




NORMAL SINUS RHYTHM

SINUS node is the pacemaker, firing at a regular rate of 60–100 times per minute. Each beat is conducted normally through to the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Normal Sinus Rhythm

The rules for this rhythm:

REGULARITY: The R-R intervals are constant; the rhythm is regular.

RATE: The atrial and ventricular rates are equal; heart rate is between 60 and 100 beats per minute.

P WAVE: The P waves are uniform. There is one P wave in front of every QRS complex.

PRI: The PR interval measures between .12 and .20 seconds; the PRI measurement is constant across the strip.

QRS: The QRS complex measures less than .12 seconds.




SINUS TACHYCARDIA

SINUS node is the pacemaker, firing regularly at a rate of greater than 100 times per minute. Each impulse is conducted normally through to the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Sinus Tachycardia

The rules for this rhythm:

REGULARITY: The R-R intervals are constant; the rhythm is regular.

RATE: The atrial and ventricular rates are equal; the heart rate is greater than 100 beats per minute (usually between 100 and 160 beats per minute).

P WAVE: There is a uniform P wave in front of every QRS complex.

PRI: The PR interval measures between .12 and .20 seconds; the PRI measurement is constant across the strip.

QRS: The QRS complex measures less than .12 seconds.




SINUS BRADYCARDIA

SINUS node is the pacemaker, firing regularly at a rate of less than 60 times per minute. Each impulse is conducted normally through to the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Sinus Bradycardia

The rules for this rhythm:

REGULARITY: The R-R intervals are constant; the rhythm is regular.

RATE: The atrial and ventricular rates are equal; heart rate is less than 60 beats per minute.

P WAVE: There is a uniform P wave in front of every QRS complex.

PRI: The PR interval measures between .12 and .20 seconds; the PRI measurement is constant across the strip.

QRS: The QRS complex measures less than .12 seconds.



ATRIAL FIBRILLATION

The ATRIA are so irritable that a multitude of foci initiate impulses, causing the atria to depolarize repeatedly in a fibrillatory manner. The AV node blocks most of the impulses, allowing only a limited number through to the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Atrial Fibrillation

The rules for this rhythm:

- REGULARITY:** The atrial rhythm is unmeasurable; all atrial activity is chaotic. The ventricular rhythm is grossly irregular, having no pattern to its irregularity.
- RATE:** The atrial rate cannot be measured because it is so chaotic; research indicates that it exceeds 350 beats per minute. The ventricular rate is significantly slower because the AV node blocks most of the impulses. If the ventricular rate is below 100 beats per minute, the rhythm is said to be "controlled"; if it is over 100 beats per minute, it is considered to have a "rapid ventricular response."
- P WAVE:** In this arrhythmia the atria are not depolarizing in an effective way; instead, they are fibrillating. Thus, no P wave is produced. All atrial activity is depicted as "fibrillatory" waves, or grossly chaotic undulations of the baseline.
- PRI:** Since no P waves are visible, no PRI can be measured.
- QRS:** The QRS complex measurement should be less than .12 seconds.



ATRIAL FLUTTER

A single irritable focus within the ATRIA issues an impulse that is conducted in a rapid, repetitive fashion. To protect the ventricles from receiving too many impulses, the AV node blocks some of the impulses from being conducted through to the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Atrial Flutter

The rules for this rhythm:

- REGULARITY:** The atrial rhythm is regular. The ventricular rhythm will be regular if the AV node conducts impulses through in a consistent pattern. If the pattern varies, the ventricular rate will be irregular.
- RATE:** Atrial rate is between 250 and 350 beats per minute. Ventricular rate will depend on the ratio of impulses conducted through to the ventricles.
- P WAVE:** When the atria flutter they produce a series of well-defined P waves. When seen together, these "Flutter" waves have a sawtooth appearance.
- PRI:** 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.
- QRS:** The QRS complex measures less than .12 seconds; measurement can be difficult if one or more Flutter waves is concealed within the QRS complex.

SVT



ATRIAL TACHYCARDIA

The pacemaker is a single irritable site within the ATRIUM that fires repetitively at a very rapid rate. Conduction through to the ventricles is normal.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Atrial Tachycardia

The rules for this rhythm:

REGULARITY: The R-R intervals are constant; the rhythm is regular.

RATE: The atrial and ventricular rates are equal; the heart rate is usually 150–250 beats per minute.

P WAVE: There is one P wave in front of every QRS complex. The configuration of the P wave will be different than 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 waves of the preceding beats.

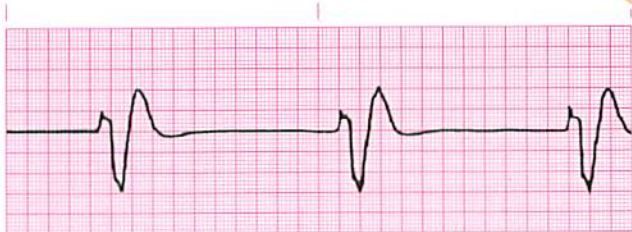
PRI: The PRI is between .12 and .20 seconds and constant across the strip. The PRI may be difficult to measure if the P wave is obscured by the T wave.

QRS: The QRS complex measures less than .12 seconds.




IDIOVENTRICULAR RHYTHM

In the absence of a higher pacemaker, the VENTRICLES initiate a regular impulse at their inherent rate of 20–40 beats per minute.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Idioventricular Rhythm

The rules for this rhythm:

REGULARITY: This rhythm is usually regular, although it is less reliable as the heart dies.

RATE: The ventricular rate is usually 20–40 beats per minute, but it can drop below 20 beats per minute.

P WAVE: There are no P waves in this arrhythmia.

PRI: There is no PRI.

QRS: The QRS complex is wide and bizarre, measuring at least .12 seconds.




PREMATURE VENTRICULAR CONTRACTIONS

A PVC is a single irritable focus within the VENTRICLES that fires prematurely to initiate an ectopic complex.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Premature Ventricular Contractions

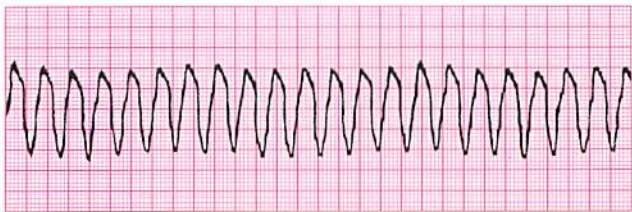
The rules for this rhythm:

- REGULARITY:** The underlying rhythm can be regular or irregular. The ectopic PVC will interrupt the regularity of the underlying rhythm (unless the PVC is interpolated).
- RATE:** The rate will be determined by the underlying rhythm. PVCs are not usually included in the rate determination because they frequently do not produce a pulse.
- P WAVE:** The ectopic is not preceded by a P wave. You may see a coincidental P wave near the PVC, but it is dissociated.
- PRI:** Since the ectopic comes from a lower focus, there will be no PRI.
- QRS:** The QRS complex will be wide and bizarre, measuring at least .12 seconds. The configuration will differ from the configuration of the underlying QRS complexes. The T wave is frequently in the opposite direction from the QRS complex.



VENTRICULAR TACHYCARDIA

An irritable focus in the VENTRICLES fires regularly at a rate of 150–250 beats per minute to override higher sites for control of the heart.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Ventricular Tachycardia

The rules for this rhythm:

- REGULARITY:** This rhythm is usually regular, although it can be slightly irregular.
- RATE:** Atrial rate cannot be determined. The ventricular rate range is 150–250 beats per minute. If the rate is below 150 beats per minute, it is considered a slow VT. If the rate exceeds 250 beats per minute, it is called Ventricular Flutter.
- P WAVE:** None of the QRS complexes will be preceded by P waves. You may see dissociated P waves intermittently across the strip.
- PRI:** Since the rhythm originates in the ventricles, there will be no PRI.
- QRS:** The QRS complexes will be wide and bizarre, measuring at least .12 seconds. It is often difficult to differentiate between the QRS and the T wave.



VENTRICULAR FIBRILLATION

Multiple foci in the VENTRICLES become irritable and generate uncoordinated, chaotic impulses that cause the heart to fibrillate rather than contract.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Ventricular Fibrillation

The rules for this rhythm:

REGULARITY: There are no waves or complexes that can be analyzed to determine regularity. The baseline is totally chaotic.

RATE: The rate cannot be determined since there are no discernible waves or complexes to measure.

P WAVE: There are no discernible P waves.

PRI: There is no PRI.

QRS: There are no discernible QRS complexes.



FIRST DEGREE HEART BLOCK

The AV NODE holds each sinus impulse longer than normal before conducting it through the ventricles. Each impulse is eventually conducted. Once into the ventricles, conduction proceeds normally.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



First Degree Heart Block

The rules for this rhythm:

REGULARITY: This will depend on the regularity of the underlying rhythm.

RATE: The rate will depend on the rate of the underlying rhythm.

P WAVE: The P waves will be upright and uniform. Each P wave will be followed by a QRS complex.

PRI: The PRI will be constant across the entire strip, but it will always be greater than .20 seconds.

QRS: The QRS complex measurement will be less than .12 seconds.




Type I Second Degree Heart Block **WENCKEBACH**

As the sinus node initiates impulses, each one is delayed in the AV NODE a little longer than the preceding one, until one is eventually blocked completely. Those impulses that are conducted travel normally through the ventricles.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Wenckebach Type I Second Degree Heart Block

The rules for this rhythm:

- REGULARITY:** The R-R interval is irregular in a pattern of grouped beating. The R-R interval changes as the PRI gets progressively longer.
- RATE:** Since some beats are not conducted, the ventricular rate is usually slightly slower than normal (<100 beats per minute). The atrial rate is normal (60–100 beats per minute).
- P WAVE:** The P waves are upright and uniform. Some P waves are not followed by QRS complexes.
- PRI:** The PR intervals get progressively longer, until one P wave is not followed by a QRS complex. After the blocked beat, the cycle starts again.
- QRS:** The QRS complex measurement will be less than .12 seconds.



TYPE II Second Degree Heart Block

The AV NODE selectively conducts some beats while blocking others. Those that are not blocked are conducted through to the ventricles, although they may encounter a slight delay in the node. Once in the ventricles, conduction proceeds normally.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Type II Second Degree Heart Block

The rules for this rhythm:

- REGULARITY:** If the conduction ratio is consistent, the R–R interval will be constant, and the rhythm will be regular. If the conduction ratio varies, the R–R will be irregular.
- RATE:** The atrial rate is usually normal (60–100 beats per minute). Since many of the atrial impulses are blocked, the ventricular rate will usually be in the bradycardia range (< 60 beats per minute), often one half, one third, or one fourth of the atrial rate.
- P WAVE:** The P waves are upright and uniform. There are always more P waves than QRS complexes.
- PRI:** The PRI on conducted beats will be constant across the strip, although it might be longer than a normal PRI measurement.
- QRS:** The QRS complex measurement will be less than .12 seconds.



COMPLETE HEART BLOCK

The block at the AV NODE is complete. The sinus impulses cannot penetrate the node, and thus are not conducted through to the ventricles. An escape mechanism from either the junction or the ventricles will take over to pace the ventricles. The atria and the ventricles function in a totally dissociated fashion.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Complete Heart Block

The rules for this rhythm:

- REGULARITY:** Both the atrial and the ventricular foci are firing regularly; thus the P-P intervals and the R-R intervals are regular.
- RATE:** The atrial rate will usually be in a normal range (60–100 beats per minute). The ventricular rate will be slower. If a junctional focus is controlling the ventricles, the rate will be 40–60 beats per minute. If the focus is ventricular, the rate will be 20–40 beats per minute.
- P WAVE:** The P waves are upright and uniform. There are more P waves than QRS complexes.
- PRI:** Since the block at the AV node is complete, none of the atrial impulses is conducted through to the ventricles. There is no PRI. The P waves have no relationship to the QRS complexes. You may occasionally see a P wave superimposed on the QRS complex.
- QRS:** If the ventricles are being controlled by a junctional focus, the QRS complex will measure less than .12 seconds. If the focus is ventricular, the QRS will measure .12 seconds or greater.



ASYSTOLE

The heart has lost its electrical activity. There is no electrical pacemaker to initiate electrical flow.



What are the rules for this rhythm? (Regularity, Rate, P Wave, PRI, QRS)



Asystole

The rules for this rhythm:

REGULARITY: There is no electrical activity; only a straight line.

RATE: There is no electrical activity; only a straight line.

P WAVE: There is no electrical activity; only a straight line.

PRI: There is no electrical activity; only a straight line.

QRS: There is no electrical activity; only a straight line.