Atrioventricular Block Types

Atrioventricular blocks, or heart blocks, can be divided into 3 main types, or degrees. First degree AV block is characterized by a PR interval that is greater than 200 ms. These are often incidental, and if the patient is asymptomatic, no treatment is necessary. Second degree AV blocks are characterized by a nonconducted QRS complex and can be subclassified as either Mobitz type I or Mobitz type II. In Mobitz type I, also called Wenckebach, the PR interval displays progressive lengthening until a QRS complex is dropped or nonconducted. In a Mobitz type II, the PR interval is constant for several beats until a QRS complex is nonconducted. In a third degree AV block, there is complete atrioventricular dissociation such that the atria and ventricles are contracting independently of each other.

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First Degree

First Degree
(1) Wand
In first degree AV block, all atrial impulses are conducted to the ventricle but are delayed. Patients with first degree AV block may be bradycardic but are often otherwise asymptomatic. Evidence of first degree AV block may be seen in healthy individuals who have a low resting heart rate, such as conditioned athletes. However it may also be a result of underlying cardiac pathology.

PR Interval > 200ms
Purse with Greater than 2 x 100 Dollar Bills
In a first degree heart block, the PR interval is longer than 200msec, but the EKG is otherwise normal. Potentially pathologic etiologies of first degree (as well as second and third degree) heart blocks include ischemia involving the conduction system, cardiomyopathy (ie sarcoidosis), myocarditis (Lyme disease), hyperkalemia, and excess vagal stimulation. Iatrogenic causes include catheter ablation, valvular implantation, and medications such as AV-nodal blockers

No Treatment Needed
No-sign Treat
No treatment is needed for first degree heart blocks, as they are frequently asymptomatic. Patients found to have first degree heart block should be questioned about their medication regimen and risk factors relating to cardiac disease, as there is an overlap of cardiac conduction disturbances and other cardiac diseases including infiltrative cardiomyopathies, cardiomyopathies associated with muscular dystrophy, and other dilated cardiomyopathies. Patients with such diseases and risk factors may progress to more severe degrees of AV block, however a first degree AV block on its own does not warrant any intervention.

Second Degree

Second Degree
(2) Tutu
Second degree heart blocks are characterized by intermittent atrial conduction to the ventricle. In other words, not all atrial impulses are conducted to the ventricle. Second degree blocks are further characterized into Mobitz I and Mobitz II, which are differentiated by their different patterns of intermittent conduction on EKG.

Mobitz I (Wenckebach)
Mobitz-mobile with (1) Wand and Winking-Bach
Symptoms of Mobitz I characteristically improve with exercise and worsen with vagal maneuvers. This is because vagal stimulation causes delay at the AV node via M2 muscarinic receptors, therefore worsening AV block. Conversely, sympathetic stimulation has the opposite effect.

Progressive PR Interval Lengthening with Nonconducted QRS Complex
Progressively Lengthening PRada-purse with Nun-conductor Queen's-Rocket-Ship Complex
Mobitz I is characterized by progressive lengthening of the PR interval until a QRS is dropped. Remember this distinction with the rhyme "Longer, longer, longer, stop, then you've got a Wenckebach"

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Mobitz II

Mobitz-mobile in (2) Tutu

Patients with Mobitz II require pacing either in the form of atropine if they are unstable, or transcutaneous pacing if they are stable. Atropine acts as a muscarinic antagonist at the M2 cholinergic receptors of the AV node. As activation of these receptors typically causes slowing of heart rate, blocking these receptors will increase heart rate.

Constant PR Interval with Nonconducted QRS Complex

Constant PRada-purse with Nun-conductor Queen's-Rocket-Ship Complex

In Mobitz II, beats are randomly dropped and there is no progressive PR prolongation as in Mobitz I. The PR interval remains constant beat-to-beat.

Third Degree

Third Degree

(3) Tree

3rd degree heart block can be a result of Lyme disease. Because biopsies of the heart are rarely performed in cases of Lyme myocarditis and because Lyme myocarditis is rarely fatal, a relatively limited amount is known about the related pathophysiology. However based on animal studies, it is likely related to inflammation of cardiac tissue caused primarily by macrophages and lymphocytes. Treatment of Lyme carditis consists of IV or oral antibiotics such as doxycycline, amoxicillin, or ceftriaxone.

Atrioventricular Dissociation

AViators Disconnected

In a complete, or third degree, heart block, both P and QRS waves are present, but they bear no relation to each other. For example, P waves may occur every 100ms while QRS complexes only occur every 200ms. Patients with a third degree heart block require pacing. This can be in the form of atropine if they are stable, or transcutaneous pacing if they are unstable.

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