Heart Failure

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Lub-dub, lub-dub. This is a normal heart; this is the sound of valves closing in the heart as blood is pumped between each chamber. The heart is a part of the cardiovascular system. This system is meant to pump oxygenated blood to every aspect of the body to prevent tissue death. It also must bring the blood back to be reoxygenated after the muscles and tissues have taken their required oxygen. To make this possible the system contains the heart, arteries, veins, and valves. If everything is working well the cycle should flow perfectly. If something were to disrupt the cycle major complications can occur, one of them being heart failure. Heart failure is a condition that results in the heart contracting ineffectively. Heart failure can be caused by many things such as coronary artery disease, hypertension, and myocardial infarction. The initial signs and symptoms include unexpected weight gain and the need to sit up when sleeping. Heart failure is a preventable disease with proper education. Over the next few paragraphs, heart failure will be defined, risk factors and treatments will be discussed, along with methods to deliver this vital information.

Statement of the Problem

Heart failure causes a disruption in the normal blood flow of the cardiovascular system. A normal heart's blood flow starts in the right atrium, the first of four chambers of the heart. The right atrium receives deoxygenated blood from the superior and inferior vena cava. When the right atrium contracts the blood goes into the right ventricle through the tricuspid valve, once the right ventricle contracts the blood goes past the pulmonic valve to the lungs to be oxygenated. The pulmonary artery is the vessel that delivers blood to the lungs where oxygen is brought in and waste is expelled. The blood comes back from the lungs along the pulmonary vein and enters the left atrium. The blood in the left atrium is now oxygenated. When the left atrium contracts the blood flows past the mitral valve into the left ventricle. The left ventricle is the strongest

chamber of the heart because it pumps against the force of the body, known as the afterload. When the left ventricle contracts the blood goes past the aortic valve. The blood then goes along the aorta and is dispersed throughout the body. The pumping of the heart is controlled by the SA node, the pacemaker of the heart. The SA node sends an electrical current along the heart going to the AV node, the bundle of HIS, and then the Purkinje fibers which are the muscle cells of the heart. This current causes the atria to contract in unison, the valves to open and close when needed, and for the ventricles to contract in unison. When the atria contract the tricuspid and mitral valves are open, when the ventricles contract the pulmonic and aortic valves are open. The arteries of this system are used to transport the oxygenated blood to the body. The veins are used to bring deoxygenated blood back to the heart to be reoxygenated. The valves are used to prevent prefilling of an area or backflow of blood. In heart failure this cycle is disrupted.

Heart failure causes the heart to have a decreased output resulting in decreased tissue perfusion and a backup of fluids in the body. Heart failure can be identified by present S3 or S4 sounds, decreased urine output, decreased pulse oximetry, edema, shortness of breath, and crackles in the lungs. Heart failure can be broken down into different types, left-sided versus right-sided heart failure, and systolic versus diastolic heart failure. Left-sided heart failure is identified by crackles in the lungs, shortness of breath, and decreased cardiac output. This is due to the left ventricle not pumping well. Right-sided heart failure is identified by jugular vein distention, edema, and is usually caused by left-sided heart failure. Systolic and diastolic heart failure has to do with the ejection fraction of the heart, this is the amount of blood being pumped out by the left ventricle every contraction versus how much is left in the ventricle after contraction. A normal ejection fraction is above 50% (Heart Failure [ClinicalKey], 2022). Systolic heart failure has a reduced ejection fraction below 50% and cannot pump enough blood

out to the body causing the backup of blood and decreased cardiac output (Heart Failure [ClinicalKey], 2022). Diastolic heart failure is when the ventricle cannot relax and fill properly due to stiffening, but still has an ejection fraction greater than 50% (Heart Failure [ClinicalKey], 2022). There are many reasons for the ventricles to not pump blood effectively. One is hypertension, which causes the heart to pump against a strong force in the body resulting in the heart muscle becoming bigger, this is known as hypertrophy, and having less space to pump blood. A myocardial infarction, or a heart attack, can be a cause for ineffective pumping, this can be marked by increased troponin levels indicating heart damage. When a heart attack occurs the muscle dies, leading to weakness and stretching, resulting in ineffective pumping. Other causes of heart failure include coronary artery disease which decreases blood flow to the heart resulting in dead tissue, dysfunction of the SA node causing the contractions of the heart to not be in synch resulting in prefilling of chambers or regur, and arrhythmias cause the heart to pump faster causing muscle weakness (Heart Failure [Lippincott], 2022). Heart failure is a common disease occurring in 6.2 million adults (Centers for Disease Control and Prevention [CDC], 2023) About one-half of the people who develop heart failure die within five years (Heart Failure [Lippincott], 2022). Heart failure is significant because it is a progressive disease that if not managed will result in death. Heart failure cannot be cured, only managed.

Nurses play a key role in the management of care for heart failure patients. When heart failure patients do not take care of their disease it can have a toll on the nursing community. When a heart failure patient comes in with uncontrolled heart failure it requires more staff to help reverse the damage to a more manageable state. It requires more medications, more consults, more people to provide education, more at-home resources, and more money. An estimated 30.7 billion dollars in 2012 went towards the healthcare services and medications of

heart failure patients (CDC, 2023). When heart failure is unmanaged it puts more strain on the nurses to correct the situation, using resources that could be used elsewhere. Heart failure is a manageable disease and should be managed to have a better quality of life.

Risk Reduction/Treatment of the Problem

Many risk factors can contribute to the cause of heart failure such as smoking, obesity, and inactivity which are modifiable risk factors. There are also non-modifiable risk factors such as age, gender, and ethnicity (Heart Failure [ClinicalKey], 2022). Ways to prevent the development of heart failure include changing the modifiable risk factors. Exercising five times a week for at least 30 minutes a day helps increase the strength of the heart and gets the blood flowing in the body. Eating a healthy diet, low in cholesterol and fats, decreases the build-up of plaque in the artery allowing for blood flow. Not smoking does not speed up the process of hardening the arteries, known as atherosclerosis, allowing for good blood flow. Making positive lifestyle choices can help prevent the problem. But, if these measures do not work there are ways to test for heart failure.

Heart failure can occur at any age, so screening should start when there is a known family history, when symptoms appear, and when a person has many contributing risk factors for heart failure (Heart Failure [ClinicalKey], 2022). There are tests that can be ran to help diagnose the problem, such as labs. They are a common diagnostic tool that show blood level indications of heart failure. Some labs include arterial blood gasses which show if there is hypoxemia, or decreased oxygen in the blood (Heart Failure [Lippincott], 2022). B-type natriuretic peptide (BNP) shows ventricular stretching. BNP is a key sign of heart failure when increased. Troponin shows signs of heart wall damage when increased, which can cause heart failure. Low-density lipoprotein can show the presence of fat in the blood, which can lead to plaque blockages.

Imaging, such as an x-ray, can be used to diagnose heart failure by showing cardiac enlargement. Procedures such as an echocardiogram can show ventricular size and function, while an electrocardiogram can show heart strain and enlargement (Heart Failure [Lippincott], 2022). Once heart failure has been diagnosed there are many treatments to help manage the disease.

Some treatments for heart failure include following the medication regimen. Medications can include diuretics, inotropic drugs, anticoagulants, and vasodilators. Diuretics help by secreting excess fluid to decrease fluid retention. Inotropic drugs work by increasing contractility and promoting blood flow to extremities (Heart Failure [Lippincott], 2022). Anticoagulants help decrease clot formation allowing for smooth blood flow. Vasodilators work by opening the blood vessels to allow blood flow. Another treatment method is modifying their diet and utilizing the D.A.S.H. diet. Some modifications are a 2g sodium diet daily, a fluid restriction of 2000mL per day, calorie restriction, trans-fat restriction, and weight reduction (Heart Failure [Lippincott], 2022). The D.A.S.H. diet is used to stop hypertension and consists of eating vegetables, fruits, low-fat dairy products, whole grains, fish, poultry, lean meats, and nuts (Heart Failure [Lippincott], 2022). This diet can help decrease hypertension, water retention, and plaque build-up (Heart Failure [Lippincott], 2022). These treatments along with controlling modifiable risk factors can help prevent and manage heart failure.

Planning of Teaching Content

By the end of the presentation learners will be able to identify three signs and symptoms of heart failure, along with identifying 2 modifiable risk factors that can help prevent heart failure. Teaching strategies that will be utilized during the presentation are using layman’s terms and having hands-on work to connect the auditory teaching to a physical object. By speaking and

having props the learners will get a better understanding of heart failure. Teaching tools that will be used during this presentation are a tri-fold poster, pamphlets, and a figurine of the heart.

Conclusion

To conclude, heart failure can occur at any age. It is a progressive disease; it cannot be cured but managed. The best way to prevent heart failure is by being educated and managing the modifiable risk factors, such as obesity and inactivity, that can lead to the disease. Take on healthy lifestyle choices such as eating a healthy diet and exercising. Heart failure is preventable, and this vital information will be taught at the health fair with visuals, spoken word, and hands-on objects. Education is important for preventing heart failure and the education will be delivered at the health fair for all to hear.

References

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