

BRADYARRHYTHMIAS

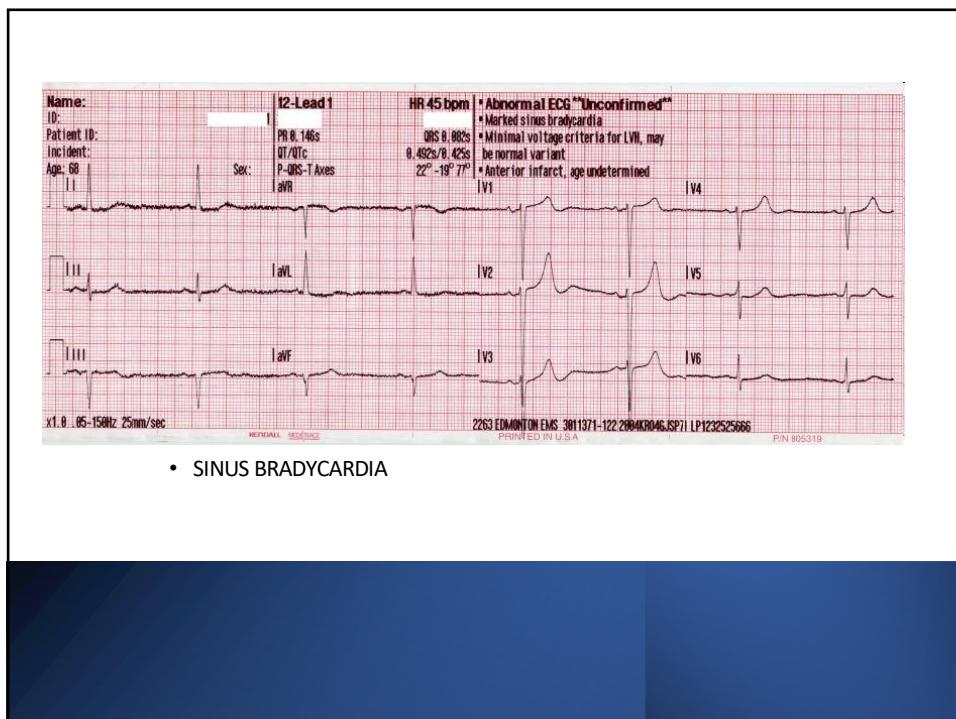
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Bradyarrhythmias

- Is it a problem with the SA node or the AV node or both?
 - Sinus bradycardia
 - Sick sinus syndrome
 - AV nodal blockade
 - First degree
 - Second degree
 - Mobitz 1
 - Mobitz 2
 - Third degree (or complete heart block)
 - Slow AF/Flutter

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Sinus bradycardia

- Asymptomatic
 - No treatment required
- Symptomatic
 - Treatment aimed at restoring normal sinus rate
 - Specific to aetiology of bradycardia
 - If patient is on rate controlling medications -> stop them
 - If patient is hypothyroid -> replace it
- Permanent pacemaker if the patient has continued symptoms with no improvement from intervention or with no identifiable cause.

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Sick Sinus Syndrome

- Involves a dysfunction in the ability of the sinus node to generate or transmit an action potential to the atria.
- Includes a variety of disorders and pathological processes that are grouped within one loosely defined clinical syndrome.
- includes signs and symptoms related to cerebral hypoperfusion, in association with sinus bradycardia, sinus arrest, sinoatrial (SA) block, carotid hypersensitivity, or alternating episodes of bradycardia and tachycardia (bradycardia-tachycardia syndrome).

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Sick Sinus Syndrome

- Most commonly occurs in elderly patients with concomitant cardiovascular disease
- The majority of cases remain idiopathic
- Clinical presentation: same as symptomatic sinus bradycardia
- Treatment: same as symptomatic sinus bradycardia
- Usually requires permanent pacemaker

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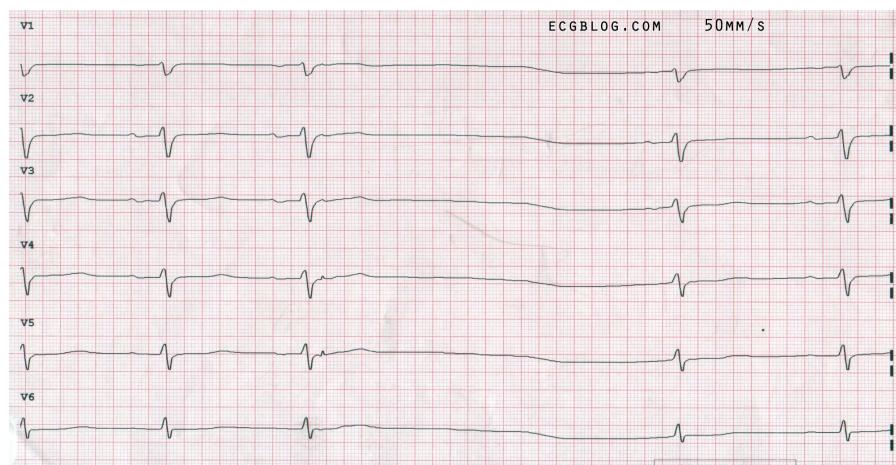
SINUS (OR SINOATRIAL) ARREST

- Sinoatrial node transiently ceases to generate the electrical impulses that stimulate the myocardial tissues to contract.
- If the next available pacemaker takes over, it is in the following order:
 - atrial escape (rate 60-80 bpm): originates within the atria, not in the sinus node.
Normal P morphology is lost
 - junctional escape (rate 40-60 bpm): originates near the AV node. A normal P wave is not seen. May occasionally see a retrograde P wave
 - ventricular escape (rate 20-40 bpm): originates in ventricular conduction system
No P waves. Wide, abnormal QRS

■ Sometimes confused with sinoatrial block, a condition in which the pacing impulse is generated, but fails to conduct through the myocardium

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SINUS ARREST



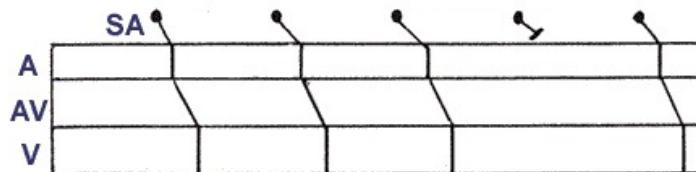
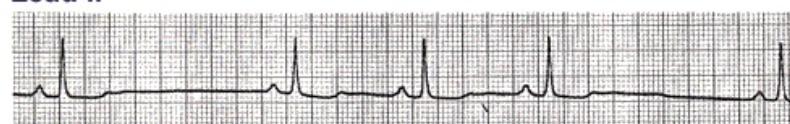
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SINOATRIAL BLOCK

- The pacing impulse is generated by the sinus node
- but fails to conduct through the myocardium.
- Two types of SA block
- type I: the PP interval shortens until one P wave is dropped. The pause duration is less than the two preceding PP intervals. The PP interval following the pause is greater than the PP interval just before the pause
- type II: PP intervals fairly constant until conduction failure occurs. The pause is approximately twice the basic PP interval.
- They usually occur transiently and produce no symptoms.
- They may occur in healthy patients with increased vagal tone.
- They may also be found with CAD, inferior MI and digitalis toxicity.
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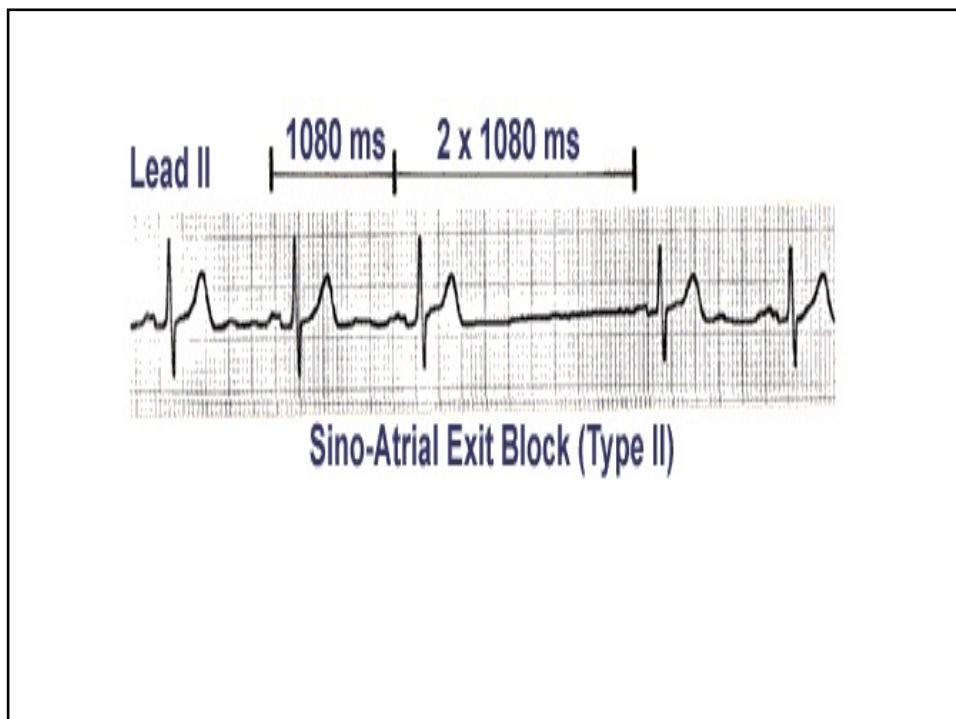
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Lead II



Sino-Atrial Exit Block (type I)

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ATRIOVENTRICULAR BLOCK

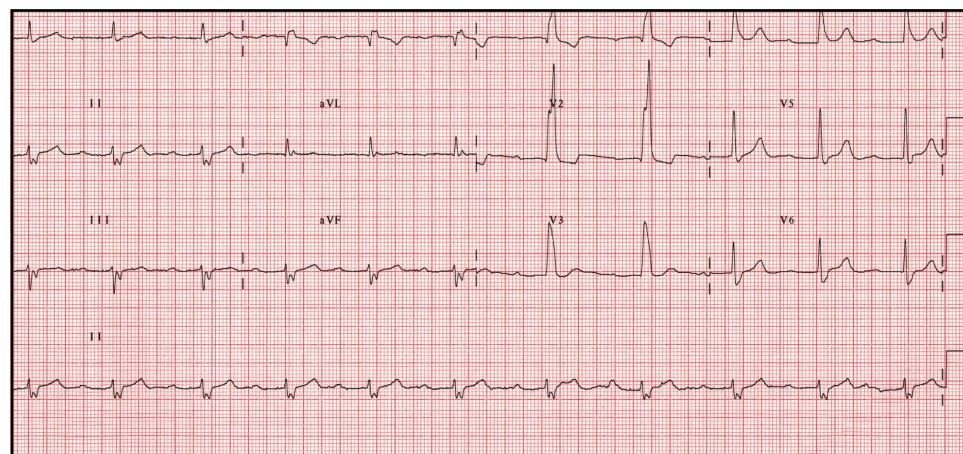
- All indicate problems with the AV node conduction.
- 3 degrees progressive.
- Higher degree AV block is dangerous and needs a PPM (risk of asystole or VF).
- Most rate-lowering drugs work by slowing AV conduction.

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■ First degree atrioventricular block

- Prolongation of the PR interval on the ECG to more than 200 msec.
- Every atrial impulse is transmitted to the ventricles, resulting in a regular ventricular rate.
- Can arise from delays in the conduction system in the AV node itself (most common), the His-Purkinje system or a combination of both.
- The prevalence of first degree AV-block among young adults ranges from 0.65-1.6 %
- AV BLOCKS
 - It is a benign condition, with no associated increase in morbidity or mortality
 - If an underlying condition is suspected (drug overdose, acute MI, myocarditis), treat it.
 - No treatment is indicated if asymptomatic

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- FIRST DEGREE AV BLOCK (+ complete RBBB and left anterior hemiblock)

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AV BLOCKS

■ Second degree atrioventricular block

- Refers to a disorder of the cardiac conduction system in which some atrial impulses are not conducted to the ventricles.
- Some P waves are not followed by a QRS complex.
- Composed of two types: Mobitz I or Wenckebach block, and Mobitz

■ Mobitz I second degree AV block

- Characterized by a progressive prolongation of the PR interval, which results in a progressive shortening of the R-R interval. Ultimately, the atrial impulse fails to conduct, a QRS complex is not generated, and there is no ventricular conduction.

■ Mobitz II second degree AV block

- Characterized by an unexpected nonconducted atrial impulse.

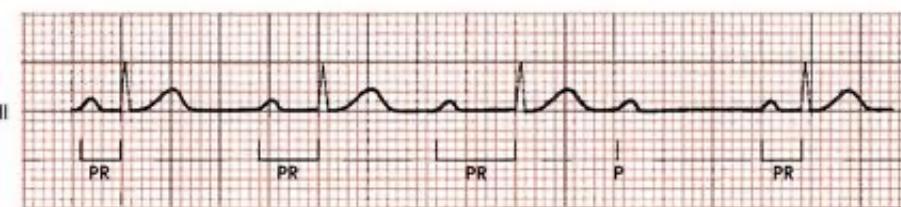
Thus,
the PR and R-R intervals between conducted beats are constant.

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MOBITZ I SECOND DEGREE AV BLOCK

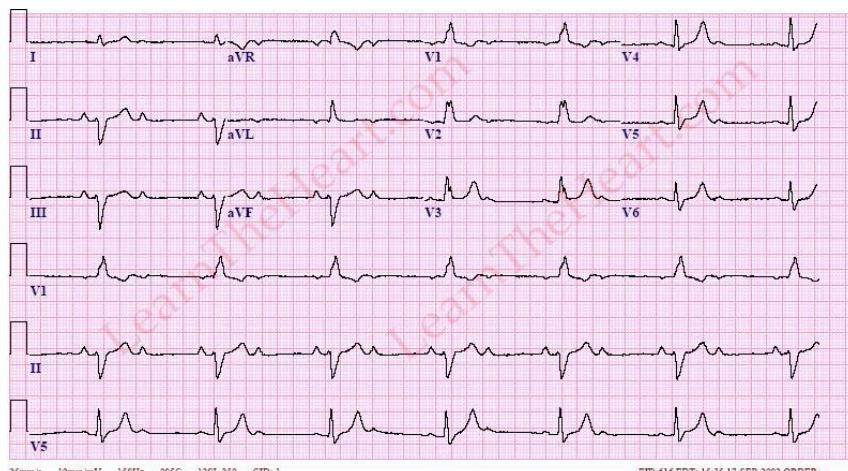


Mobitz Type I (Wenckebach) Second-Degree AV Block



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MOBITZ II SECOND DEGREE AV BLOCK



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AV BLOCKS

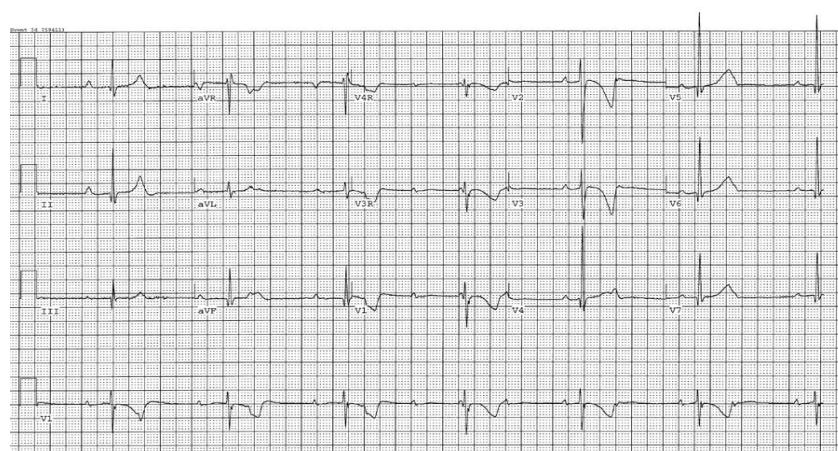
- Mobitz type I
block
 - Caused by conduction delay in the AV node in 72% of patients and by conduction delay in the His-Purkinje system in the remaining 28%
- Mobitz type II
block
 - conduction delay occurs infranodally. The QRS complex is likely to be wide, except in patients where the delay is localized to the bundle of His.
- Mobitz type I second degree AV block
 - Not associated with an increased risk of morbidity or death, in absence of heart disease
 - If it occurs during an acute myocardial infarction, mortality is increased
- Mobitz type II second degree AV block
 - Carries a risk of progression to complete heart block
 - It is associated with an increased risk of mortality

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AV BLOCKS

- Disorder of the cardiac conduction system where there is no conduction through the AV node
- Complete dissociation of the atrial and ventricular activity exists
 - ■ COMPLETE HEART BLOCK OR THIRD-DEGREE AV BLOCK
- Ventricular escape mechanisms can occur anywhere from the AV node to the bundle-branch Purkinje system
- QRS complexes are conducted at their own rate and totally independent of the P waves

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THIRD DEGREE AV BLOCK

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COMPLETE HEART BLOCK

- CONGENITAL FORM
- usually occurs at the level of the AV node
- patients are relatively asymptomatic at rest but later develop symptoms because the fixed heart rate is not able to adjust for exertion
 - ■ CAUSES
 - ■ can be either congenital or acquired
- in the absence of major structural abnormalities, congenital heart block is often associated with maternal antibodies to SS-A (Ro) and SS-B (La)

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COMPLETE HEART BLOCK

- can develop from isolated, single-agent overdose, or often from combined, iatrogenic coadministration of AV nodal, beta-blockers, and calcium channel blocking agents
- infectious causes include the following:
 - cardiomyopathy, eg. Lyme carditis and acute rheumatic fever
- ■ ACQUIRED
 - metabolic disturbances, eg. severe hyperkalemia
- Ischemia
 - MI- anterior wall MI can be associated with an infranodal AV block. Complete heart block develops in slightly less than 10% of acute inferior MI and usually resolves within few hours or days.

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SYMPTOMS

- signs of congestive heart failure as a result of decreased cardiac output may be present and include the following:
 - tachypnea or respiratory distress
 - crackles
 - raised JVP
- patients may have signs of hypoperfusion, including:
 - altered mental status
 - hypotension
 - lethargy

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AV BLOCKS

- ■ Treatment
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- ■ For all symptomatic high degree blocks
- ■ ALS as indicated
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- ■ Identification of etiology based on clinical presentation
- ■ Transcutaneous pacing for unstable patients
- ■ Permanent pacemaker when indicated

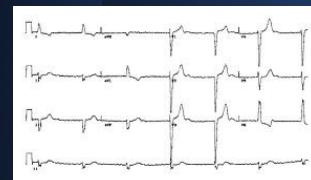
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SLOW AF/FLUTTER

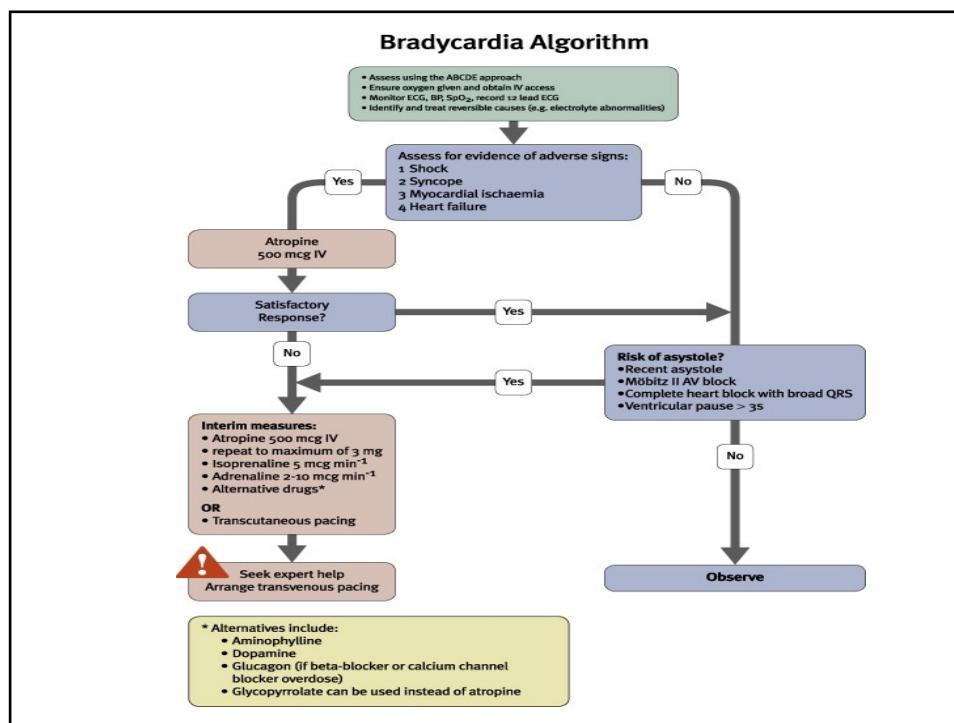
- If ventricular rhythm is slow, regular and broad, it is likely to be complete heart block with ventricular escape.
- Easily missed!

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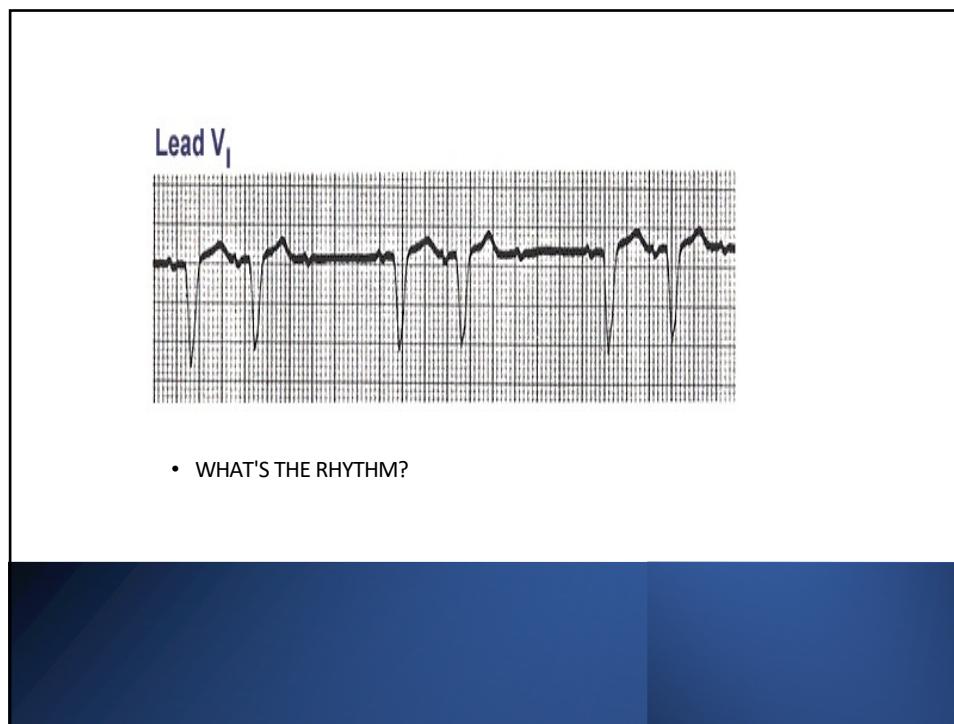
ATRIAL FIBRILLATION AND COMPLETE HEART BLOCK



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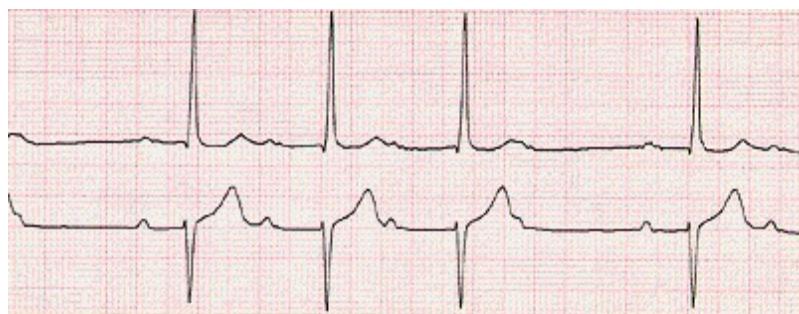


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- WHAT'S THE RHYTHM?

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- WHAT'S THE RHYTHM?

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- WHAT'S THE RHYTHM?

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- WHAT'S THE RHYTHM?

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