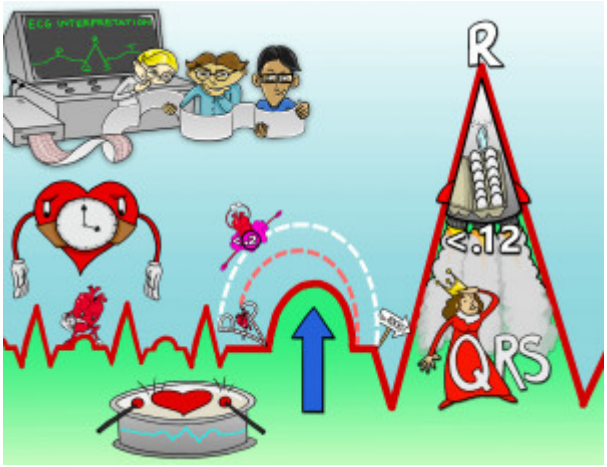
ECG Interpretation

An electrocardiogram (ECG) is a noninvasive test that monitors the electrical activity of the heart. An ECG involves graphic tracings of bolded and light lines forming a grid. Each large square is composed of 25 smaller squares. Each small square represents 0.04 seconds while each large square equals 0.20 seconds. An ECG measures the heart's rate and rhythm (refer to the Picmonic on "ECG Rhythm Waves"). Other components of ECG interpretation include the present of P waves before every normal QRS, the ST segment, and the T wave.



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Rate

Heart-rate-timer

Normally, the SA node acts as the pacemaker with a rate of 60 to 100 bpm. Sinus bradycardia is characterized by a heart rate below 60 bpm while sinus tachycardia presents with a heart rate exceeding 100 bpm. Dysrhythmias are caused by disorders of impulse formation or conduction. Assuming the heart rhythm is regular, the heart rate is calculated by either counting the number of QRS complexes over a 6 second interval and multiplying by 10, or by counting the number of large squares between one R-R interval and dividing the number into 300. For fast rhythms, you can count the number of small squares in between one R-R interval and divide the number into 1500.

Rhythm

Rhythm-drum

A regular rhythm is characterized by the same duration between each R-R interval. Normal sinus rhythm is defined as a rhythm starting at the SA node at a rate between 60 to 100 beats per minute and follows the normal conduction pathway. Dysrhythmias are caused by abnormal cardiac conduction. Although many dysrhythmias may be serious, some are benign and require no treatment.

P Waves

P-pole-vault

The presence of P waves is a component of a normal ECG. P waves precede the QRS complex and represent atrial depolarization. The absence of P waves may indicate atrial fibrillation or sinoatrial arrest.

Upright, Rounded, Before Every QRS

Up-arrow, Rounded, and Before Queen's-Rocket-Ship

A normal ECG has one upright and rounded P wave before every QRS.

PR Interval (< 0.20 seconds)

P-pole to Rocket with Less-than (.2) Tutu

The PR interval indicates AV conduction time. To measure the PR interval on the ECG strip, start from the beginning of the P wave and mark until the beginning of the QRS complex. Normally, this interval should be between 0.12 to 0.20 seconds, or less than 0.20 for simplicity. This interval shortens with increased heart rate.

Normal QRS (< 0.12 seconds)

Normal Queen's-Rocket-Ship with Less-than (.12) Dozen

The QRS complex represents ventricular depolarization. Measure the QRS complex from the end of the PR interval to the end of the S wave. Normally, this interval should be between 0.06 to 0.12 seconds, or less than 0.12 for simplicity.

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