8 Junctional Dysrhythmias

Learning Outcomes

- **8.1** Describe the various junctional dysrhythmias.
- **8.2** Analyze premature junctional complexes and their effect on the patient, including basic patient care and treatment.
- **8.3** Analyze junctional escape rhythm and its effect on the patient, including basic patient care and treatment.
- **8.4** Analyze accelerated junctional rhythm and its effect on the patient, including basic patient care and treatment.
- **8.5** Analyze junctional tachycardia and its effect on the patient, including basic patient care and treatment.
- **8.6** Analyze supraventricular tachycardia and its effect on the patient, including basic patient care and treatment.

Key Terms

AV junction
delta wave
hypotension
junctional escape rhythm
retrograde
supraventricular
underlying rhythm
Wolff-Parkinson-White syndrome

8.1 Introduction to Junctional Dysrhythmias

AV junction The AV node and surrounding tissue, including the bundle of His.

The atrioventricular (AV) node and the surrounding area, including the bundle of His, are collectively known as the **AV junction.** Cells in the AV junction have automaticity and can function as a pacemaker, although the AV junction is not the heart's normal pacemaker. Junctional rhythms are the result of electrical impulses coming from the AV junction rather than the SA node. The inherent rate of the AV junction is between 40 and 60 bpm. As discussed later, junctional rhythms are classified as follows: junctional rhythm 40 to 60 bpm, accelerated junctional rhythm 60 to 100 bpm, and junctional tachycardia 100 bpm or greater.

retrograde Moving backward.

With junctional rhythms, it is important to understand that the electrical current is initiated *from* the AV junction. As a result, the electrical impulses that cause depolarization of the atria flow **retrograde,** or backward. This reverse flow of electrical activity causes the inverted P wave morphology

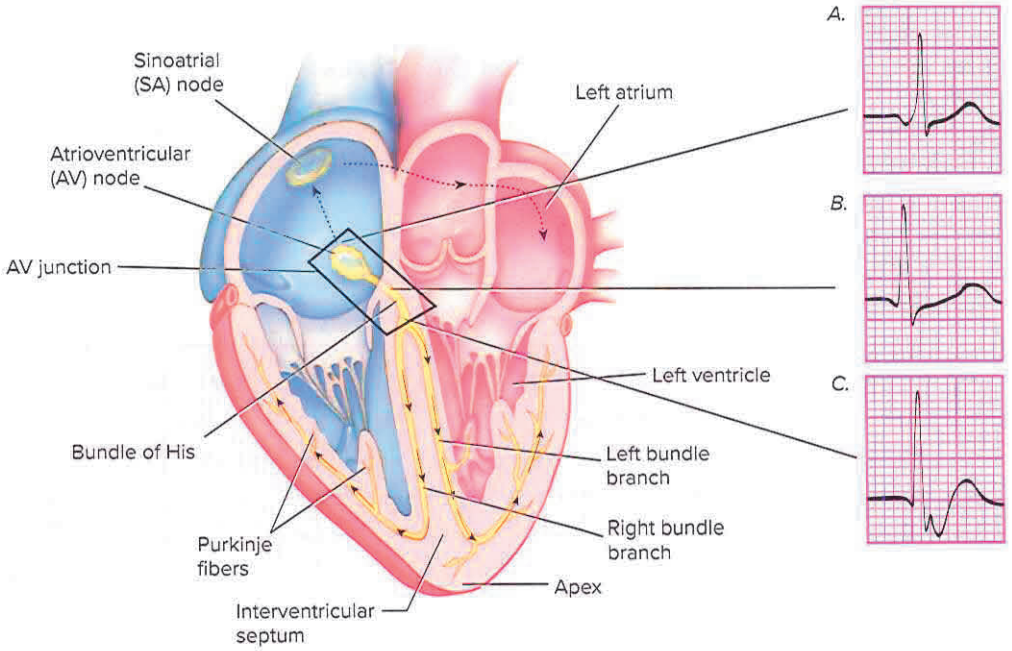
seen in junctional dysrhythmias. Depending on the heart rate, patients with junctional rhythms may complain of light-headedness or dizziness if the rate is slow or rapid heart rates if the rate is fast.

Another feature of junctional complexes and rhythms is the orientation of the P wave in relation to the QRS complex. The P wave can occur before, during (hidden or buried), or after the QRS complex, depending on the region of tissue from which the impulse originates. When the impulse leaves the AV junction, it travels backward (retrograde) to the atria, but it also travels forward (antegrade) into the ventricles. Therefore, location, distance, and speed of the impulse play a role where the "P" wave occurs in junctional complexes.

If the impulse is initiated high up in the AV junction (higher in the atrium, near the AV node), atrial depolarization occurs before ventricular depolarization, so the P wave occurs before the QRS complex. If the impulse comes from the midpoint of the AV junction, atrial and ventricular depolarization occurs at the same time. As a result, the P wave is buried within the QRS complex. Remember that the cardiac monitor or ECG machine records electrical activity in the form of voltage, and it can record only what it "sees." If the P wave and QRS complex occur at the same time, whichever has the larger voltage is reflected on the tracing. Finally, if the electrical impulse comes from the lowest aspect of the AV junction, the ventricles depolarize before the atria, and the P wave occurs after the QRS complex (see Figure 8-1).

Think of it as a kiddie pool in your backyard. If you drop a stone in the middle of the pool, the little waves will reach all sides of the pool at the same time. If you drop another stone closer to one side of the pool, the waves reach one side before the other.

Figure 8-1 For junctional rhythms the electrical impulses are retrograde and the P wave location on the ECG tracing depends on where the ectopic impulse occurs. *A.* The P wave precedes the QRS complex; *B.* the P wave is buried in the QRS complex; *C.* the P wave follows the QRS complex.



Checkpoint Question (LO 8.1)

1. Explain what causes the inverted P wave morphology found with junctional rhythms.

_____

_____

underlying rhythm
The heart rhythm that would be present if the abnormal impulses were ignored or removed from the tracing.

8.2 Premature Junctional Complex (PJC)

A premature junctional complex (PJC) is caused by a single early electrical impulse that originates in the atrioventricular junction. It occurs before the next expected sinus impulse, causing an irregularity in the **underlying rhythm** (Figure 8-2).

Criteria for Classification

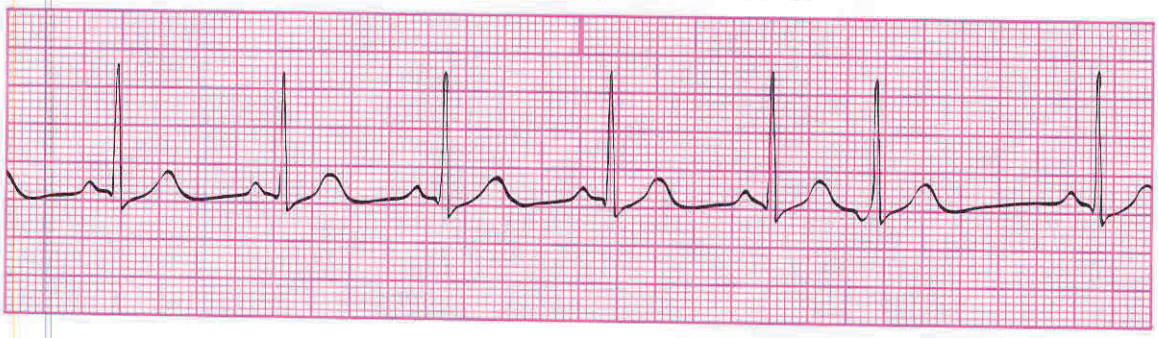
- ***Rhythm:*** May be occasionally irregular or frequently irregular, depending on the underlying rhythm and the number of PJCs present.
- ***Rate:*** Depends on the underlying rhythm and number of PJCs present.
- ***P wave morphology:*** The P wave of the premature junctional complex, if seen, is inverted and may immediately precede or follow the QRS complex, or it may be buried within the QRS complex. The P wave of the underlying rhythm will typically be upright and with similar morphology.
- ***PR interval:*** May be shorter than normal if the P wave precedes the QRS complex, absent if the P wave is buried in the QRS, or not measurable if it occurs after the QRS complex. *Note:* The PR interval can be measured only if the P wave (regardless of shape) occurs prior to the QRS complex.
- ***QRS duration and morphology:*** The QRS duration is between the normal limits of 0.06 and 0.10 second.

Interpret-TIP

Premature Junctional Complexes

PJCs cause the rhythm to be irregular, and the P wave may appear before, during, or after the QRS complex. Regardless of location, if the P wave is seen, it will be inverted.

Figure 8-2 The premature junctional complex is the sixth complex on this tracing.



How the Patient Is Affected and What You Should Know

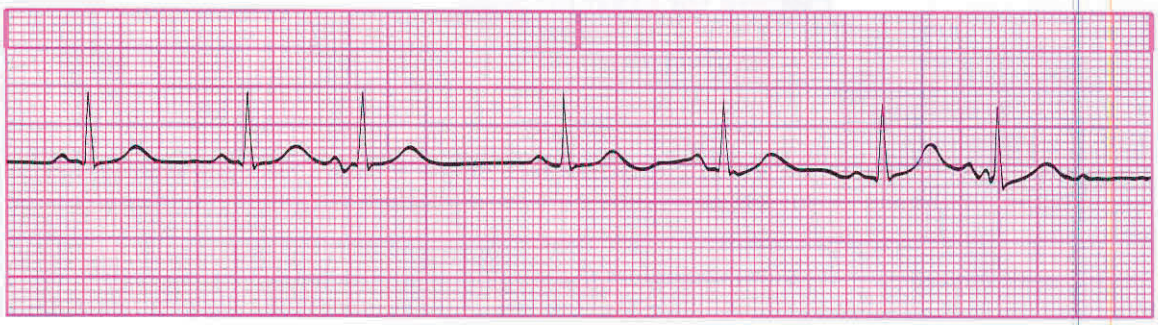
hypotension A lower than normal blood pressure that can cause reduction of blood flow to vital organs.

When the patient has a healthy heart, isolated PJCs cause no signs or symptoms. If more than four to six PJCs occur per minute, this warns of a more serious condition. An irregular pulse would be noted, and the patient may experience **hypotension** due to low cardiac output.

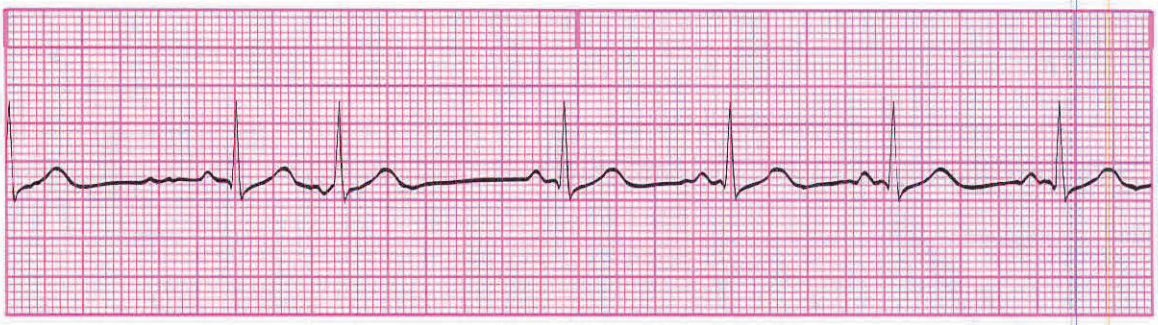
Checkpoint Question (LO 8.2)

Using the criteria for classification, select the rhythm that most closely resembles premature junctional complex.

A.



B.



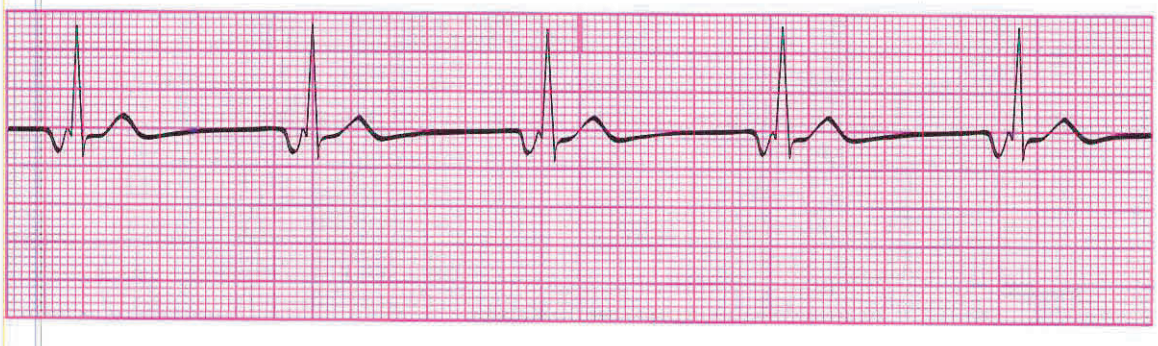
1. Which distinguishing feature(s) led you to make the selection?

8.3 Junctional Escape Rhythm

junctional escape rhythm A rhythm that occurs when the SA node fails to initiate the electrical activity and one of the backup pacemaker sites takes over.

Junctional rhythm, also known as **junctional escape rhythm,** originates at the AV junction, producing retrograde (backward) depolarization of atrial tissue and, at the same time, stimulating the depolarization of ventricles (Figure 8-3). Escape rhythms occur when the SA node fails to initiate the electrical activity and the rhythm is established by a backup pacemaker site.

Figure 8-3 Junctional escape rhythm.



Criteria for Classification

- ***Rhythm:*** The P-P (is seen) and R-R intervals are regular and occur at similar intervals. The P-P interval may be difficult to measure due to the location of the P wave.
- ***Rate:*** The ventricular rate is 40 to 60 beats per minute. The atrial rate is 40 to 60 beats per minute, but this may not be measurable if the P waves are not identifiable.
- ***P wave morphology:*** If seen, the P wave is usually inverted and may precede, follow, or fall within the QRS complex. It may not be visible at all on the rhythm strip.
- ***PR interval:*** If the P wave is before the QRS complex, the PR interval measures less than 0.12 second and is constant. If the P wave is not before the QRS complex, the PR interval cannot be determined because this P wave is not associated with the next QRS complex.
- ***QRS duration and morphology:*** The QRS duration is within normal limits of 0.06 to 0.10 second.

Interpret-TIP

Junctional Escape Rhythm

The P wave may occur before, during (buried in), or after the QRS. If the P wave is seen, it will be inverted. The heart rate is between 40 and 60 beats per minute.

How the Patient Is Affected and What You Should Know

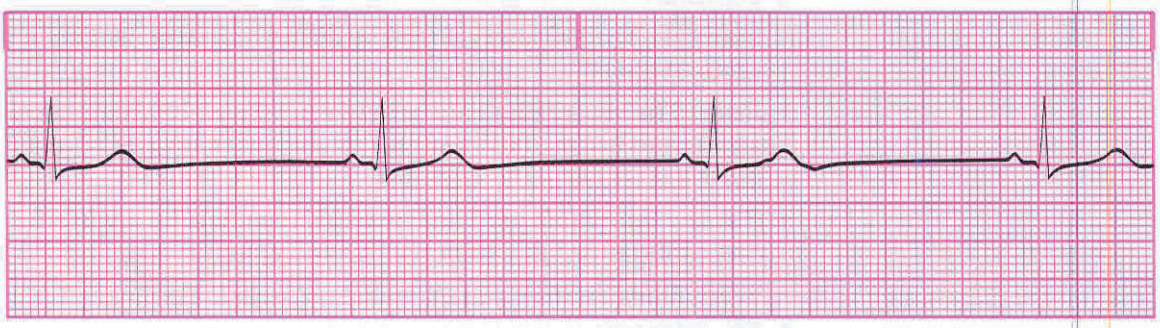
The patient with junctional escape rhythm has a slower heart rate than normal and decreased atrial kick due to the shortening of the interval between the atrial depolarization and ventricular depolarization. These conditions may cause the patient to exhibit signs and symptoms of low cardiac output. Common signs and symptoms of low cardiac output include hypotension and altered mental status, such as confusion or disorientation. Observe for symptoms and monitor the ECG tracing in case a more serious dysrhythmia occurs. Report the presence of junctional rhythm and your observations of the patient to a licensed practitioner for appropriate medical treatment.

Checkpoint Questions (LO 8.3)

Using the criteria for classification, select the rhythm that most closely resembles junctional escape rhythm.

A.

B.



1. Which distinguishing feature(s) led you to make the selection?

_____

_____

2. What are the differences between a rhythm with a PJC in it and a junctional escape rhythm?

_____

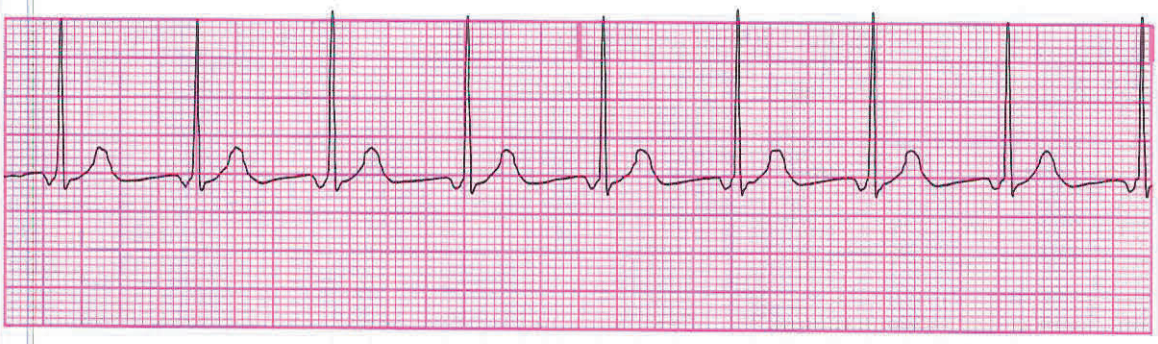
_____

_____

8.4 Accelerated Junctional Rhythm

The morphology of accelerated junctional rhythm is similar to that of junctional escape rhythm. Like junctional rhythm, accelerated junctional rhythm originates at the AV junction, producing retrograde depolarization of atrial tissue and depolarization of the ventricles. The distinguishing factor between junctional rhythm and accelerated junctional rhythm is the heart rate. The P wave may therefore be buried or may occur after the QRS (Figure 8-4).

Figure 8-4 Accelerated junctional rhythm.



Criteria for Classification

- ***Rhythm:*** The P-P and R-R intervals are regular and occur at similar intervals. The P-P interval may be difficult to measure due to the location of the P wave.
- ***Rate:*** The ventricular rate is between 60 and 100 beats per minute. The atrial rate is 60 to 100 beats per minute, but this may not be measurable if the P waves are not identifiable.
- ***P wave morphology:*** The P wave, if seen, will be inverted and may precede, follow, or fall within the QRS complex. It may not be visible at all on the rhythm strip.
- ***PR interval:*** If the P wave is before the QRS complex, the PR interval measures less than 0.12 second and is constant. If the P wave is not before the QRS complex, the PR interval cannot be determined because this P wave is not associated with the next QRS complex.
- ***QRS duration and morphology:*** The QRS duration is within normal limits of 0.06 to 0.10 second.

Interpret-TIP

Accelerated Junctional Rhythm

An accelerated junctional rhythm may have an inverted or absent P wave or a P wave that follows the QRS complex. Heart rate is between 60 and 100 beats per minute.

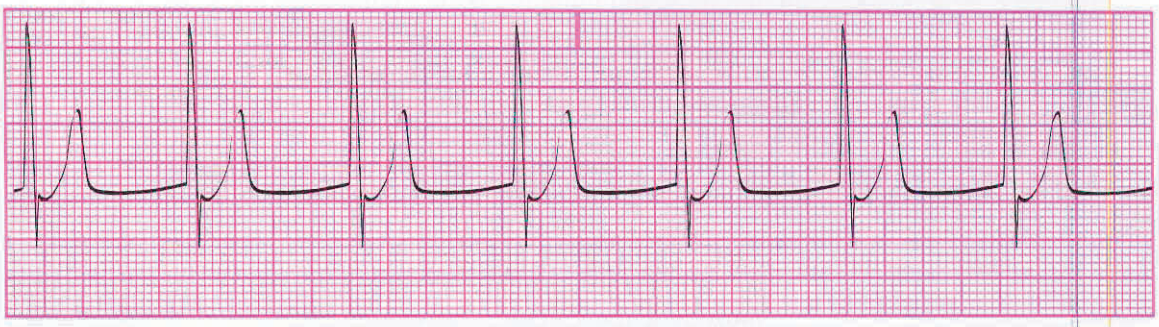
How the Patient Is Affected and What You Should Know

It is possible that the patient will show signs and symptoms of low cardiac output because of the loss of atrial kick. It is still very important to observe your patient for symptoms and to monitor the ECG tracing in case a more serious dysrhythmia occurs. Report the presence of accelerated junctional rhythm and your observations of the patient to a licensed practitioner for appropriate medical treatment.

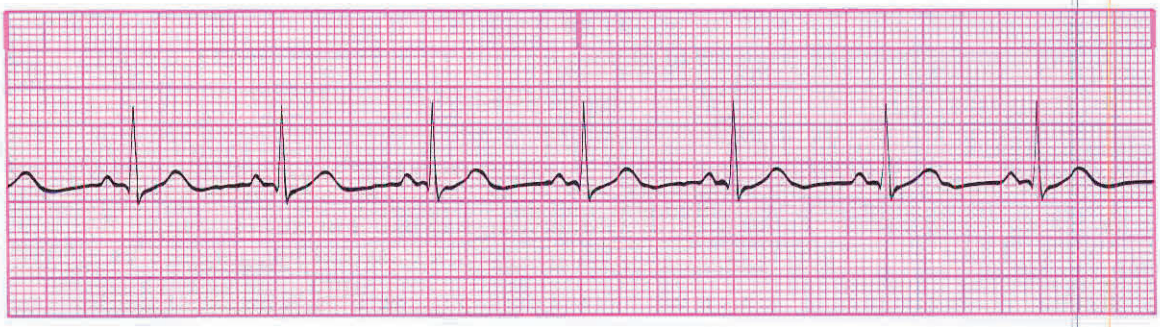
Checkpoint Question (LO 8.4)

Using the criteria for classification, select the rhythm that most closely resembles accelerated junctional rhythm.

A.



B.



1. Which distinguishing feature(s) led you to make the selection?

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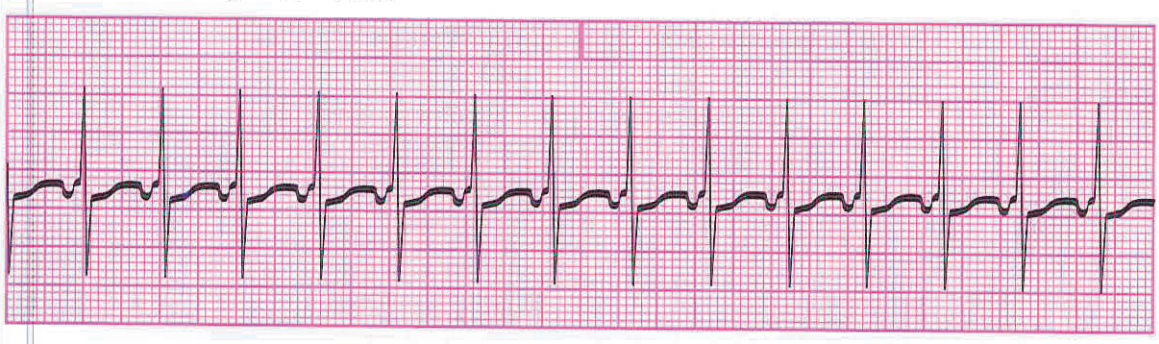
8.5 Junctional Tachycardia

The morphology of junctional tachycardia rhythm is similar to that of junctional escape rhythm and accelerated junctional rhythm. The distinguishing factor is that the heart rate exceeds 100 beats per minute in junctional tachycardia. The electrical activity originates at the AV junction from an irritable and ectopic focus (location) that overrides the SA node due to its rate, producing retrograde depolarization of atrial tissue, and at the same time stimulates the depolarization of ventricles (Figure 8-5).

Criteria for Classification

- ***Rhythm:*** The P-P and R-R intervals are regular and occur at similar intervals. The P-P interval may be even more difficult to measure because of the combination of location of the P wave and the increased rate of automaticity.

Figure 8-5 Junctional tachycardia rhythm.



- ***Rate:*** The ventricular rate is between 100 and 180 beats per minute. The atrial rate is 100 to 180 beats per minute, but this may not be measurable if the P waves are not identifiable. If this happens, the rhythm will be identified as supraventricular tachycardia (SVT) which is discussed in the next section.
- ***P wave morphology:*** The P wave, if seen, will be inverted and may precede, follow, or fall within the QRS complex. It may not be visible at all on the rhythm strip. At the upper limit of this range, it may be very difficult to determine the origin of the atrial electrical activity without increasing the print speed of your cardiac monitor or ECG machine.
- ***PR interval:*** If the P wave is before the QRS complex, the PR interval measures less than 0.12 second and is constant. If the P wave is not before the QRS complex, the PR interval cannot be determined because this P wave is not associated with the next QRS complex.
- ***QRS duration and morphology:*** The QRS duration is within the normal limits of 0.06 to 0.10 second.

Interpret-TIP

Junctional Tachycardia Rhythm

A junctional tachycardia rhythm may have an inverted or absent P wave or a P wave that follows the QRS complex. Heart rate is between 100 and 180 beats per minute.

How the Patient Is Affected and What You Should Know

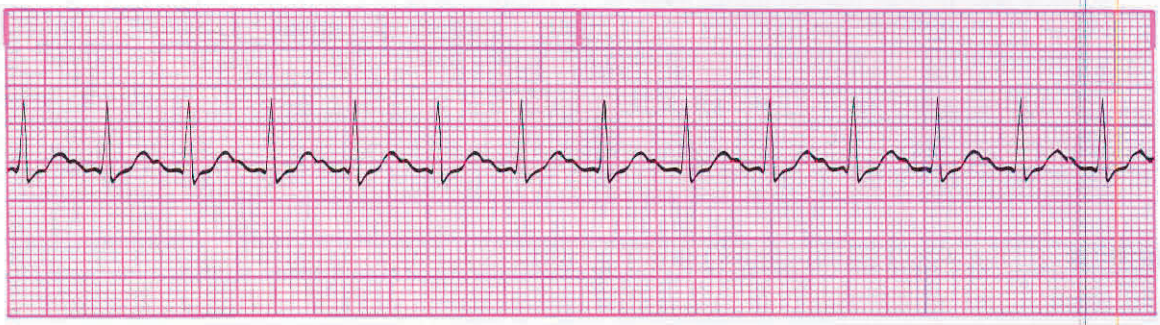
The effect of this rhythm on the patient depends on the rate of junctional tachycardia. For example, if the patient's normal resting heart rate is 90 and now the patient is exhibiting a rate of 108 beats per minute after walking the hallway, tachycardia would be expected and is viewed as the patient's normal response to exertion. However, if the patient's normal heart rate is 60 and it is now 140, the patient is probably experiencing signs and symptoms of low cardiac output. Often the patient will complain of their heart racing in their chest with faster rates. If the patient has had a recent myocardial infarction, junctional tachycardia, or tachycardia of any type is considered to be more serious or even life threatening due to increased myocardial oxygen demand.

Observe the patient for symptoms, and monitor the ECG tracing in case a more serious dysrhythmia occurs. Report the presence of junctional tachycardia rhythm and your observations of the patient to a licensed practitioner for appropriate medical treatment. Common treatment includes medication and in some cases a permanent pacemaker.

Checkpoint Question (LO 8.5)

Using the criteria for classification, select the rhythm that most closely resembles junctional tachycardia rhythm.

A.



B.

1. Which distinguishing feature(s) led you to make the selection?

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_____

_____

8.6 Supraventricular Tachycardia (SVT)

supraventricular An ectopic focus originating above the ventricles in the atria or junctional region of the heart.

A supraventricular tachycardia (SVT) is a category of rapid rhythms in which the heart beats faster than 100 beats per minute (Figure 8-6). *Supra* means "above," so the term **supraventricular** refers to an ectopic focus originating above the ventricles; in other words, in the atria or in the AV junction of the heart. Only those cases of SVT that originate in the AV junction are technically junctional dysrhythmias. However, the electrical rate is so fast that it is difficult to determine whether the origin is from the SA node, the atria, or the AV junction. Types of SVT include atrioventricular nodal re-entrant tachycardia (AVNRT) and atrioventricular reciprocating tachycardia (AVRT), including Wolff-Parkinson-White syndrome.

Because the heart rate is so rapid, the atria contract as soon as the ventricles relax. This causes the P waves, which represent atrial contraction, to be difficult to identify because they occur at the same time as the QRS complexes or T waves (ventricular repolarization). Rhythms that fall into this category are identified in Table 8-1.

The primary difficulty in classifying the actual rhythm is identifying where the tachycardia originates. The P wave may appear before, after, or during the QRS complex, depending on the origin. The PR interval measurement is difficult

Figure 8-6 Supraventricular tachycardia.

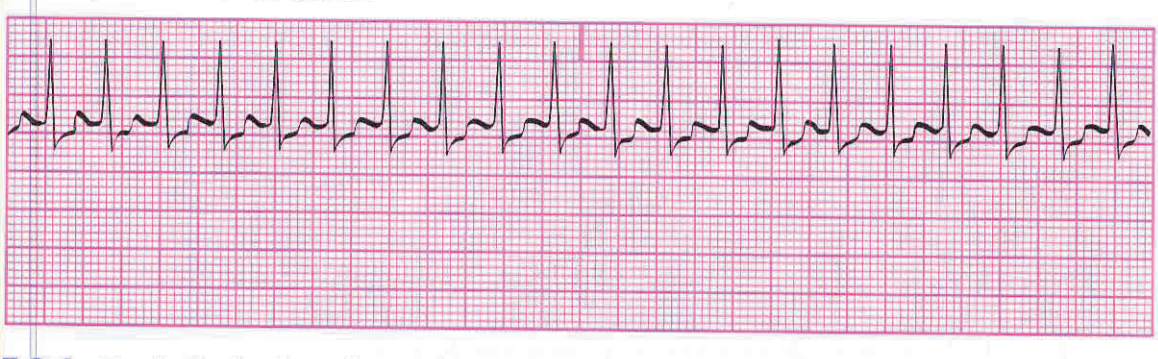


TABLE 8-1 Dysrhythmias Associated with Supraventricular Tachycardia

Sinus Node	Atrium	Junctional
Sinus tachycardia	Atrial flutter Atrial fibrillation Wolff-Parkinson-White syndrome	Junctional tachycardia

or may be impossible to assess because you often cannot see the beginning of the P wave. Frequently, the licensed practitioner will request that the paper speed be increased to pull the cardiac complexes apart in an attempt to expose the P wave and determine the origin or source of the electrical activity. Be sure to make a notation of the print speed change on the tracing if you increase the paper speed.

Some SVTs are *reentry dysrhythmias.* They occur when there is a blockage, short circuit, an abnormal (accessory) conduction pathway bypassing the normal electrical conduction pathway. This forces the electrical impulse to follow a different pathway, which often leads to a series of rapid depolarizations that in turn lead to tachydysrhythmias such as atrial fibrillation, atrial flutter, or junctional tachycardia. *Atrioventricular nodal reentry tachycardia(AVNRT)* is one type of re-entrant supraventricular tachycardia (SVT).

Although not specifically a junctional dysrhythmia, another example of a reentry dysrhythmia is **Wolff-Parkinson-White syndrome.** This dysrhythmia occurs as a result of an abnormal electrical conduction pathway between one of the atria and a ventricle. This abnormal pathway allows a portion of the electrical impulse causing atrial depolarization to enter the ventricle directly (prematurely), bypassing the AV node. The tracing presents with a P wave, but the P wave may not completely reach the isoelectric line before it starts into an early QRS complex. Whether the P wave is able to complete or not, the tracing will have a short PR interval due to ventricular *pre-excitation* (early start). Due to this pre-excitation, the QRS is abnormally wide (0.12 second or greater). The pre-excitation period looks like a slurred QRS complex, as shown in Figure 8-7. This portion of the cardiac complex is commonly referred to as the **delta wave.**

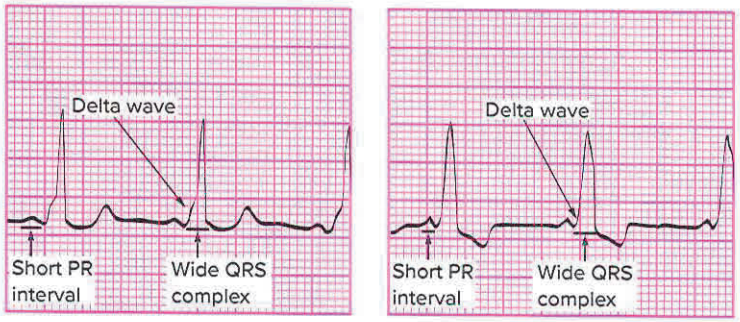
Wolff-Parkinson-White syndrome A type of supraventricular tachycardia in which an extra electrical pathway allows the electrical signal to arrive at the ventricles too soon. This pre-excitation syndrome causes tachycardia and affects the morphology of the QRS complex. As a result of the abnormal conduction pathway, the QRS complex begins early and measures abnormally wide (0.12 second or greater) with a classic "delta" wave.

delta wave A widening at the beginning of the QRS complex due to ventricular pre-excitation.

Criteria for Classification

- ***Rhythm:*** The ventricular (R-R) rhythm is usually regular or has minimal irregularity. The atrial rhythm may or may not be seen because other electrical activity is occurring at the same time. Remember, the ECG records only the activity it "sees" in each lead. The atrial activity is small compared to ventricular activity; therefore, the ventricular activity is the largest amount of energy seen when the ECG tracing is recorded.

Figure 8-7 Delta waves due to Wolfe-Parkinson-White syndrome.



Depending on whether the P waves are seen, you may not be able to determine regular P waves. If identifiable, they are usually regular.

- ***Rate:*** The ventricular rate is 150 to 250 beats per minute. The atrial rate is difficult to determine when P waves are unidentifiable.
- ***P wave morphology:*** The P waves are usually not identified when the heart rate is this rapid. Remember that when the heart rate increases, the time interval between atrial contraction and ventricular relaxation decreases. Therefore, if there is a P wave present, it may occur simultaneously with the T wave and may be buried within it. The P wave may occur before, during, or after the QRS complex.
- ***PR interval:*** Usually the PR interval cannot be determined because the beginning of the P wave cannot be clearly identified.
- ***QRS duration and morphology:*** The QRS measurement will be within normal limits of 0.06 to 0.11 second.

Interpret-TIP

Supraventricular Dysrhythmias

Supraventricular tachycardia describes a group of dysrhythmias that present with a normal-to-narrow appearing QRS complex and a rate of greater than 150 beats per minute.

How the Patient Is Affected and What You Should Know

There are various supraventricular dysrhythmias, all of which may cause the patient to exhibit the same signs and symptoms. The patient may be in either a stable or an unstable condition. The stable patient (one without signs and symptoms of decreased cardiac output) may complain of their heart racing in their chest and state, "I'm just not feeling right." When the patient's condition is *unstable,* they may experience symptoms such as chest pain or tightness, and symptoms of low cardiac output. Many patients will present in a stable SVT yet may deteriorate quickly. If they deteriorate quickly, they will need immediate intervention by a licensed practitioner.

Observe the patient for signs and symptoms of low cardiac output. Signs, symptoms, and rhythm changes need to be communicated quickly to a licensed practitioner for appropriate medical treatment. Because tachycardia significantly increases myocardial oxygen demand, treatment should begin as early as possible. Acute episodes may be immediately treated with maneuvers to stimulate the vagus nerve, which can slow the heart rate. The Valsalva maneuver (holding the breath and bearing down) is commonly used. Medications, such as adenosine, and cardioversion may also need to be employed. It is difficult to predict how long a patient's heart can beat at a rapid rate before it begins to affect the other body systems.

Law & Ethics

Scope of Practice

Your role regarding evaluation of the rhythm strip and assessment of the patient will depend on your training and place of employment. Working outside your scope of practice is illegal, and you could be held liable for performing tasks that are not part of your role as a healthcare professional.

Checkpoint Questions (LO 8.6)

1. What are the rate and the origination point of a supraventricular tachycardia?

   _____

   _____

2. What might you be asked to do when a patient has a supraventricular dysrhythmia?

   _____

   _____

3. List common sensations described by patients experiencing SVT.

   _____

   _____

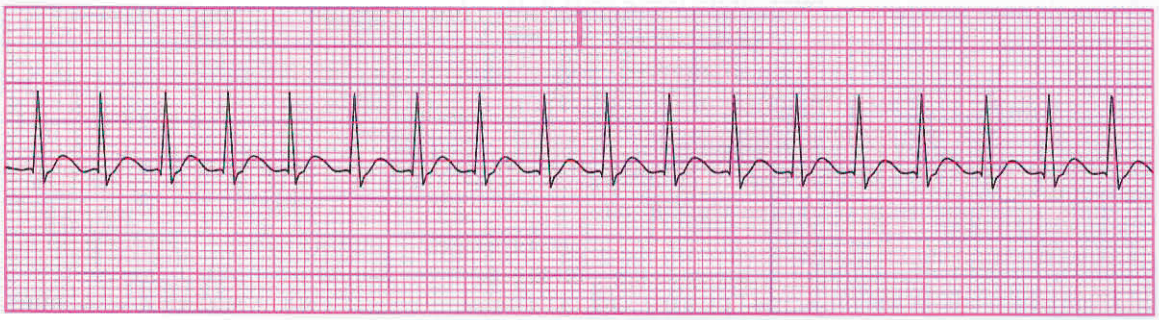
4. Using the criteria for classification, select the rhythm that most closely resembles a supraventricular tachycardia (SVT) rhythm.

   _____

   _____

A.

B.



5. Which distinguishing feature(s) led you to make the selection?

_____

_____

Chapter Summary

Learning Outcomes	Summary	Pages
8.1 Describe the various junctional dysrhythmias.	Junctional rhythms occur as a result of electrical impulses coming from the AV junction rather than the SA node. As a result of this change in origination site, the electrical impulses causing depolarization of the atria flow retrograde (backward). This reverse flow of electrical activity causes the inverted P wave morphology seen in junctional dysrhythmias.	184–186
8.2 Analyze premature junctional complexes and their effect on the patient, including basic patient care and treatment.	A premature junctional complex (PJC) is a single early electrical complex that originates in the AV junction. It occurs before the next expected sinus impulse, causing an irregularity in the rhythm. Isolated PJCs cause no signs and symptoms; however, 40 to 60 beats per minute warns of a serious condition.	186–187
8.3 Analyze junctional escape rhythm and its effect on the patient, including basic patient care and treatment.	Junctional rhythm, also known as junctional escape rhythm, originates at AV junctional tissue, producing retrograde (backward) depolarization of atrial tissue and, at the same time, stimulates the depolarization of ventricles. This rhythm may be lifesaving and occurs when a higher pacemaker (the SA node) has failed to fire impulses to initiate depolarization. The inherent rate of the AV junction is 40 to 60 beats per minute. Observe for signs and symptoms of low cardiac output.	187–189
8.4 Analyze accelerated junctional rhythm and its effect on the patient, including basic patient care and treatment.	Accelerated junctional rhythm is similar to junctional escape rhythm, except that the heart rate is between 60 and 100 beats per minute for accelerated junctional rhythm. Monitor the patient and observe for a more serious rhythm.	189–191
8.5 Analyze junctional tachycardia rhythm and its effect on the patient, including basic patient care and treatment.	Junctional tachycardia rhythm is similar to junctional escape rhythm in its morphology; however, while junctional escape rhythm is lifesaving and occurs in failure of a higher pacemaker (the SA node), junctional tachycardia occurs when the rate exceeds 100 beats per minute. It commonly arises from an irritable and ectopic focus and overrides the SA node due to its rate. Observe the patient carefully and monitor the ECG tracing for a more serious rhythm. Condition is more serious for patients after a recent MI.	191–193
8.6 Analyze supraventricular tachycardia rhythm and its effect on the patient, including basic patient care and treatment.	Although supraventricular tachycardia is not specifically a junctional dysrhythmia, the origin causing this rapid heart rhythm may come from any location "above the ventricles." Supraventricular tachycardia presents with a normal- to narrow-appearing QRS complex and a rate of greater than 150 beats per minute. Supraventricular tachycardia includes all forms of tachycardia that originate above the ventricles. For a patient that is unstable, treatment may include the use of the Valsalva maneuver and medications.	193–196

Chapter Review

Multiple Choice

Circle the correct answer.

1. What is the normal, inherent rate for the AV junction? (LO 8.1)
   a. 60–100 beats per minute
   b. 40–60 beats per minute
   c. 100–160 beats per minute
   d. 20–40 beats per minute

2. Which of the following dysrhythmias is *not* considered part of the supraventricular tachycardia classification? (LO 8.6)
   a. Atrial fibrillation
   b. Sinus tachycardia
   c. Ventricular tachycardia
   d. Junctional tachycardia

3. What sign or symptom might a patient complain about when experiencing a supraventricular tachycardia in an unstable condition? (LO 8.6)
   a. Back pain
   b. Sensation of a racing heart
   c. Flank pain
   d. Abdominal pain and discomfort

4. The criterion needed to classify a dysrhythmia as a supraventricular tachycardia is (LO 8.6)
   a. a heart rate between 150 and 250 beats per minute with narrow QRS complexes.
   b. a wide QRS complex.
   c. a clear, easily identifiable P wave with the entire wave visualized.
   d. atrial and ventricular rates that are not the same.

5. What is the primary difficulty in determining a supraventricular rhythm? (LO 8.6)
   a. Determining the ventricular rate
   b. Determining the regularity
   c. Measuring the QRS interval
   d. Determining the origin of the tachycardia

6. When is the identification of the specific dysrhythmia important in terms of treatment of the patient? (LO 8.6)
   a. When the patient first complains of any signs or symptoms of distress
   b. When the patient's heart rate has decreased to a rate of 100 beats per minute
   c. During the treatment of a fast tachycardia situation
   d. After the rhythm has been converted to a normal rhythm and/or the heart rate is between 60 and 100 beats per minute

7. What is the heart rate range for junctional escape rhythm? (LO 8.2)
   a. 20–40 beats per minute
   b. 100–150 beats per minute
   c. 40–60 beats per minute
   d. 60–100 beats per minute

8. What is the heart rate range for accelerated junctional rhythm? (LO 8.3)
   a. 20–40 beats per minute
   b. 100–150 beats per minute
   c. 40–60 beats per minute
   d. 60–100 beats per minute

9. What is the heart rate range for junctional tachycardia? (LO 8.4)
   a. 20–40 beats per minute
   b. 100–150 beats per minute
   c. 40–60 beats per minute
   d. 60–100 beats per minute

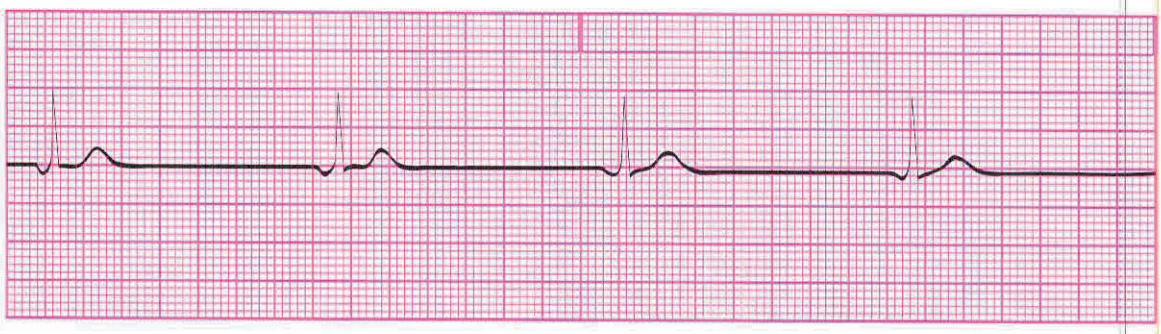
Short Answer

10. Describe why P waves are inverted or buried within the QRS complex with junctional dysrhythmias. (LO 8.1)

Critical Thinking Application *Rhythm Identification*

Review the dysrhythmias pictured here and, using the criteria for classification provided in the chapter as clues, identify each rhythm and provide the information you used to make your decision. (LO 8.2–8.6)

11.

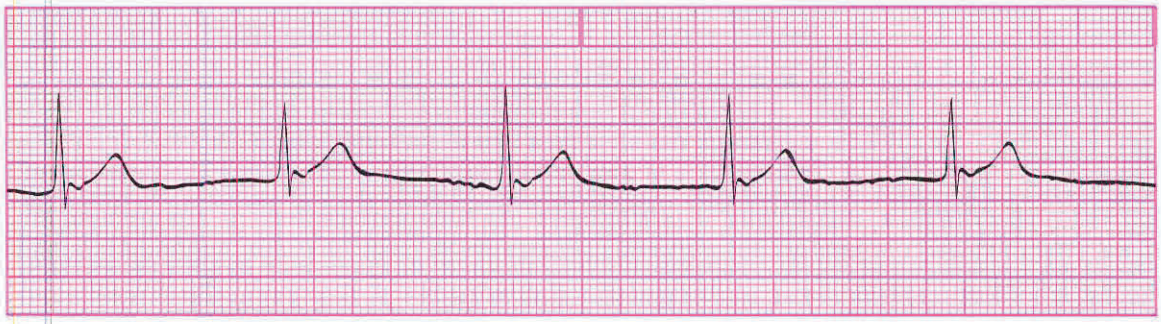


Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

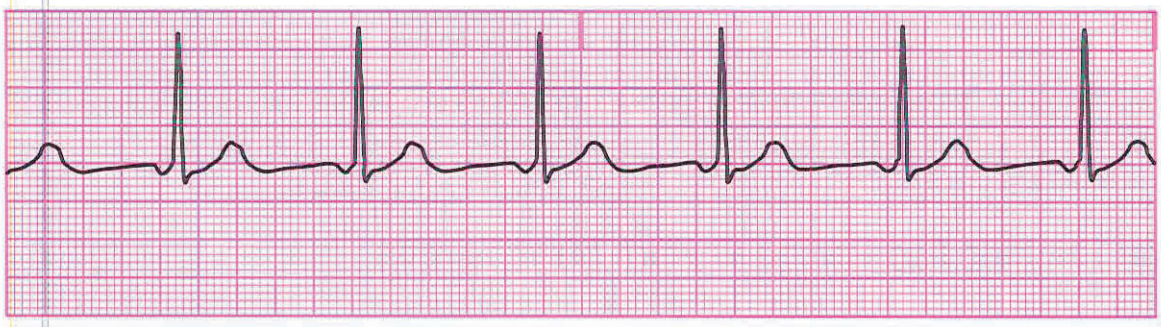
P wave: _____ Interpretation: _____

12.



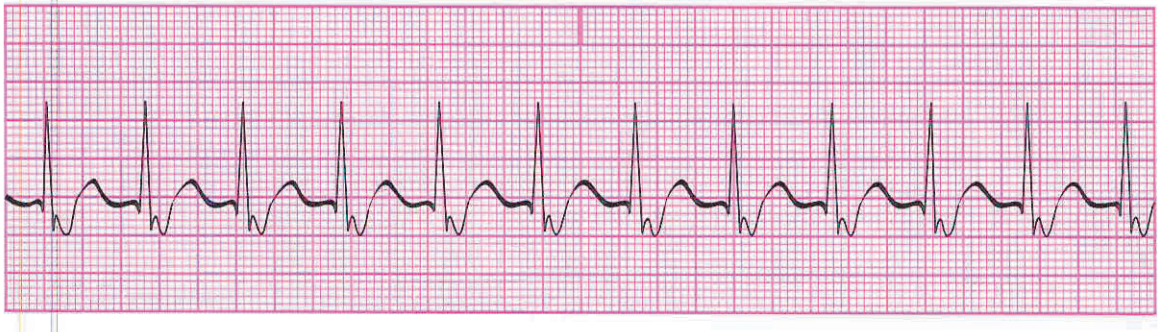
Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

13.



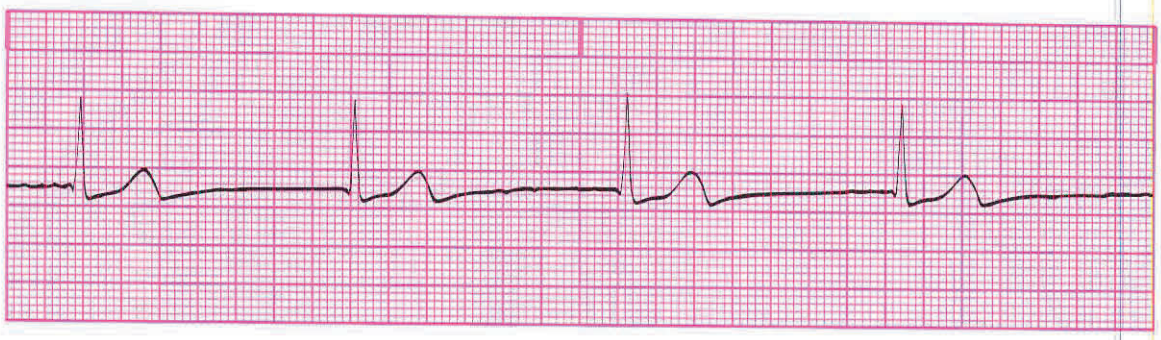
Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

14.



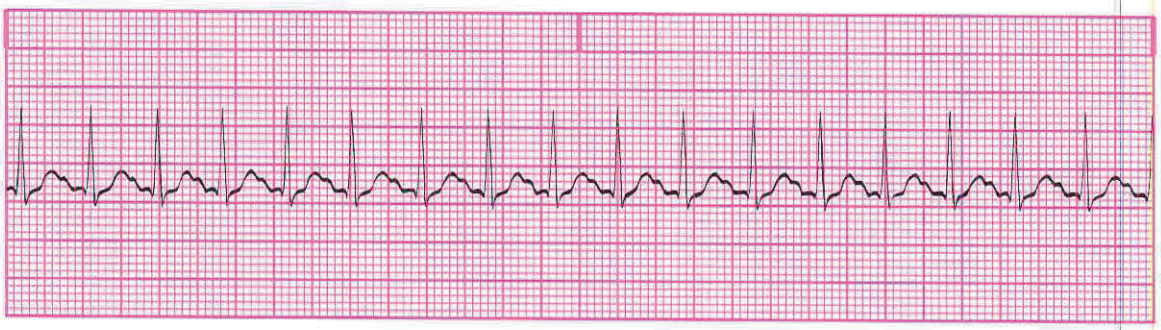
Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

15.



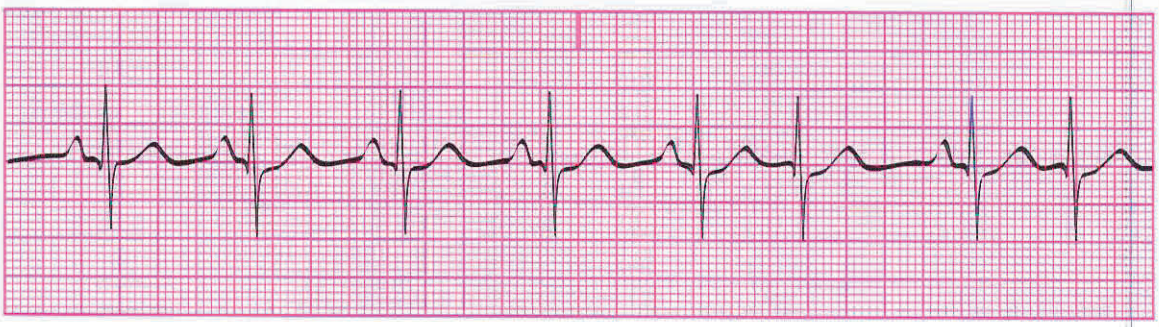
Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

16.



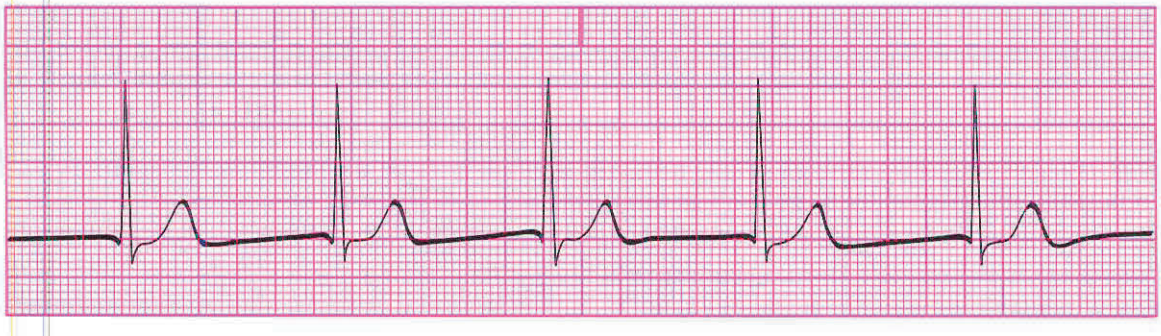
Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

17.



Rhythm (regular or irregular): _____ PR interval: _____
Rate: _____ QRS: _____
P wave: _____ Interpretation: _____

18.

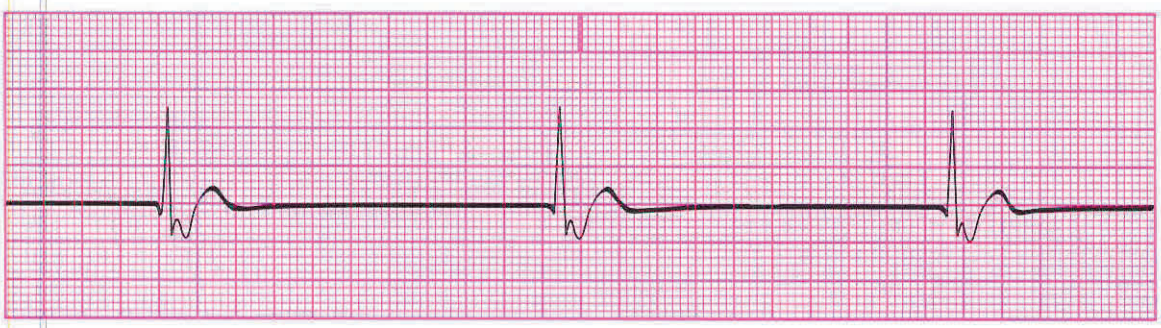


Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

P wave: _____ Interpretation: _____

19.

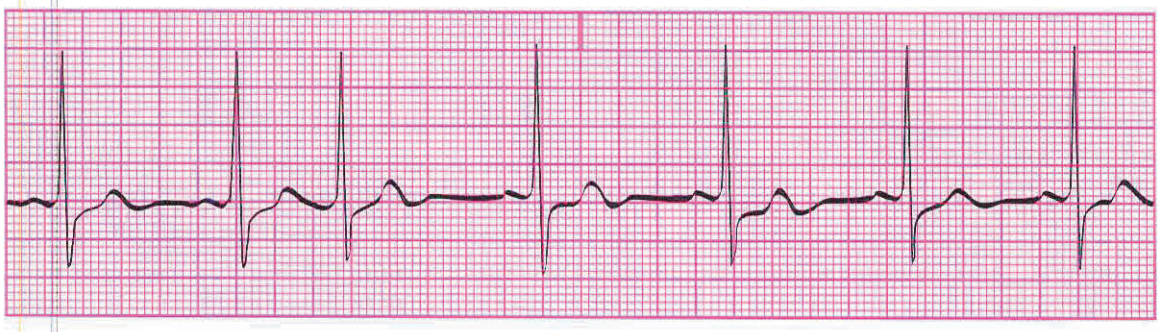


Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

P wave: _____ Interpretation: _____

20.

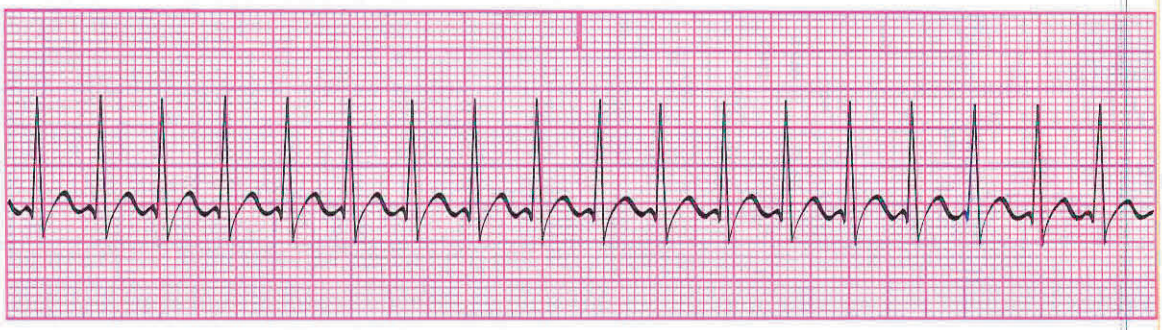


Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

P wave: _____ Interpretation: _____

21.

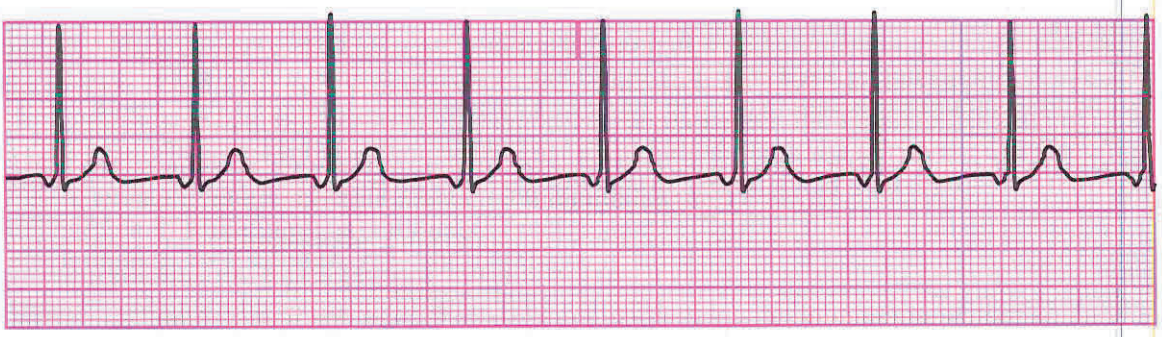


Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

P wave: _____ Interpretation: _____

22.



Rhythm (regular or irregular): _____ PR interval: _____

Rate: _____ QRS: _____

P wave: _____ Interpretation: _____

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