valves (stenosis or regurgitation)
- Abnormalities of the pericardium
- Abnormalities of the endocardium
- Abnormalities of the heart rhythm or conduction (Schwinger, 2020).

Noninvasive (echocardiography, NMR, NT-ProBNP) and invasive (heart catheterization and biopsy) diagnostic procedures are available (Schwinger, 2020).

Treatment of heart failure is largely based on restoring coronary blood flow, treatment of valvular abnormalities, and use of heart failure medications (Prinzen et al., 2022).

Modulation of activated systems by beta blockers, ACE-inhibitors, and ARNI improve outcomes and symptoms of heart failure (Schwinger, 2020).

Interventional and surgical options are available and may be performed (Schwinger, 2020).

According to the Mayo Clinic (2022), severe heart failure may make patients candidates for heart transplants or ventricular assist devices (VAD).

Lifestyle changes such as losing weight, exercising, reducing salt in your diet and managing stress can improve the quality of life with heart failure.

Measurement of ejection fraction (EF) using echocardiography to measure how well your heart pumps is used as an indication of severity of heart failure

- 50% or less means a reduced EF
- 50% or more means EF is preserved (National Heart, Lung, and Blood Institute, 2022)

Heart Failure

- According to the CDC (2020), heart failure (HF) occurs when the heart cannot pump enough blood and oxygen to support other organs in your body
- According to the Mayo Clinic (2022), heart failure happens when blood backs up and fluid builds up in the lungs leading to shortness of breath
- Ventricles of the heart become stiff and do not fill properly between beats, making the heart muscle damaged and weakened.
- Over time the heart cannot keep up with the demands of the body and pump blood adequately to the body
- Heart failure can be ongoing (chronic) or may start suddenly (acute)
- Types of Heart Failure
 - Left-sided HF: fluid backs up in lungs
 - Right-sided HF: fluid backs up into abdomen, legs, and feet
 - Systolic HF (HF with reduced ejection fraction): left ventricle cannot contract adequately
 - HF with preserved ejection fraction: left ventricle cannot relax or fill fully

Risk Factors include:

- Coronary Artery Disease
- Heart Attack
- Heart Valve Disease
- High Blood Pressure
- Irregular Beats
- Congenital Heart Disease
- Diabetes
- Some medications can lead to heart failure
- Alcohol use
- Sleep Apnea
- Smoking or tobacco use
- Obesity
- Viruses

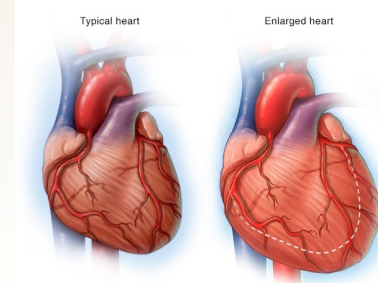


Figure 2. Heart Failure, Mayo Clinic, 2022

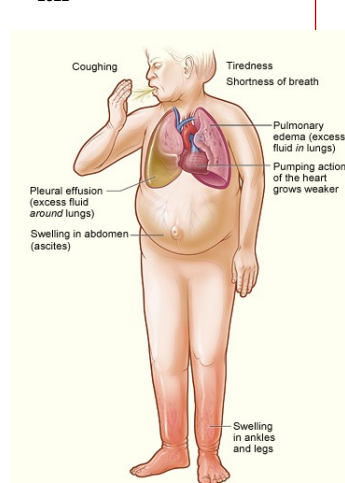
Why Heart Failure?

- Heart failure is an epidemic disease affecting 1-2% of the population worldwide (Schwinger, 2020).
- Heart Failure is one of the leading causes of morbidity and mortality worldwide with an estimated 6.5 million adults with HF in the United States (Lo et al., 2021)
- One of the leading causes of morbidity and mortality in our country (Lo, et al., 2021).
- According to the CDC (2020), heart failure was mentioned on 379,800 death certificates in 2018
- In 2012, heart failure cost the nation an estimated \$30.7 billion for health care services (CDC, 2020).

Implications for Nursing Care

- Key roles for the nurse in the management of heart failure focus on follow up and monitoring of patients at high risk for hospital readmission (Riley, 2015).
- Nursing assessment should include: dyspnea severity, hemodynamic status, heart rhythm, indicators for adequate cardiac output, clinical examination for signs of cardiovascular congestion, laboratory blood tests, and patient anxiety levels (Riley, 2015).
- Provide patient education including basic anatomy and physiology of the disease, symptoms to be aware of, medication regimen, and diet and exercise recommendations (Quan, 2020)
- Remind patients to take daily morning weights and explain that weight gain of 2 or more pounds can mean an exacerbation (Quan, 2020)
- Discharge planning and referral to disease management program is imperative to decrease hospital readmissions (Riley, 2015)

Figure 3. Heart Failure, National Heart, Lung, and Blood Institute, 2022



Perioperative Considerations

- Medical advances have increased the survival of those diagnosed with heart failure (Lerman, et al., 2019a) leading to an increased prevalence of those with cardiovascular risk factors undergoing non-cardiac surgeries (Smilowitz et al., 2018)
- Patients with existing heart failure undergoing surgery are at an increased risk for major cardiovascular complications such as death, myocardial infarctions, and stroke (Smilowitz, et al., 2018).
- Postoperative mortality risk among patients with heart failure was 5.49% compared to 1.22% for those without heart failure (Lerman et al., 2019b).
- In general, those with symptomatic heart failure are at a higher risk for procedures than those that are asymptomatic (Lerman et al., 2019b).
- Low ejection fractions have a higher postoperative mortality rate (Lerman et al., 2019b).
- Patients with HF, especially those with symptoms or low ejection fractions should be counseled about the higher risk of postoperative mortality (Lerman et al, 2019a).
- Common side effects associated with general anesthesia such as hypotension may be poorly tolerated among patients with heart failure and can lead to reduced long-term survival (Lerman et al, 2019a).

- Cardiac function and all modifiable risk factors should be optimized before procedures (Lerman et al, 2019a).
- Negative perioperative outcomes of a patient with heart failure include cardiac arrest, myocardial infarction, stroke, surgical site infection, urinary tract infection, and postoperative bleeding (Lerman et al., 2019b)

Conclusions

- Heart failure is an epidemic disease affecting millions of people worldwide (Schwinger, 2020).
- Heart failure is one of the leading causes of death worldwide (Lo, et al., 2021).
- With advances in medical technology, those with heart failure can live longer lives after disease diagnosis and are being seen in an increased number in perioperative settings.
- Heart failure patients are at an increased risk of postoperative morbidity and mortality.
- Patients with symptomatic heart failure or reduced ejection fractions are at an even greater risk of perioperative mortality.
- Patients with heart failure should be optimized as much as possible before surgery.
- Patient education on lifestyle changes and disease management can decrease hospital readmittance rates.

References and Additional Resources



OTTERBEIN
UNIVERSITY