

# Emergency treatment to SVT Evidence-based Approach

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# Description

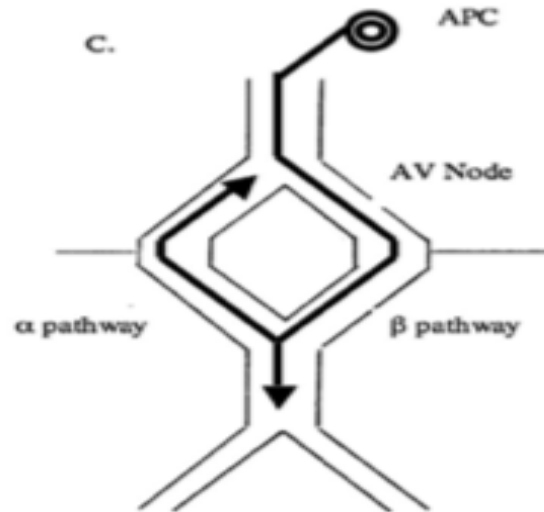
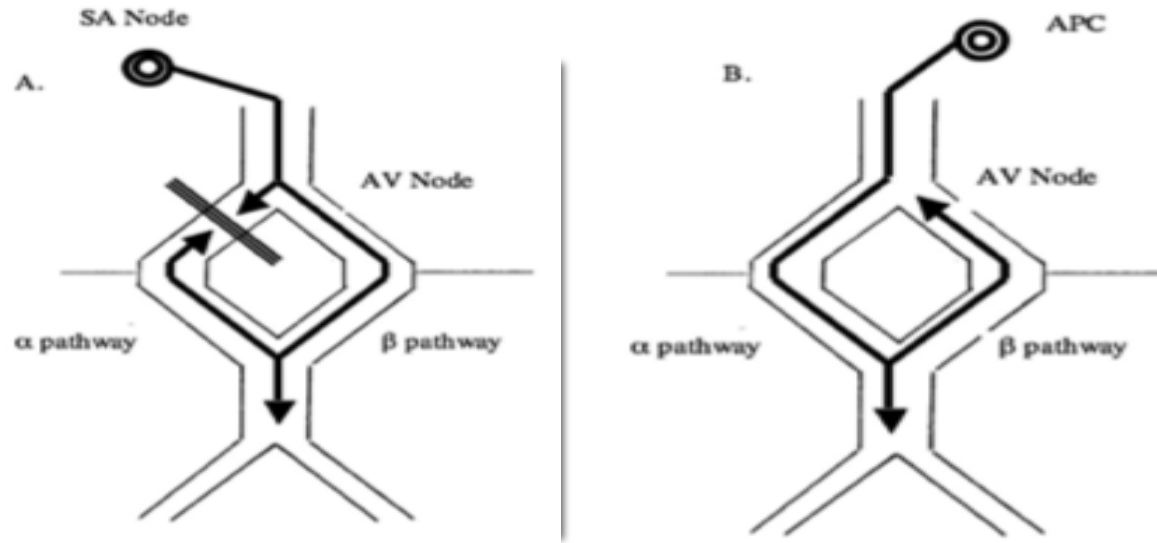
- ECG manifestations:
  - HR is extremely rapid and regular (240bpm  $\pm$  40)
  - P wave is:
    - usually invisible
    - When visible: anormal P axis, P precedes or follow QRS



# Description

- SVT refers to tachydysrhythmias that require
  - sinus nodal
  - atrial
  - AV (atrioventricular) nodal tissue,
  - or a combination of these tissues for their commencement and continuation.
- the term SVT refers to the following diagnoses:
  - AV reentry tachycardia
  - AV nodal reentry tachycardia
  - unifocal atrial tachycardia
  - multifocal atrial tachycardia
  - sinoatrial reentry tachycardia
  - and junctional tachycardia

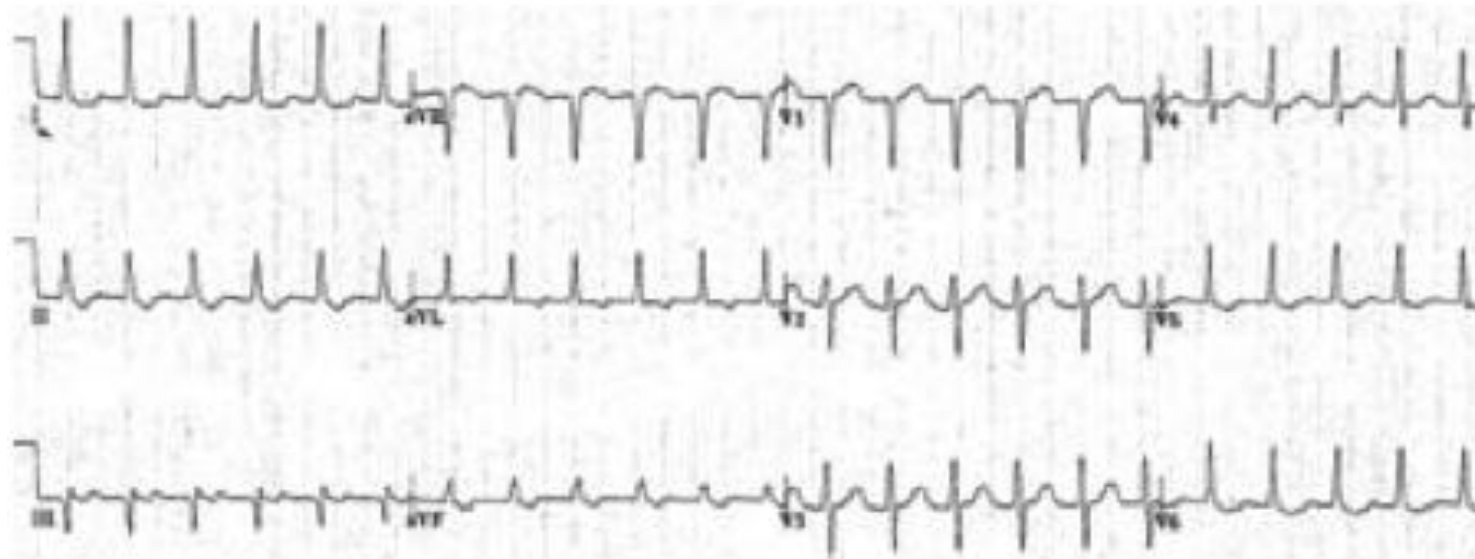
# Mechanism of AVNRT



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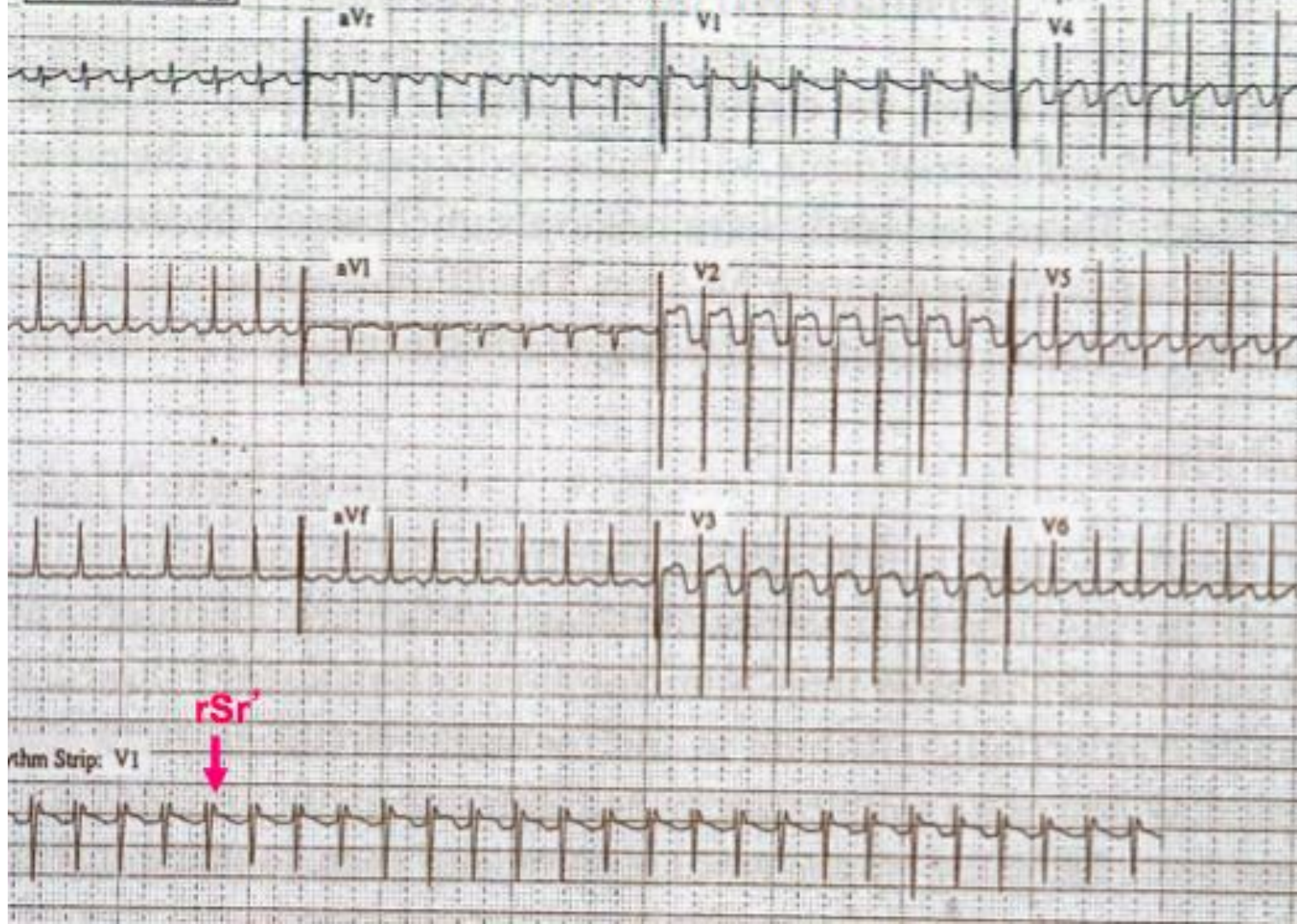
**Figure 4. AVNRT**

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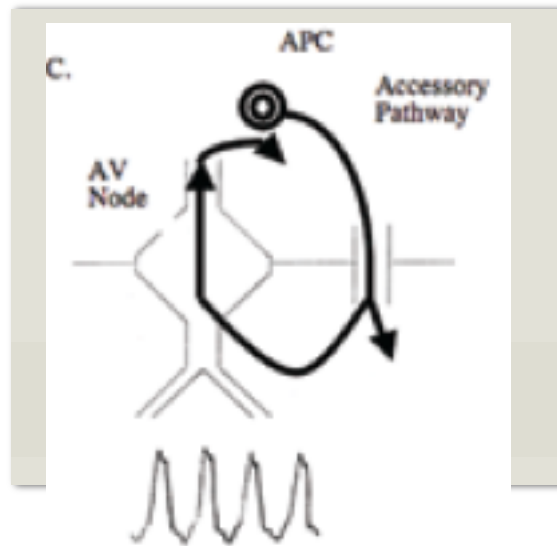
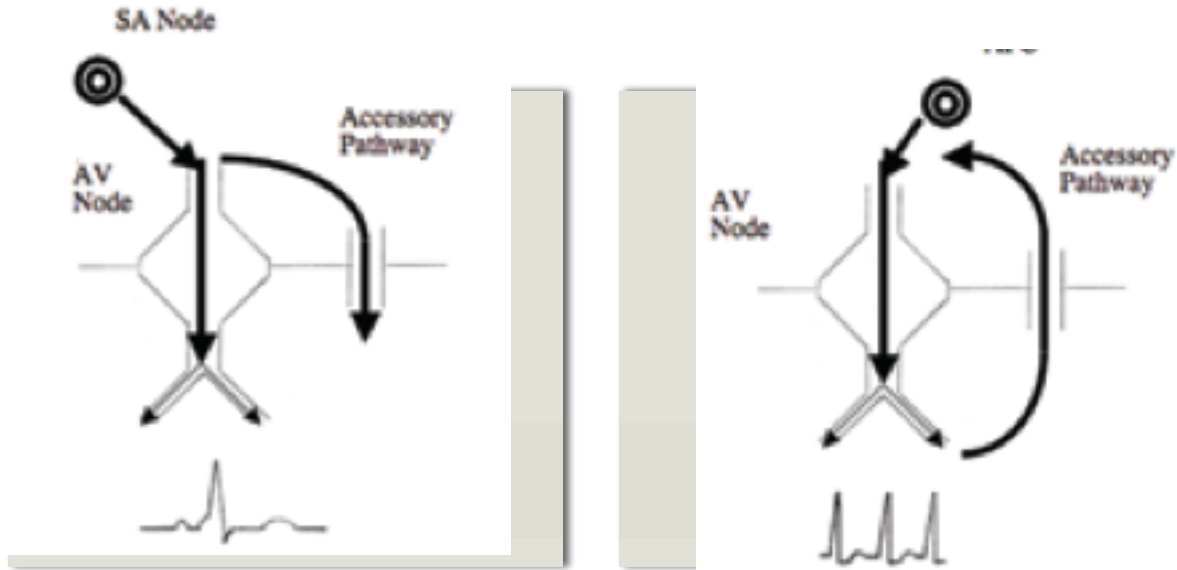


10-04-94 09:55:28  
Sensel Dole RYA  
V1 V1 • V152 • 8253 320

### Slow-fast (typical AVNRT)

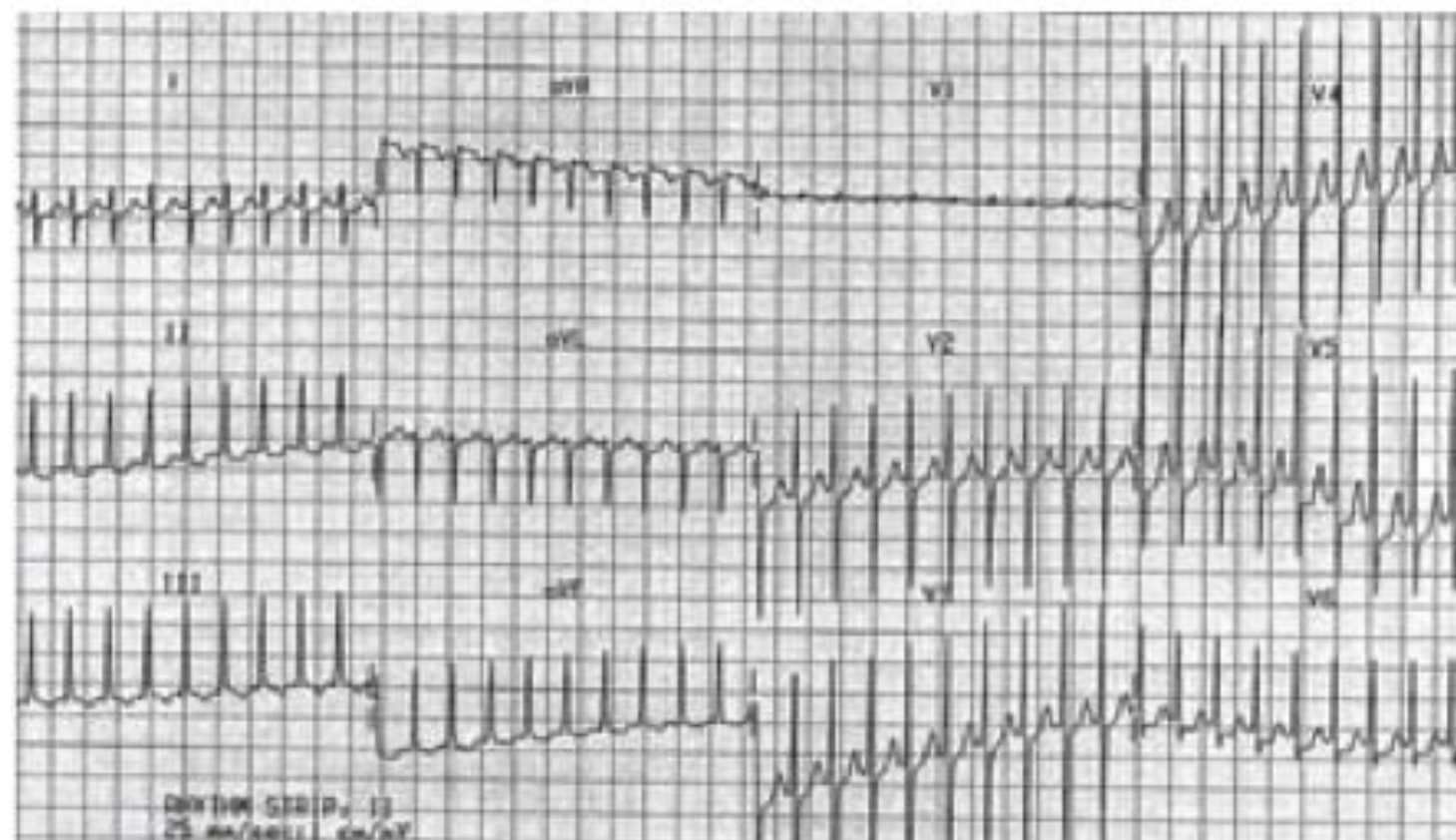


# Mechanism of AVRT





## Figure 6. AVRT Orthodromic Conduction

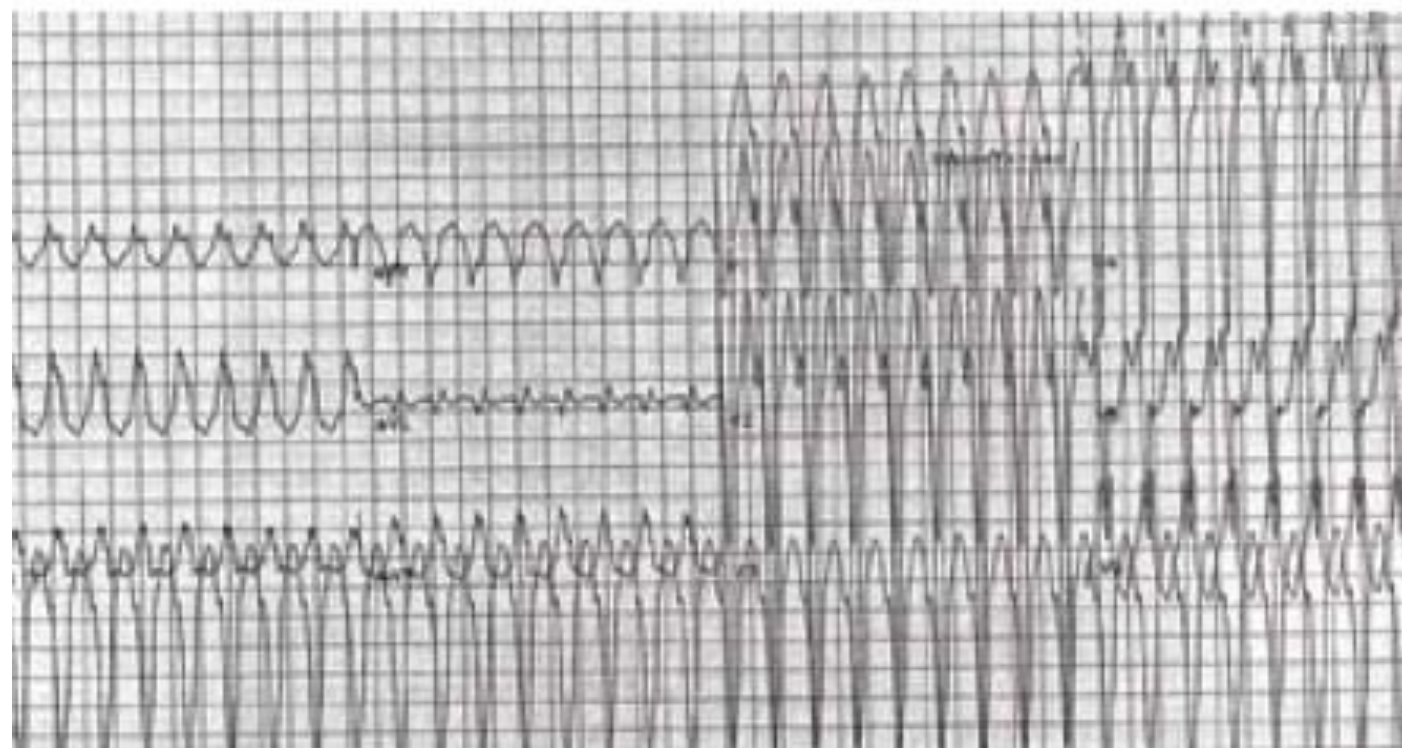




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## Figure 7. AVRT Antidromic Conduction

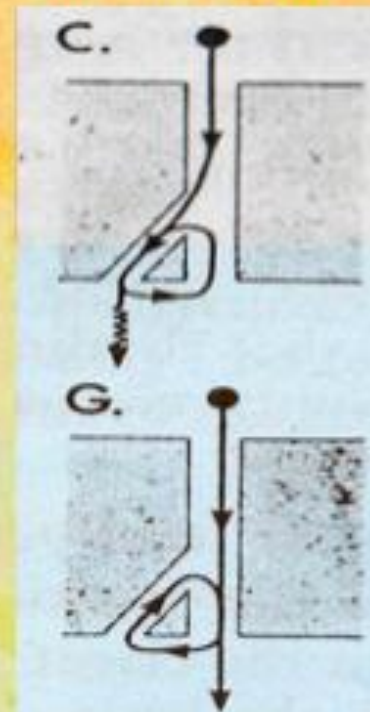
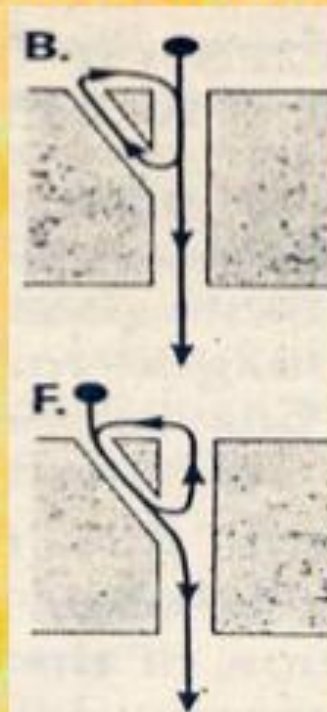
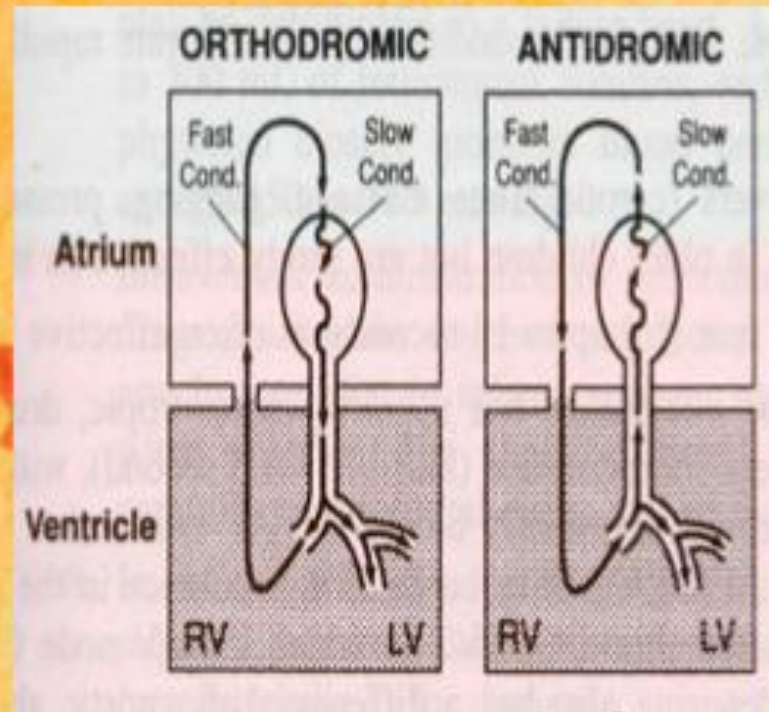
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### Kent bundle

### James pathway

### Mahaim fibre



	<b>Regular RR Rhythm</b>	<b>Irregular RR Rhythm</b>
Narrow-QRS complex (< 120 msec)	<p><b>Sinus tachycardia:</b> look for "sinus" P waves</p> <p><b>SVT (AVNRT, orthodromic AVRT, UAT, JT):</b> no clear P waves (usually)</p> <p><b>Atrial flutter fixed/rapid:</b> look for flutter waves</p>	<p><b>Atrial fibrillation rapid:</b> no clear P waves</p> <p><b>MAT:</b> three or more P wave morphologies</p> <p><b>Atrial flutter variable/rapid:</b> look for flutter waves</p> <p><b>Sinus tachycardia with multiple PACs:</b> multiple P wave morphologies but one dominant pacemaker</p>
Wide-QRS complex (> 120 msec)	<p>Any of the above rhythms + BBB/aberrancy</p> <p>Atrial flutter with antegrade with bypass tract conduction (WPW syndrome)</p> <p>Antidromic AVRT</p> <p>Ventricular tachycardia</p>	<p>Any of the above rhythms + BBB/aberrancy</p> <p>Atrial fibrillation + WPW syndrome</p> <p>Polymorphic VT</p> <p>Ventricular fibrillation</p>

# Pathologic causes

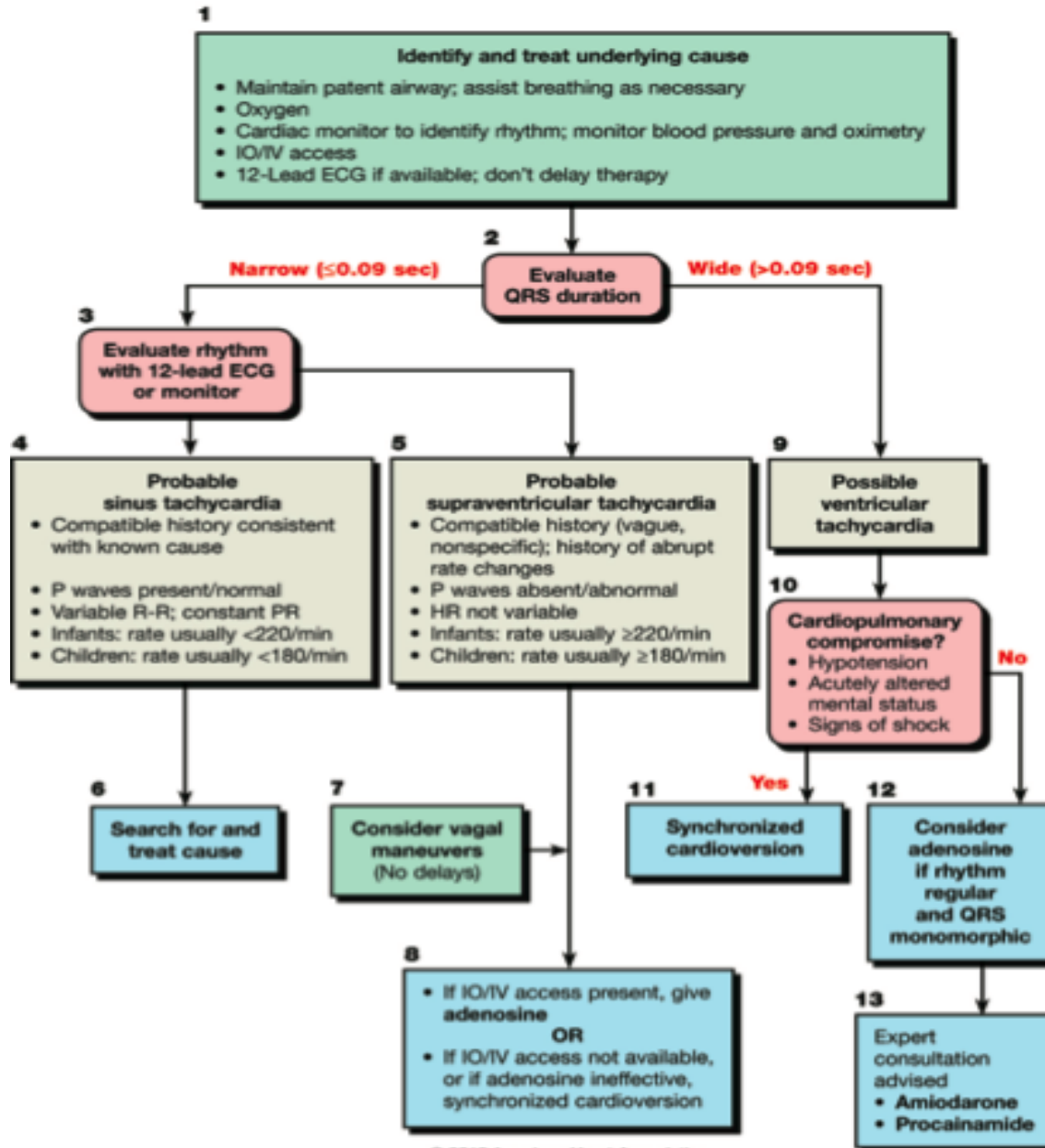
- Pyrexia
- Hypovolemia
- Anemia
- Anxiety
- Infection
- Maglinancy
- Miocardio ischemia
- Congestive cardiac failure
- Pulmonary embolus
- Shock
- Stimulants, prescriptions

# Emergency evaluation

- Many infants tolerate SVT well
- SVT > 6-12hrs → ↓ CO → CHF
- Clinical of CHF :
  - infants : irritability, tachypnea, poor feeding, pallor
  - children : chest pain, palpitation, shortness of breath, lightheadedness, fatigue



# Pediatric Tachycardia With a Pulse and Poor Perfusion



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**Part 14: Pediatric Advanced Life Support : 2010 American Heart Association Guidelines  
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Monica E. Kleinman, Leon Chameides, Stephen M. Schexnayder, Ricardo A. Samson, Mary Fran Hazinski, Dianne L. Atkins, Marc D. Berg, Allan R. de Caen, Ericka L. Fink, Eugene B. Freid, Robert W. Hickey, Bradley S. Marino, Vinay M. Nadkarni, Lester T. Proctor, Faiqa A. Qureshi, Kenneth Sartorelli, Alexis Topjian, Elise W. van der Jagt and Arno L. Zaritsky

- Monitor rhythm during therapy to evaluate the effect of interventions.
- The choice of therapy is determined by the patient's degree of hemodynamic instability.

- Attempt vagal stimulation first, unless the patient is hemodynamically unstable or the procedure will unduly delay chemical or electric cardioversion (**Class IIa, LOE C**).
- In infants and young children, apply ice to the face without occluding the airway.
- In older children, carotid sinus massage or Valsalva maneuvers are safe.

- One method for performing a Valsalva maneuver is to have the child blow through a narrow straw.
- Do not apply pressure to the eye because this can damage the retina.

# Pharmacologic cardioversion

- If IV/IO access is readily available, adenosine is the drug of choice (Class I, LOE C).
- IV/IO adenosine 0.1 mg/kg with 2 syringes connected to a T-connector
- Use a large vein for access
- give adenosine rapidly with 1 syringe and immediately flush with 5 ml – 10ml of normal saline with the other.
- Subsequent doses are increased by 0.1 mg/kg to a maximum of 0.3 mg/kg (maximum dose = 12 mg), every 30sec if no effect on rhythm



# Pharmacologic cardioversion

- An IV/IO dose of Verapamil, 0.1 to 0.3 mg/kg is also effective in terminating SVT in older children, but it should not be used in infants without expert consultation (Class III, LOE C) because it may cause potential myocardial depression, hypotension, and cardiac arrest

# Pharmacologic cardioversion

- If the patient is hemodynamically unstable or if adenosine is ineffective, perform electric synchronized cardioversion.
- Use sedation, if possible. Start with a dose of 0.5 to 1 J/kg. If unsuccessful, increase the dose to 2 J/kg (Class IIb, LOE C).
- If a second shock is unsuccessful or the tachycardia recurs quickly, consider amiodarone or procainamide before a third shock

# Pharmacologic cardioversion

- amiodarone 5 mg/kg IO/IV or procainamide 15 mg/kg IO/IV for a patient with SVT unresponsive to vagal maneuvers and adenosine and/or electric cardioversion.
- for hemodynamically stable patients, expert consultation is strongly recommended prior to administration (Class IIb, LOE C)

# Pharmacologic cardioversion

- Both amiodarone and procainamide must be infused slowly (amiodarone over 20 to 60 minutes and procainamide over 30 to 60 minutes), depending on the urgency, while the ECG and blood pressure are monitored. If there is no effect and there are no signs of toxicity, give additional doses.
- Avoid the simultaneous use of amiodarone and procainamide without expert consultation.

- Ectopic SVT does not response to adenosine, overdrive pacing, and electric cardioversion
- Prevention of recurrence of SVT
  - In patients with: many times of recurrence, severe manifestation during SVT (CHF, shock), difficulties in termination of SVT
  - Drugs: digoxin, propranolol or atenolol, verapamil, amiodarone, sotalol.

# summary

- SVT is the most common symptomatic arrhythmia requiring medical attention in the pediatric population.
- SVT should be suspected in any child with a heart rate exceeding 180 bpm and any infant with a heart rate greater than 220 bpm.



# summary

- The initial treatment in stable patients is vagal maneuvers.
- Adenosine is used if vagal maneuvers do not break the SVT
- Synchronized cardioversion is performed in unstable patients.

Thank you

