**Cardiovascular System**

*Case Stdy #3:*

*Patient CB has a history of strokes. The patient has been diagnosed with type 2 diabetes, hypertension, and hyperlipidemia. Drugs currently prescribed include the following:*

*Glipizide 10 mg po daily*
*HCTZ 25 mg daily*
*Atenolol 25 mg po daily*
*Hydralazine 25 mg qid*
*Simvastatin 80 mg daily*
*Verapamil 180 mg CD daily*

**Pharmacotherapy for Cardiovascular Disorders**

 Hypertension (HTN) is the number one silent killer in around the world and not just in America. According to the American Heart Association (AHA) 2019, hypertension affects approximately 77.9 million people in the united states and high blood pressure is the leading risk factor for death in women in the united states, which contributes to nearly 200,00 female deaths each year. Many people can have high blood pressure and exhibit no symptoms and by having no symptoms can increase your chances of having a heart attack or stroke (Mayo Clinic, 2019). In patient CB, the patient has already had a stroke and along with the history of HTN and diabetes another stroke can happen. As an advanced nurse practitioner, we should know how to manage patients that has cardiovascular disorder knowing that hypertension is a silent killer. With a diagnosis of HTN, strokes, diabetes, and hyperlipidemia, advanced nurse practitioners needs to know how to effectively treat the patient and prevent any further complications.

**Behavior as a Factor Influencing Pharmacokinetic and Pharmacodynamics Processes**

 There are multiple factors that affects the pharmacokinetics and pharmacodynamics process in a patient such as gender, age, health status, genetics, and behavioral factors. A unhealthy diet, lack of physical activity, weight gain, and smoking are some negative behavioral factors that affects the cardiovascular disease process especially HTN which will lead to fatal complications such as a stroke or even death. According to Arcangelo et al (2017), 69% of adults 20 years and older are overweight and 35% of adults age 20 years and older are obese. There are ways to prevent a patient from having HTN leading to a stroke such as weight loss, smoking cessation, decreasing blood sugar levels, and decrease in sodium intake. The renal system plays an important role in the cardiovascular system because RASS regulates sodium, potassium, and fluid balance in the body (Arcangelo et al, 2017). A high level of sodium in the body draws additional water into the circulatory system which in turns raises the amount of blood in the circulatory system which in turn increases blood pressure. It is important that advance practitioners explain very well how the heart works and stress the importance of the medications prescribed to their patients. When a patient is already diagnosed with HTN, hyperlipidemia, type 2 diabetes, and stroke and is at high risk for a recurrent stroke, the patient is to follow their practitioner advise such as rigorously obey to ordered medications like anticoagulants and medications to lower B/P, quit smoking, engage in physical activities, weight management, stress management and reduction, consume healthy appropriate/specific diet such as heart healthy and low fat/salt diet. By lowering the blood pressure in patient CB, it obliges as a primary and secondary management measure for stroke.

**Pharmacology of Current Medications**

The patient is currently taken medications to help to correct her diabetes, hypertension, and cholesterol level. Glipizide belongs to the class of drugs known as sulfonylureas and it works by controlling high blood sugars in patients that has type 2 diabetes. Simvastatin belongs to a group of medications called statins and the medication helps by lowering the “bad” cholesterol and fats in the blood and helps raise the “good” cholesterol level in the blood. Hydrochlorothiazide (HCTZ), Atenolol, Hydralazine, and Verapamil are all medications to treat hypertension. Hydrochlorothiazide belongs to a class of drugs called diuretics and the medication helps to reduce high blood pressure and treat fluid retention. Atenolol belongs to a class of medication called beta blockers and works by blocking the action of certain chemicals in the body such as epinephrine on the heart and blood vessels. Hydralazine belongs to the medication class of vasodilators and it works by relaxing blood vessels so that blood can flow through the body more easily. Lastly, Verapamil belongs to the calcium channel blocker medication class and works by relaxing the muscles of the heart and blood vessels.

**Changes That Might Impact Recommended Drug Therapy**

 With the patient population that I have taken care of in the past, a lot of their complaints is the cost of healthy food and that the unhealthy food is so much cheaper for them. But as an advanced nurse practitioner, we have to stress the importance of eating healthy and reading the food labels of food and getting items that are low in sodium. We have to encourage them that eating foods such as vegetables, fruits, whole grains, nuts, drinking more water will helps to lower their BP. Pertinent patient education helps a patient make informed decisions like taking cholesterol medication like simvastatin at night because it is when cholesterol is at its highest level (Laureate Education, 2012). Other important education for patient CB includes monitoring blood sugar and BP, adhering to ordered medications, follow-up with primary physician regularly, and even smoking cessation to live a quality life.

**Improving Drug Therapy Plan**

For patient CB, their drug therapy depends on so many factors such as a thorough examination, history, over the counter medications, herbal. medications, ETOH and smoking intake, vital signs (heart rate, blood pressure), lab work (cholesterol level, blood sugar level, hemoglobin and hematocrit level, complete chemistry level, and a urinalysis), and an electrocardiogram. The first line of treatment for HTN patients is diuretics. The second line of therapy would be a diuretic with an Angiotensin-Converting-Enzyme (ACE) inhibitor or a beta blocker or the combination of both to lower the blood pressure (Arcangelo et al, 2017). Depending on the level of BP and cholesterol level, simvastatin may be reduced from 80 mg to 40mg daily to decrease the effect of myopathy. The practitioner will monitor CB’s HR very closely and adjust the medications atenolol to 12.mg daily and verapamil to 80 mg daily to avoid bradycardia. According to Laureate Education (2012), HCTZ may be switched to Angiotensin II Receptor Blockers (ARBs) to avoid an increase in blood sugar associated with HCTZ. The ARBs that I would prescribe to the patient is Cozaar, 25 mg daily by mouth. Cozaar works. By blocking a substance in the body that causes blood vessels to tighten and as result, the medication relaxes the blood vessels. This client will benefit by taking aspirin or plavix to prevent further strokes. As advanced practitioners, we must be aware of all the therapy that we are giving our patients and make sure the patient understands fully why they have to make these lifestyle changes and the purpose of each medication they take.

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