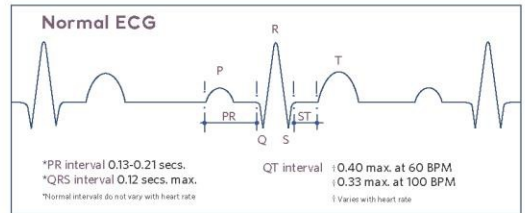


Calculating Heart Rate

At a paper speed of 25mm per sec., each small square represents 0.04 sec. and each large square represents 0.2 secs.

$$\text{Heart rate} = \frac{300}{\text{No. of large squares between R waves}}$$



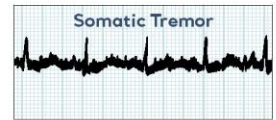
Beware of:



Reason: Electrical interference from adjacent wiring or appliances.
Remedy: Check that electrodes are secured according to instructions. Try a second lead position or re-position patient cable away from possible interference source.



Reason: Interference because of patients movement or breathing.
Remedy: Repeat patients skin preparation and re-position electrodes along sternum or on shoulder.



Reason: Shivering or muscle tension.
Remedy: Patient should be kept warm and relaxed. Check electrodes are properly fixed.

Abnormal Heart Rhythms



Normal Sinus Rhythm
HEART RATE: 60-90 BPM



Sinus Bradycardia
HEART RATE: 60 BPM MAX, sometimes with irregularities in rhythm.
REASON: Normal sleep or high vagal tone.



Sinus Tachycardia
HEART RATE: OVER 90 BPM
REASON: Anxiety. If it continues it may be caused by left ventricular failure.



Atrial Flutter
Continual atrial discharge at about 300/min shows up as the classic 'saw tooth' between and through QRS intervals in favourable lead.
Ventricular response notably fixed at 150/min for long periods or irregular at 75-200/min.
REASON: Usually heart failure.



Atrial Fibrillation
Irregular fine or coarse atrial depolarisation waves at a rapid rate of 400-600/min. Irregular ventricular response (QRS interval) in absence of complete heart block.
REASON: Usually heart failure.



Left Bundle Branch Block
QRS interval 0.12 secs. maximum as seen in a lead system like V1 or V6. QRS intervals typically broad with an indentation, S-T troughs may indicate ventricular ectopics. In sequence may be confused with ventricular tachycardia except that they regularly follow atrial peaks - here shown as sinus rhythm P waves.
REASON: Strong possibility of AV block.



Right Bundle Branch Block
QRS interval at 0.12 secs. maximum as seen in lead system like V1 or V6, shown here with normal sinus rhythm. When these striking, repeating QRS intervals do not appear to follow a P wave they can be confused with those of ventricular tachycardia.
REASON: May be warning of serious AV block if post-infarction develops.



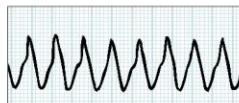
Supraventricular Ectopics
Out-of-sequence extra beats known as extrasystoles, with QRS intervals similar to adjacent sinus beats. Atrial depolarisation waves, unlike normal P waves, may occur before or within the extra QRS traces.
REASON: May be a warning of atrial flutter, fibrillation or tachycardia but usually benign.



First Degree Av Block
Normal sinus rhythm with extended P-R interval.
REASON: No obvious reason



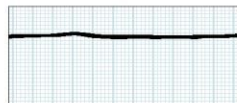
Second Degree Av Block
Regularly or occasionally, the P wave is not followed by an obvious QRS interval, but other beats intrude. Wenckbach type illustrated is normally benign. Note extended P-R interval until a beat is dropped before sequence continues.
REASON: May be leading up to complete heart block and/or ventricular asystole.



Ventricular Tachycardia
A series of ventricular ectopics with a heart rate of 100-280/min. Normally 140-180/min. QRS intervals are consistent broad notched format.
REASON: High risk of ventricular fibrillation. Only 'slow' forms are not potentially dangerous.



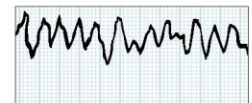
Ventricular Asystole
P wave indicates beating atria but ventricles have stopped - no QRS interval. Possibility of development from second or third AV block.
REASON: Circulatory arrest.



Total Cardiac Asystole
Atria and ventricles stopped. Assume ventricular fibrillation if the 'straight line' trace is disturbed, even if the probable cause is electrical interference.
REASON: Circulatory arrest. Usually terminal, unless caused by anoxia or similar reason which can be rectified.



Ventricular Ectopics
Extra beats with QRS intervals greater than 0.12 secs. Any P waves are coincidental and irregular.
REASON: Possibility of developing ventricular fibrillation or tachycardia.



Ventricular Fibrillation
Chaotic electrical activity producing irregular, inconsistent non-repeating trace.
REASON: Circulatory arrest.

Determination Of Regular Rhythm

- Are normal P waves present?
- Are the QRS complexes narrow or wide?
- Is there a relationship between the P waves and the QRS complexes i.e. 1:1?
- Is the rhythm regular?

The QRS complexes are narrow (<0.12 seconds wide)

Every QRS complex is preceded by a P wave

P waves are present

The rhythm is regular

