ECG Underwriting Puzzler

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• Select “Slide Show” from the menu option on top

• Select “From the beginning”

• Slowly click through the presentation
• Have fun!—Good luck
Question?

What is the major abnormality on this ECG?

If you said WPW pattern, you were correct!!!!
Let’s review the normal conduction system

The impulse starts in the SA node…spreads across the atrium….is stopped briefly at the AV node…and then proceeds down into the ventricle
In WPW the accessory bundle (Bundle of Kent) allows an impulse to enter the ventricle prematurely.

Early depolarization occurs in this area of the ventricle which causes a couple of ECG changes:

- It causes a short PR interval.
- It also causes a slurring of the QRS complex which is called a “Delta Wave.”
Accessory Pathways

James Fibers are intra-nodal tracts that connect the atrium to the AV node as depicted with the red bundle.

Of course James Fibers are present in the condition named Lown-Ganong-Levine Syndrome.

So, while WPW pattern involves an accessory pathway that connects the atrium directly with the ventricular myocardium as depicted with this green bundle.

There are other accessory pathways as well. All have the effect of bypassing the usual AV node pathway.
**ECG Puzzler**

ECG characteristics of “Classic” WPW pattern include:
- PR interval is short (<0.12)
- Delta wave is present

Unfortunately, these two characteristics are not always present or may be rate dependent.

As stated previously the accessory pathway in WPW is called the “Bundle of Kent”.

This bundle can be located anywhere along the AV ring or in the septum.

The ECG appearance of WPW therefore can vary based upon the location of this bundle. Even the same bundle can cause different appearing ECG’s in different people.

Conversely, a right sided bypass tract (“Type B”) causes QS waves in leads V1-3 which is from a negative delta wave.

Therefore, it is difficult at times to tell exactly where the bundle is anatomically located based upon the ECG.

In general then:
- Left lateral pathway = pseudo lateral wall MI
- Posterior septal pathway = pseudo inferior wall MI
- Left sided pathway = pseudo posterior wall MI
- Right sided pathway = pseudo anterior wall MI

50% of bundles of Kent are left lateral, 30% are posteroseptal, 10% are right anteroseptal, 10% are right lateral.
Returning to our ECG

The rhythm is sinus bradycardia (rate ~ 50 b.p.m.)

Axis is WNL (~ 0 degrees) since the QRS is upright in leads I and II and there are isoelectric QRS complexes in aVF

No signs of hypertrophy. In addition, the ST/T wave segments are WNL
The intervals are not normal though!!

The PR interval is ~0.10 secs
The QRS is ~ 0.11 secs
The QTc looks ok at 0.44 sec

Notice the delta wave.

Finally, look at the q waves in V1-3. This probably represents a “Type B” pattern of WPW.
ECG Puzzler Solved—It is WPW

1. WPW pattern is caused by an accessory pathway which bypasses the AV node
2. The accessory pathway can be located in different spots in the heart
3. Classically the PR interval is short and there is frequently a “delta wave” present
4. The accessory pathway can cause many different appearances on the ECG.
   ✓ There can be abnormal q waves in several different leads
   ✓ The QRS complex can be prolonged and have a delta wave present
   ✓ The ST/T waves can be abnormal
5. WPW pattern can cause difficulty diagnosing ischemia, infarction, hypertrophy or pericarditis because of the changes outlined above.
6. One final thing: Notice I keep referring to this as a WPW pattern. If there is a WPW pattern and arrhythmias occur because of this bundle then it is called WPW Syndrome.

This concludes this issue’s ECG Puzzler. Contact me if you have questions!