ECG Underwriting Puzzler

Presented by: William Rooney, M.D.
Obtaining Best Results from this presentation

For best results—please do the following:
• Select “Slide Show” from the menu option on top

• Select “From the beginning”

• Slowly click through the presentation
• Have fun!---Good luck
Here is that ECG. This 54 y/o male is applying for life insurance. How would you interpret this ECG?
After inspecting for technical issues let’s examine the ECG using our usual routine:

1) Rhythm 2) Axis 3) Intervals 4) Q waves 5) Hypertrophy 6) ST/T waves

<table>
<thead>
<tr>
<th>Technically, any issues?</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal rhythm?</td>
<td>Yes, normal sinus rhythm</td>
</tr>
<tr>
<td>Normal Axis?</td>
<td>Yes. The axis is approximately 0°</td>
</tr>
<tr>
<td>Normal Intervals?</td>
<td>No. PR interval is prolonged at ~0.32 sec</td>
</tr>
<tr>
<td>Significant Q waves?</td>
<td>No.</td>
</tr>
<tr>
<td>Hypertrophy?</td>
<td>No.</td>
</tr>
<tr>
<td>ST/T wave abnormalities?</td>
<td>Yes, V2-3 are low/flat/biphasic suggestive of minor T wave changes.</td>
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The PR interval is measured from the beginning of the P wave to the beginning of the R wave. A PR interval is considered to be normal if between 0.12 and 0.20 seconds. If longer than 0.2 seconds in any lead it is indicative of a first degree AV “block”. Actually, there is no block but rather a slowed or delayed AV conduction.

The PR interval will usually vary based upon the heart rate. The interval gets longer with bradycardia typically.

When associated with a bundle branch block with/without an associated fascicular block there are concerns for development of complete heart block.
How about isolated first degree AV block? Is that something to worry about? The question is:

How does this finding impact mortality?

Although there is still debate regarding the long term mortality implications of this disorder there are several studies that have challenged the previous thinking that first degree AV block, especially in healthy young individuals, was not associated with increased mortality. The next two slides review two studies which are especially helpful.
First Degree AV Block—Healthy individuals

This study had 7575 individuals in it (Framingham Heart Study).
- Mean age 47 y/o.
- 54% women.
- F/u through 2007

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2765917/

All cause mortality

Cumulative Incidence of Death

PR ≤ median
PR > median

0 0.1 0.2 0.3 0.4 0.5 0.6
0 5 10 15 20

Years

Individuals with first-degree AV block had and adjusted risk of a:
- 2-fold increased risk for AF
- 3-fold increased risk for pacemaker
- 1.4-fold increased risk for all-cause mortality

Incidence of Atrial Fibrillation

No. at Risk
PR ≤ median: PR > median
3809 3766
3721 3642
3600 3450
3425 3238
3237 3009

Incidence of pacemaker

No. at Risk
PR ≤ median: PR > median
3809 3766
3721 3642
3600 3450
3425 3238
3237 3009

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2765917/
First Degree AV Block---Stable Coronary Artery Disease Individuals

This study had:
• 938 individuals in it (Heart and Soul Study). 9.3% had first degree AVB
• Enrollees with stable coronary artery disease.
  – >50% coronary stenosis or
  – Exercised induced ischemia or
  – Prior revascularization

Compared to those without first degree AV block those with it had:
• 1.58 age-adjusted hazard ratio for all cause mortality.
• 2.8 age-adjusted hazard ratio for cardiovascular mortality.

Kaplan-Meier curve showing the combined endpoint of freedom from CHF hospitalization or CV mortality by the presence or absence of first degree AVB.

Thus, this ECG shows a first degree AV block. Recent studies suggest there might be some mortality concerns but additional studies are needed to make a firm conclusion. Underwriters should be on the look out for evidence of other conduction abnormalities (e.g. Atrial fibrillation, complete heart block)

That concludes this issue’s ECG Underwriting Puzzler!! Contact me if you have any questions!!