ECG Underwriting Puzzler

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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
57 yo male. No cardiac hx.

Question: What is the major abnormality on this ECG???
After inspecting for technical issues let’s examine the ECG using our usual routine:

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

<table>
<thead>
<tr>
<th>Technically, any issues?</th>
<th>Copy quality is not great</th>
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</thead>
<tbody>
<tr>
<td>Normal rate and rhythm?</td>
<td>Yes, normal sinus rhythm. Rate ~62 bpm</td>
</tr>
<tr>
<td>Normal Axis?</td>
<td>Yes</td>
</tr>
<tr>
<td>Normal Intervals?</td>
<td>No. The QRS interval is prolonged at &gt;0.12 sec</td>
</tr>
<tr>
<td>Significant Q waves?</td>
<td>No</td>
</tr>
<tr>
<td>Hypertrophy?</td>
<td>No</td>
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<tr>
<td>ST/T wave abnormalities?</td>
<td>Yes, there are T wave inversions in V2 and V3.</td>
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<tr>
<td>The next slide is a review on measuring intervals</td>
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</table>
Analyzing intervals—steps to success

**Step 1**

Determine the PR interval
- **Clue:** Any lead can be checked but frequently lead II has the highest p waves
- Normally 0.12 to 0.20 seconds, it is impacted by heart rate
- Short intervals can signify the presence of pre-excitations syndromes
- Long intervals can signify the presence of AV blocks

**Step 2**

Determine the QRS interval
- **Clue:** Look at V1-2 and V5-6
- The normal QRS interval is 0.06 to 0.10 seconds and is not impacted by rate
- Long QRS intervals suggest bundle branch blocks, pre-excitation syndromes, ventricular pacing or Ventricular tachycardia

**Step 3**

Determine the QT interval
- **Clue:** Use the lead that has the clearest ending to the T wave. If it is <2 big boxes it is typically WNL as long as the heart rate is normal
- Measure from the onset of the QRS to the end of the T wave
- Measure 3-5 consecutive beats and then average
- QT intervals vary based upon the lead being evaluated and by heart rate
- Most normal ranges use lead II
- V2-3 typically have the longest QT interval however and is frequently used
- Use the QT interval calculation for equivocal findings
Measure the QRS interval. It looks prolonged!!

~0.13 seconds

Prolonged indeed!!!
In adults think of RBBB when:

- QRS $\geq 0.12$ sec
- There is a Rsr’, rsR’ or rSR’ in leads V1 or V2. In some individuals a wide and often notched R wave pattern may be seen in V1 and/or V2.
- The S wave in leads I and V6 is $> 40$ milliseconds or is of greater duration than the R wave.

When these criteria are met….we have RBBB
The ST segment and T waves can appear to be abnormal with RBBB.

T waves are frequently inverted in the right precordial leads (when a terminal R’ wave is present). The T waves are frequently upright in the left precordial leads (when a terminal S wave is present). These changes don’t necessarily imply cardiac disease however in the presence of RBBB.

Interestingly, unlike LBBB, RBBB does *not* interfere with the diagnosis of a myocardial infarction using the typical Q and R wave criteria.

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