

BRADYCARDIA

■ WHAT IS BRADYCARDIA?

Bradycardia is a general term that describes a number of conditions in which the heart beats at an unusually slow rate (fewer than 50 to 60 beats per minute). However, electrical impulses may be slowed, delayed, or blocked altogether, resulting in bradycardia. This may be due to aging, medication, metabolic disturbances or pre-existing heart disease.

■ TYPES OF BRADYCARDIA

Sinus bradycardia: An unusually slow heartbeat due to normal causes such as when a person is in a state of deep relaxation or is in excellent physical condition. It may be present in athletes but can also occur in patients with heart disease or as a reaction to a variety of medications such as digoxin, beta blockers or calcium channel blockers.

Sick sinus syndrome: A condition in which the heart's natural pacemaker (the sinoatrial node) malfunctions and fails to deliver a heartbeat.

Heart block: The electrical impulses are slowed or blocked as they travel from the upper chambers of the heart (atria,) to the lower chambers of the heart (ventricles). The result is a delayed or complete lack of electrical communication between the upper and lower chambers of the heart. Both the symptoms and treatments for heart block depend on its degree of severity:

- First-degree heart block. The electrical impulses are slowed as they pass through the AV node, but all of them successfully reach the ventricles. First-degree heart block rarely causes any symptoms or problems, and is a common finding. No treatments are generally necessary.
- Type I second-degree heart block. The electrical impulses between the upper and lower chambers are delayed with each heartbeat until a lower chamber beat is skipped entirely. The condition rarely causes dizziness and/or other symptoms. In such cases, implantation of a pacemaker may be required.
- Type II second-degree heart block. Some of the electrical impulses are unable to reach the ventricles (lower chambers). In contrast with type I second-degree heart block, this condition generally carries more risk and is less common. A physician generally recommends a pacemaker for the abnormally slow heartbeat (bradycardia) associated with this condition.
- Third-degree heart block (also known as complete heart block). None of the electrical impulses can reach the ventricles. With no electrical impulses coming from the atria, the ventricles (lower chambers) may generate some impulses on their own. These are called ventricular escape beats. However, these natural “backups” are usually very slow and are generally unable to sustain the full functioning of the heart muscle. Therefore, this condition requires implantation of a pacemaker.

Bundle branch block: A condition in which the electrical impulses traveling through the lower chambers of the heart are slowed or blocked completely from traveling along their normal route through the

ventricles. The condition tends to produce no symptoms. In some patients with heart failure, the presence of a bundle branch block may be associated with increased symptoms. In these patients, a biventricular pacemaker may be beneficial. Several specific types of bundle branch block occur. These include left bundle branch block, right bundle branch block, and nonspecific intraventricular conduction delays.

■ RISK FACTORS AND CAUSES FOR BRADYCARDIA

The electrical system of the heart conduction system is a complex network of cells and fibers. Electrical impulses travel through these to trigger a heartbeat. The impulses are first sent out by the sinoatrial node (sinus node or S-A node), located in the top of the upper right chamber of the heart (the right atrium). From there, the impulses spread through the atria and to the atrioventricular node (A-V node). Here they are transmitted to the lower chambers of the heart (the ventricles), via the bundle branches. Once the impulses reach the ventricles, they cause the chambers to contract and pump out blood in a routine and consistent manner.

If impulses are sent from the sinoatrial node at a slow rate, or are delayed as they travel through the conduction system, the heartbeat will be slow. The impulses may even be blocked altogether, which will lead to a complete stopping of the heart (complete heart block) unless treatment is received immediately. This is a medical emergency.

In many cases, a temporarily slow heartbeat is not medically significant by itself. For instance, sinus bradycardia is a normal response to deep relaxation or being in excellent physical shape. Bradycardia may also be caused by:

- Aging-related degeneration of the heart's electrical conduction system.
- Certain medications, such as those to treat arrhythmias, high blood pressure (beta blockers, calcium channel blockers) or heart failure (digoxin). Once these medications have been reduced or discontinued, the bradycardia will usually resolve on its own.
- Protease inhibitors, a class of medication typically used to treat HIV infection.
- Coronary artery disease.
- Disturbances in metabolism such as low thyroid levels or electrolyte imbalances like high or low potassium levels.
- Some heart conditions that are inherited or present at birth (congenital heart defects).

Some types of persistent bradycardia, however, can cause increasingly worse symptoms and even death if left untreated.

■ SIGNS, SYMPTOMS AND DIAGNOSIS OF BRADYCARDIA

Some types of bradycardia produce no symptoms, and others may cause dizziness, weakness or fainting. The most serious forms of bradycardia (e.g., complete heart block) are medical emergencies that could lead to convulsions or sudden cardiac death. People are encouraged to read more about a specific bradycardia of interest to learn its symptoms.

The baseline electrocardiogram (ECG or EKG) is the main test to diagnose bradycardia. In some cases bradycardia and heart block may come and go, making it harder to diagnose. The doctor may ask the patient to wear a 24-hour ECG Holter or event monitor to record the heartbeat over a period of time in hopes of recording bradycardia when it is occurring.

■ TREATMENT OPTIONS FOR BRADYCARDIA

Bradycardia that has specific symptoms is commonly treated by discontinuing any medications that slow the heartbeat. The doctor may also treat any underlying conditions like an electrolyte imbalance and/or a permanent pacemaker may be implanted. Pacemakers are implanted under the skin and permanently attached to the heart. When a slowed or abnormal heart rhythm is detected, the pacemaker fires an electrical impulse to correct the heartbeat.