Quiz Section

Answer to Quiz No 3 (PMR Vol 3 No 03 September 2008)

Answer to Quiz No. 3(ECG)

1. What is the diagnosis? Complete right bundle branch block with left anterior hemiblock

2. What is the immediate next step in management? Evaluate patient clinically. Take complains of similar chest discomfort in past and detail history including h/o syncope. Review old ECG if present. Send for cardiac enzymes. Do ECHO. Repeat ECG.

Bundle branch block (BBB) is a relatively frequent finding on the electrocardiogram (ECG). Sometimes BBB itself needs to be treated; sometimes it indicates significant underlying cardiac disease that needs to be treated; and sometimes it has so little significance that no treatment is necessary at all.

In RBBB, the right bundle branch no longer conducts electricity. Therefore, as the electrical impulse leaves the His bundle, it enters left bundle branch only, and is carried to the left ventricle. Then, from the left ventricle, the electrical impulse finally makes its way to the right ventricle. As a result, the two ventricles no longer receive the electrical impulse simultaneously. First the left ventricle receives the electrical impulse, then the right.

In LBBB, the opposite occurs. Here, the left bundle branch no longer conducts electricity. The electrical impulse thus enters right bundle branch, and is carried to the right ventricle (first panel). From there, it finally spreads to the left ventricle (second panel). Once again, the two ventricles no longer receive the electrical impulse simultaneously. First the right ventricle receives the electrical impulse, then the left.

Why does the QRS complex change in BBB? The QRS represents the spread of the heart's electrical impulse across the right and left ventricles. Because with BBB the ventricles receive the electrical impulse one after another instead of at the same time, it takes longer to form the QRS complex on the ECG. The QRS complex is said to "widen." Also, since the pattern of the spreading of the electrical impulse is abnormal in BBB, the pattern of the QRS complex is also abnormal.

*What is the significance of bundle branch block?*BBB is quite common, and occurs in a variety of medical conditions. RBBB occurs in medical conditions that affect the right side of the heart or the lungs, so a finding of RBBB on the ECG ought to trigger a screening exam for such conditions. These include blood clots to the lung (pulmonary embolus), chronic lung disease, cardiomyopathy, and atrial and ventricular septal defects. However, RBBB also commonly occurs in normal, healthy individuals, and the screening exam therefore often turns up no medical problems. In these cases, the RBBB has no apparent medical significance, and can be written off as a "normal variant," and safely ignored.

In contrast, LBBB usually indicates underlying cardiac pathology. It is seen in dilated cardiomyopathy, hypertrophic cardiomyopathy, hypertension, aortic valve disease, coronary artery disease, and a variety of other cardiac conditions. While occasionally LBBB occurs in apparently healthy people, its appearance should trigger a thorough search (as opposed to a simple screening) for underlying cardiac problems.

If both the right and left bundle branches are completely blocked (i.e., "bilateral" BBB), the electrical impulse cannot reach the ventricles. In this case, unless spontaneous electrical impulses arise within the ventricles (a so-called "escape rhythm"), the ventricles stop beating and death occurs.

In summary, the major significance of BBB is that it may indicate the presence of previously unknown underlying cardiovascular disease. When BBB is found, therefore, a search for such underlying disease ought to be carried out. Since RBBB often occurs in normal individuals while LBBB usually indicates underlying disease, the search for underlying disease generally should be more aggressive with LBBB than with RBBB.

How and when to treat?

There are a few conditions in which people with bundle branch block require pacemakers:

1) When "conduction system disease" is bilateral, and is associated with a heart attack: We have previously noted that RBBB plus left anterior hemiblock should not be particularly alarming(our quiz case no.3). This is true except in this one instance – where the block occurs acutely with a myocardial infarction. Here, the conduction system disease tends to be unstable, and can progress to complete heart block. These patients often need pacemakers.

2) When bundle branch block is associated with syncope . When a patient with bundle branch block experiences syncope, in general an electrophysiology study should be considered to test for impending complete heart block. A permanent pacemaker eliminates the problem.

3) In certain patients with dilated cardiomyopathy: In patients who have dilated cardiomyopathy and either complete or incomplete bundle branch block, a new form of pacing – called cardiac resynchronization pacing or CRT – has now been shown to improve symptoms and to prolong life. CRT should now be strongly considered in any patient with heart failure and bundle branch block.

(referred American College of Cardiology guidelines)

Medical Quotes

- The most important thing in illness is never to lose heart.
  -Nikolai Lenin
- Health and cheerfulness naturally beget each other.
  -Joseph Addison
- Life is not merely to be alive, but to be well.
  -Marcus Valerius Martial
- The only weapon with which the unconscious patient can immediately retaliate upon the incompetent surgeon is hemorrhage.
  -Halsted, William Stewart