

Destiny Grande

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01 June, 2023

Cardiovascular Disorders

The cardiovascular system consists of the heart, blood, arterial system, capillaries, and the venous system. This system focuses on transporting blood and oxygen throughout the body, however, the system can fail to properly function and can lead to clinical disorders, such as angina. This disorder occurs when there is insufficient coronary blood flow, meaning not enough oxygen is being delivered. Three different types of angina can occur due to insufficient delivery of oxygen; Prinzmetal's angina occurs when the supply of oxygen is reduced (vasospasms), unstable angina occurs when there is a clot in the coronary artery that causes the supply of oxygen to decrease (thrombosis), and chronic stable angina occurs when the coronary artery narrows down too far leaving tissue unable to receive enough oxygen, which causes an increase in oxygen demand (fixed stenosis). The symptoms of angina are pain, pressure, or discomfort in the chest area. To treat angina, many patients are often prescribed different drugs/therapeutics such as vasodilators or cardio inhibitors.

Vasodilators are used to treat angina, as well as heart failure and hypertension. This is done through the relaxation of smooth muscle, resulting in the dilation of arterial vessels, and venous capacitance vessels, or are mixed and can dilate both vessels. Arterial dilators reduce the demand for oxygen, improving supply and demand ratios by reducing ventricular preload and afterload to better the cardiac output. Venous dilators increase the supply and demand ratio by decreasing the demand for oxygen, this is achieved through the decrease of the right ventricular

preload. A few vasodilator drugs that treat angina are Nitroglycerin, Multidomain, and Isosorbide dinitrate. Another therapeutic class used for angina is cardioinhibitory drugs such as centrally acting sympatholytics, calcium-channel blockers, and beta-adrenoreceptor antagonists, also known as beta-blockers. Cardioinhibitory drugs work to treat angina by reducing arterial pressure and oxygen demand to improve supply and demand for oxygen.

Another cardiovascular disorder that can occur is pulmonary arterial hypertension. This disorder is split into two categories: primary, which has no cause, and secondary, which is caused by congenital heart disease, blood clots, and other causes. When a person has pulmonary hypertension, there is too much pressure in their blood vessels. A normal adult should have pulmonary artery pressure of 15 mmHg, however, those with PAH have their pressure at 25 mmHg or higher when resting. This can lead to heart failure, or other symptoms including difficulty breathing, chest pain, and heart palpitations. To treat pulmonary arterial hypertension, some therapeutics used are vasodilators and diuretics. Similar to angina, pulmonary hypertension uses vasodilator drugs as treatment because they help lower the pressure in pulmonary vascular resistance. However, this disorder uses diuretics to treat it, this is because these drugs decrease blood volume and right ventricular stroke volume, which can help relieve symptoms that come with this disorder. Diuretics such as Metolazone and Chlorthalidone are most commonly used to treat pulmonary hypertension, and work by increasing the release of urine by the kidney.

There are many mechanism classes, meaning many ways to categorize drugs. Such as class or therapeutic use, as well as its mechanism of action. One example of this is beta-adrenoreceptor antagonists or beta-blockers. They can treat multiple disorders, such as the ones above. It works by blocking adrenaline decreasing heart rate, and controlling blood pressure. They bind to beta-adrenoreceptors to block norepinephrine and epinephrine from binding to beta-

adrenoreceptors as well, which is why they can reduce cell activity. Some beta-blockers include Nebivolol, Esmolol, and Labetalol, side effects include bradycardia, hypotension, heart failure, and more.

Works Cited

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