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Commentary

Atrioventricular Synchrony and its Function

Alper Even*

Department of Cardiology, Suleyman Demirel University, Isparta, Turkey

DESCRIPTION

Atrioventricular (AV) synchrony refers to the coordinated contraction of the atria and ventricles of the heart. This is important for a proper heart function and the maintenance of an adequate cardiac output.

Physiology of AV synchrony

The atria and ventricles of the heart are separated by the AV node, which acts as a gatekeeper for the electrical impulses that control the heartbeat. The electrical impulse that initiates the heartbeat originates in the Sinoatrial (SA) node, located in the right atrium. The impulse then travels through the atria, causing them to contract and push blood into the ventricles.

Once the impulse reaches the AV node, it is delayed briefly to allow the ventricles to fill with blood. This delay is important to ensure that the atria and ventricles contract in a coordinated manner. After the delay, the impulse travels down the "bundle of His" and into the "Purkinje fibers", causing the ventricles to contract and pump the blood out of the heart.

If the AV node is damaged or not functioning properly, the impulse may not be delayed appropriately, leading to an abnormal rhythm and decreased cardiac output. This can result in symptoms such as fatigue, shortness of breath, and dizziness.

Clinical implications

AV synchrony is important for proper heart function and the maintenance of an adequate cardiac output. If there is a delay in the conduction of the electrical impulses through the AV node, the contraction of the atria and ventricles may become desynchronized, leading to decreased cardiac output.

A delay in AV synchrony can be caused by a number of factors, including medications, heart disease, and aging. Certain medications, such as beta-blockers and calcium channel blockers, can slow the conduction of electrical impulses through the AV node, leading to a delay in AV synchrony. Heart disease, such as atrial fibrillation and heart block, can also interfere with the normal conduction of electrical impulses through the AV node. Finally, as the person ages, the conduction system of the heart can become less efficient, leading to a delay in AV synchrony.

Assessing AV synchrony

AV synchrony can be assessed through various diagnostic tests, including Electrocardiography (ECG), echocardiography, and stress testing.

ECG is a non-invasive test that measures the electrical activity of the heart. A normal ECG will show a P wave followed by a QRS complex, indicating proper atrial and ventricular contraction.

Echocardiography is a non-invasive imaging test that uses ultrasound to visualize the heart and its structures. This test can be used to assess the function of the heart valves, the size and function of the heart chambers, and the movement of the heart muscle.

Stress testing is a test that is used to assess the function of the heart under physical stress. This test can be performed on a treadmill or stationary bicycle and measures the heart's response to exercise.

Maintaining AV synchrony

There are several ways to maintain AV synchrony, including medications, pacemakers, and lifestyle changes.

Medications: Medications such as beta-blockers and calcium channel blockers can be used to slow the conduction of electrical impulses through the AV node, leading to improved AV synchrony.

Pacemakers: Pacemakers are small devices that are implanted under the skin of the chest and connected to the heart with leads.

Correspondence to: Alper Even, Department of Cardiology, Suleyman Demirel University, Isparta, Turkey, E-mail: alperen@99.tr

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