**P Wave Questions**

- Are the P waves regular? From p to p, can you measure the distance and find it is the same through the strip?
- Is there one P wave for every QRS?
- Is the P wave in front of the QRS or behind it?
- Do all the P waves look alike?
- Are the irregular P waves associated with ectopic beats? ectopic: extra heart beat out of pattern, like an irritability or an escape beat.
- Is the P wave normal and upright in Lead II?

<table>
<thead>
<tr>
<th>Sinus Rhythms</th>
<th>0.12 – 0.2 seconds and constant</th>
<th>Normal Sinus Rhythm NSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinus Bradycardia</td>
<td>0.12 – 0.2 seconds and constant</td>
<td>Sinus Arrhythmia</td>
</tr>
<tr>
<td>Sinus Tachycardia</td>
<td>0.12 – 0.2 seconds and constant</td>
<td>Supraventricular Tachycardia</td>
</tr>
</tbody>
</table>

- There is a uniform P wave in front of every QRS complex
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<table>
<thead>
<tr>
<th>Atrial Rhythms</th>
<th>morphology changed from one complex to another</th>
<th>less than 0.2 seconds: may vary</th>
<th>Wandering Pacemaker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There is one P wave of early beat differs from the sinus P waves; can be flattened or notched; may be lost in the preceding T wave</td>
<td>0.12 – 0.2 seconds: can exceed 0.2 seconds</td>
<td>Premature Atrial P wave</td>
</tr>
<tr>
<td></td>
<td>There is one P wave in front of every QRS complex. The configuration of the P wave will be different from that of sinus P waves; they may be flattened or notched. Because of the rapid rate, the P waves can be hidden in the T wave of the preceding beats</td>
<td>0.12 – 0.2 seconds and constant across the strip. The PRI may be difficult to measure if the P wave is obscured by the T wave.</td>
<td>Atrial Tachycardia * Supraventricular Tachycardia</td>
</tr>
</tbody>
</table>
When the atria flutters, they produce a series of well defined P waves. When seen together, these “flutter” waves have a sawtooth appearance. Because of the unusual configuration of the P wave (flutter wave) and the proximity of the wave to the QRS complex, it is often impossible to determine a PRI in this arrhythmia. Therefore, the PRI is not measured in Atrial Flutter.

No P wave is produced. All atrial activity is depicted as “fibrillatory” waves, or grossly chaotic undulations of the baseline. In this arrhythmia the atria are not depolarizing in an effective way: they are fibrillating. Since no P waves are visible, no PRI can be measured.

<p>| When the atria flutters, they produce a series of well defined P waves. When seen together, these “flutter” waves have a sawtooth appearance. | Because of the unusual configuration of the P wave (flutter wave) and the proximity of the wave to the QRS complex, it is often impossible to determine a PRI in this arrhythmia. Therefore, the PRI is not measured in Atrial Flutter. | Atrial Flutter * Supraventricular Tachycardia |
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<table>
<thead>
<tr>
<th>Heart Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Degree</strong></td>
</tr>
<tr>
<td>P wave will be upright and uniform. Each P wave will be followed by a QRS complex.</td>
</tr>
</tbody>
</table>

| **2nd Degree – Wenckebach** |
| P waves are upright and uniform. There are always more P waves than QRS complexes. | The PRI progressively lengthens until one P wave is blocked. | 

| **2nd Degree – Classical** |
| P waves are upright and uniform. There are always more P waves than QRS complexes. | The PRI on conducted beats will be constant across the strip, although it might be longer than a normal PRI measurement. | 

| **3rd Degree – Complete Heart Block (CHB)** |
| P waves are upright and uniform. There are always more P waves than QRS complexes. | No relationship between P waves and QRS complexes; P waves can occasionally be found superimposed on the QRS complex. | 

<p>| <img src="image1" alt="Heart Block 1st Degree" /> |
| <img src="image2" alt="Heart Block 2nd Degree Wenckebach" /> |
| <img src="image3" alt="Heart Block 2nd Degree Classical" /> |
| <img src="image4" alt="Heart Block 3rd Degree Complete Heart Block" /> |</p>
<table>
<thead>
<tr>
<th>Junctional Rhythms</th>
</tr>
</thead>
<tbody>
<tr>
<td>The P wave can come before or after the QRS complex, it can be lost entirely within the QRS complex. If visible the P wave is inverted.</td>
</tr>
<tr>
<td>If the P wave precedes the QRS complex, the PRI will be less than 0.12 seconds. If the P wave falls within the QRS complex or following it, there will be no PRI.</td>
</tr>
<tr>
<td>Premature Junctional Contraction</td>
</tr>
<tr>
<td>Inverted; can fall before, after or hidden within the QRS complex</td>
</tr>
<tr>
<td>if measureable, &lt; 0.12 seconds</td>
</tr>
<tr>
<td>Junctional Escape Rhythm</td>
</tr>
<tr>
<td>Inverted; can fall before, after or hidden within the QRS complex</td>
</tr>
<tr>
<td>if measureable, &lt; 0.12 seconds</td>
</tr>
<tr>
<td>Accelerated Junctional Rhythm</td>
</tr>
<tr>
<td>Inverted; can fall before, after or hidden within the QRS complex</td>
</tr>
<tr>
<td>if measureable, &lt; 0.12 seconds</td>
</tr>
<tr>
<td>Junctional Tachycardia</td>
</tr>
<tr>
<td>Supraventricular Tachycardia</td>
</tr>
</tbody>
</table>
### Ventricular Rhythms

The ectopic is not preceded by a P wave. You may see a coincidental P wave near the PVC, but it is dissociated.

<table>
<thead>
<tr>
<th>TYPES OF PVCs</th>
<th>PVCs of similar irritability</th>
<th>PVCs of different configurations</th>
<th>PVC on the back of T wave</th>
<th>2 PVCs attached to each other</th>
<th>&gt; 2 PVCs attached to each other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>unifocal PVC</td>
<td>multifocal PVC</td>
<td>R on T</td>
<td>Couplelet</td>
<td>Run of PVCs</td>
</tr>
</tbody>
</table>

**Premature Ventricular Contraction**
<table>
<thead>
<tr>
<th>Pattern: 1 PVC after a normal QRS, repeating</th>
<th>Bigeminy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern: 1 PVC after 2 normal QRS, repeating</td>
<td>Trigeminy</td>
</tr>
<tr>
<td>Pattern: 1 PVC after 3 normal QRS, repeating</td>
<td>Quadrigeminy</td>
</tr>
</tbody>
</table>

None of the QRS complexes will be preceded by P waves. You may see dissociated P waves intermittently across the strip.

Since the rhythm originates in the ventricles, there will be no PRI.

**Ventricular Tachycardia**

There are no discernible P waves

There is no PRI

**Ventricular Fibrillation**

There are no P waves in this arrhythmia

There is no PRI

**Idioventricular Rhythm**

* Agonal

Straight Line indicates no electrical activity

There is no PRI

**Asystole**