How Angina Pectoris Affects The Circulatory And Cardiovascular System

Posted on October 8, 2018

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Angina Pectoris, or simply Angina, is a clinical syndrome that is caused by precordial discomfort or, at times, pressure due to transient myocardial ischemia without an infraction. In other terms, the disease is merely chest pressure or pain that occurs when less blood flows to the heart muscle. It happens when the coronary arteries become obstructed, as scientific evidence cites. The causes of the disease vary. Anemia and heart failure are some of the common causes of the disease, although abnormal heart rhythms have also been identified to be among them.

Causes and Pathophysiology of Angina

As scholars establish, the disease also occurs when the cardiac workload and myocardial oxygen needs are way above the ability of one's coronary artery to supply enough blood, which is oxygenated (JCS Joint Working Group 1745-1762). In most observations, the just-explained occurrence happens when the arteries get narrowed. The narrowing of the arteries occurs due to a condition referred to as atherosclerosis and may also occur due to coronary artery spasm and, in other happenings, although rare, coronary artery embolism.

Stable Angina

Angina pectoris occurs on different platforms, i.e., stable and unstable Angina. Stable angina is the most famous type of angina and is predictable. In this essence, its patterns can be tracked, depending on what one is doing and the pain in the chest. Stable Angina happens when the heart muscle gets less oxygen than required, rendering it ineffective and, hence, malfunctioning. The same results in atherosclerosis and the formation of blood clots that block the arteries, reducing the amount of oxygenated blood flowing into the heart.

Symptoms of Stable Angina include a painful occurrence characterized as pressure or fullness in the midst of the chest. Victims have confessed to having a feeling of a vice squeezing through the chest and, in some instances, something like a dense weight material resting on the chest. The pain in most situations increases in the neck, arms, and shoulders. Other symptoms include dizziness, sweating, fatigue, and shortness of breath.

When diagnosing stable Angina, the doctor might carry out an electrocardiogram test, whereby electrical activities of the heart are measured. Angiography can also be carried out to determine blood flow to the heart and see if the blood vessels are effectively and efficiently working. The just-mentioned tests are meant to determine whether the heart is in normal working condition. Furthermore, doctors may be required to carry out a stress test. Here, the heart rhythm while on exercise is measured. In other cases, doctors run blood tests, where cholesterol and creative levels of the blood are measured. The high amount of the C-reactive is fundamental to the development of heart disease.

Unstable Angina

The second variant of Angina Is unstable Angina. Unlike stable Angina, this condition occurs when one is at rest or under stressful conditions. Depending on the situation, the frequency and severity of the pain are expected to increase. Medical evidence provides that this kind of Angina results from a buildup of plaque in the walls of the victim's arteries, causing them not only to narrow but also to become rigid. Further medical evidence provides that this kind of condition should be treated as an emergency, and immediate medical attention is preferred. If it is not treated for a very long time, this condition may result in a heart attack or heart failure.

Primary symptoms of unstable Angina include pain in the chest and unexplained discomfort. Furthermore, the patient always feels like the pain is crushing or pressure-like pains. The pain, in most instances, spreads to the back. The patient may also become nauseous, sweat profusely, become dizzy, and experience some unexplained fatigue.

Since the heart rate determines the myocardial oxygen demand, systolic wall tension, and contractility ability, narrowing of the coronary artery results in angina during extension. Medical evidence provides that this can be relieved by rest.

During the diagnosis of unstable Angina, the doctor performs a physical examination that includes checking the pressure. Extra investigations may involve testing for C-reactive kinase and troponin, which usually leak from the heat muscles in case it's damaged. The doctor might also perform an electrocardiogram to establish the patterns of the heartbeat, where an indication of the blood flow is determined.

On the other hand, the doctor might perform echocardiography to produce images of the heart; this reveals blood flow problems. Furthermore, to determine the effect that unstable angina has on the circulatory and cardiovascular systems, the doctor might carry out computed tomography, coronary angiography, and heart catheterization, where the health calibers of the arteries are studied. Angiography assists the doctor in determining artery narrowing and blockages and is one of the most frequently used tests to determine unstable angina.

To adequately explain how the Angina pectoris affects the circulatory system, this study will

demonstrate how the standard circulatory and cardiovascular system works and hence give insights into how the same is affected by Angina Pectoris disease.

A Normal Circulatory and Cardiovascular System

The cardiovascular system is made up of the heart, the blood vessels, and roughly five liters of blood, whose transportation is done by the blood vessels. This system has been named the hardest working organ of the body since it is responsible for carrying hormones, oxygen, cellular remnants, and nutrients through the body. The heart pumps blood to the lungs. Its bottom tip is called the apex, and during the pumping, it is transported to the left part of the heart. The top part of the heart connects the aorta, the vena cava, the pulmonary artery, and the pulmonary vein.

Pulmonary circulation is responsible for the transportation of less-oxygenated blood from the right part of the heart to the lungs. From this point, it picks up oxygen and eventually is moved to a part of the heart. Additionally, the system circulation is tasked with the responsibility of transporting blood with oxygen from the left part of the heart designated for the tissues of the body, where the heart and lung tissues are excluded. Henceforth, remnants from the body tissues get removed, and deoxygenated blood gets returned to the left side of the right part of the heart.

The second part of the cardiovascular system is the blood vessels, which are highways that facilitate the flow of blood from the heart to other regions of the body and back. Such gets done effectively and efficiently. The blood vessels contain a lumen, which enables the flow of the blood. There exist three categories of blood vessels, i.e., arteries, capillaries, and veins. Arteries move oxygen-rich blood away from the heart. As medical evidence establishes, the arteries face significant degrees of blood pressure as the blood they carry is being moved away from the heart with a lot of force. The walls of the arteries are very thick. Hence, they can withstand such pressure. Furthermore, they are very elastic and muscular compared to other vessels.

On the other hand, capillaries are the small and thin blood vessels of the human body, apart from being the most known. They are found in a majority of body tissues. They provide a connection between the arterioles and venules on each end. Their primary function is to carry blood to the muscles of the body where gaseous, nutrients, and waste product exchange are facilitated. Henceforth, to ensure that there is a minimum amount of structure between the blood and vessels, the capillaries are covered with a slim layer of endothelium.

The third part of the cardiovascular system is the veins and venules. Their leading role is to return blood to the arteries. Unlike other parts of the heart, the veins and venules get subjected to low blood pressure. Therefore, their walls are thin, less elastic, and not very muscular. To have blood pushed back to the heart, the veins and venues heavily rely on gravity and inertia. Furthermore, some veins have Omnidirectional valves to transport blood, which prevent blood from moving out of the heart. As the body‘s skeletal muscles gain a contracting ability, veins get squeezed, and therefore, blood

moves through the valves close to the center. On relaxing, the pipes contain the blood till after another contraction.

Blood, which also makes up the cardiovascular system, is a liquid-related tissue that carries a variety of materials within the human body. The human body contains an average of four to five liters of blood. The red blood cells, the white blood cells, the platelets, and the liquid plasma make up the blood.

Therefore, as observed above, some processes are required for the cardiovascular system to be said to be effective. For instance, the arteries transport the blood from the heart, whereas the veins move it to the heart again. The circulatory system supplements the organs, tissues, and cells with serum and oxygen, among other substances. The pulmonary system facilitates the mixing of oxygen with blood, at the same time enhances the release of carbon dioxide from the blood.

The Process of Blood Circulation

Circulation of the blood starts after the heart finds some relaxation between two heartbeats. Through this, the blood moves from the atria to the ventricles, which, after that, expand. The ejection period follows, after which blood gets pumped by the ventricles into the large arteries.

With systematic circulation, oxygenated blood is ejected by the right ventricle to the aorta. After that, the blood gets transported to arteries in the capillary system. At this point, substances such as oxygen and nutrients, among others, get released before the blood, with a low content of oxygen, flows through the right atrium and finally to the right ventricle.

After the above process, pulmonary circulation begins. In the pulmonary circulation, blood is moved by the right ventricle into the pulmonary artery. This blood is low in oxygen content. From here, the blood diverts into the small arteries and capillaries. At this juncture, carbon dioxide gets released into the air in the pulmonary cysts, and fresh oxygen becomes available to the blood. Thus, when we breathe out, carbon dioxide is released from our bodies. After that, the oxygenated blood moves through the pulmonary vein and enters the left atrium into the left ventricle. This process continues with the next heartbeat, where the system circulation begins.

How The Circulatory And Cardiovascular System Is Affected By Angina Pectoris.

Medical research indicates that Angina pectoris has diverse effects on the heart, especially on the blood vessels of the victim. According to Ginghina et al. (80), atherosclerosis is one of the underlying causes of Angina pectoris. With this condition, plaque builds up inside the arteries, which, as mentioned at the beginning, facilitates angina pectoris. The plaque is made up of different substances

that may include fats, cholesterol, calcium, and some other materials found in the blood. With time, the plaque becomes very hard, causing a narrowing effect on the heart. Therefore, one of the impacts of Angina Pectoris on the cardiovascular system is the narrowing of the arteries, as explained in the instance above.

The narrowing caused by the plaque has some other severe effects on the victim's heart. For instance, the narrowing acts as a block, limiting the amount of oxygenated blood flowing to the organs and other diverse parts of the human body. Damage to the endothelium occurs first before atherosclerosis starts. This damage can be a result of high blood pressure, smoking, or, in other occurrences, the formation of cholesterol.

In this happening, cholesterol gets formed after LDL finds a way to the endothelium that has been subjected to damage. Through this, it enters the walls of white blood cells. From this point, it gets streamed by the white blood cells and later gets digested.

The above-explained cholesterol plaque, in association with other forms of plates mentioned at the beginning, causes the blockade in diverse mechanisms. The most occurring process explains the formation of a bump on the walls of the artery. The crack gradually gets more prominent as atherosclerosis progresses. After getting more prominent enough, the blocking effect is enhanced, exposing the heart to a risk of stroke and other heart-related conditions.

Still, on the aspect of Myocardial infarction and plaque, there have been noted instances where plaques rupture, exposing the patient to death or some other lifetime health complications. Furthermore, such rapture has some implications on the cardiovascular system since it may, in some instances, result in an occlusion of the vessels. Such occlusion causes irreversible damage to the heart cells and tissues, hence rendering the tissues useless, leading to their death (Authors/Task Force Members et al. 1350).

Furthermore, in some instances, the rapture of the plaque is associated with blood clotting, a process known as Thrombosis. This condition mostly occurs when the evolution of atherosclerotic lesions arises. The formation of a blood clot in the blood vessel of the heart is referred to as coronary thrombosis. The creation of this clot restricts the blood from moving into the heart. As evidence establishes, the blood clot will come by because of the smaller room, which prevents it from flowing.

In a different study, researchers sought to establish the electrocardiographic profile of patients having Angina Pectoris. Results indicated that the patients are quite vibrating. The electrocardiogram is used to give essential data for diagnosing and prognosis, mostly when episodes of pain have been traced. Results from the same indicate that such presents complicated time-dependent effects on the electrical components of the myocardial cells. These cells are considered to be part of the cardiovascular system since they are part of the heart muscle. Some of the elements of these cells include myofibrils.

Angina, as a result, minimizes the resting membrane potential at a significant rate and reduces the

time of action of the ischemic area. Furthermore, it was established to have caused a decrease in the rising frequency and amplitude of the phase. The explained changes are fundamental to the establishment of a voltage difference, enabling a current to flow toward these areas during the testing. Furthermore, according to the results of the research, more than six percent of patients diagnosed with angina pectoris subsequently had myocardial infarctions.

Other than the above-explained instances, Angina pectoris causes the heart to have a condition referred to as Arrhythmia, or in some cases related to an irregular heartbeat. This condition does not, in some instances, mean that the heart is too fast or too slow, but the fact remains that the heart is beating out of its normal rhythm.

Some victims of this condition have confessed to having had several complications, depending on the type of Arrhythmia they are experiencing. Whereas some acknowledged having skipped a heartbeat, some argued that their hearts beat too fast. The condition whereby the heart beats too fast is called tachycardia, whereas in instances where the heart beats too slowly, the situation is called bradycardia.

Premature or extra beats Arrhythmia is the most common type of irregular heart rate. With this condition, one feels a fluttering condition in the chest. The common cause of arrhythmia is often associated with the heart's electrical complications. In most instances, they happen because electrical signals in the heart get blocked. Also, the might be a possibility of an abnormal electrical signal pathway, and in some instances, as recorded by patients, irritable heart cells send out unwanted or unexpected signals.

In different research aimed at discovering the relationship between Arrhythmias and ST-segment elevation, scholars identified the development of coronary spasms before the injection of the coronary arteries. Furthermore, some other patients used in the research were found to have proximity coronary artery obstructive conditions (Lloyd-Jones 50). Moreover, some patients were seen to be having focal lesions that had a significant impact on the proximal segments of the coronary arteries. Furthermore, it was established that some other patients had collateral circulation. The research concluded by stating that ventricular irregular heart rate had several detrimental effects on the coronary system and, to some extent, facilitated coronary artery disease.

Conclusion

Angina pectoris is a condition that should be treated as an emergency whenever one experiences the symptoms mentioned in the article. Furthermore, researchers advise that parents should ensure that their children are screened for the same at younger ages since some of the conditions associated with the disease are noticed later in life, although they start at early ages. In older generations, it's quite difficult to treat the condition.

Works Cited

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