Project: Ghana Emergency Medicine Collaborative

Document Title: Approach to Bradycardias and Tachycardias

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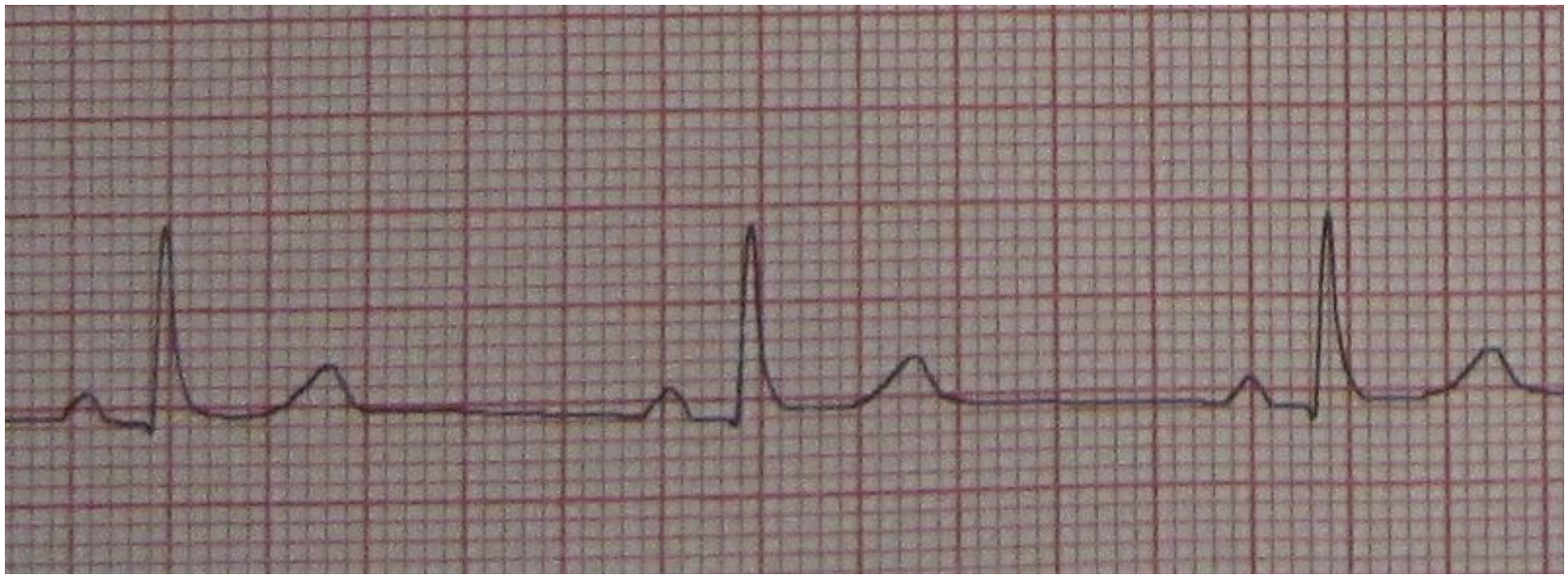
Bradycardia



James Heilman, MD, Wikimedia Commons

Brady-Arrhythmias

BRADYCARDIA
Heart Rate <60 bpm
and inadequate for clinical condition **1**

- Maintain patient airway; assist breathing as needed
- Give oxygen
- Monitor EKG (id rhythm), blood pressure, oximetry
- Establish IV access **2**

Signs or symptoms of poor perfusion caused by the bradycardia?
(e.g. acute altered mental status, ongoing chest pain, hypotension, or other signs of shock? **3**

Adequate perfusion → Observe/Monitor **4A**

Poor perfusion →

- Prepare for transcutaneous pacing
- Consider atropine
- Consider epinephrine or dopamine **4**

→

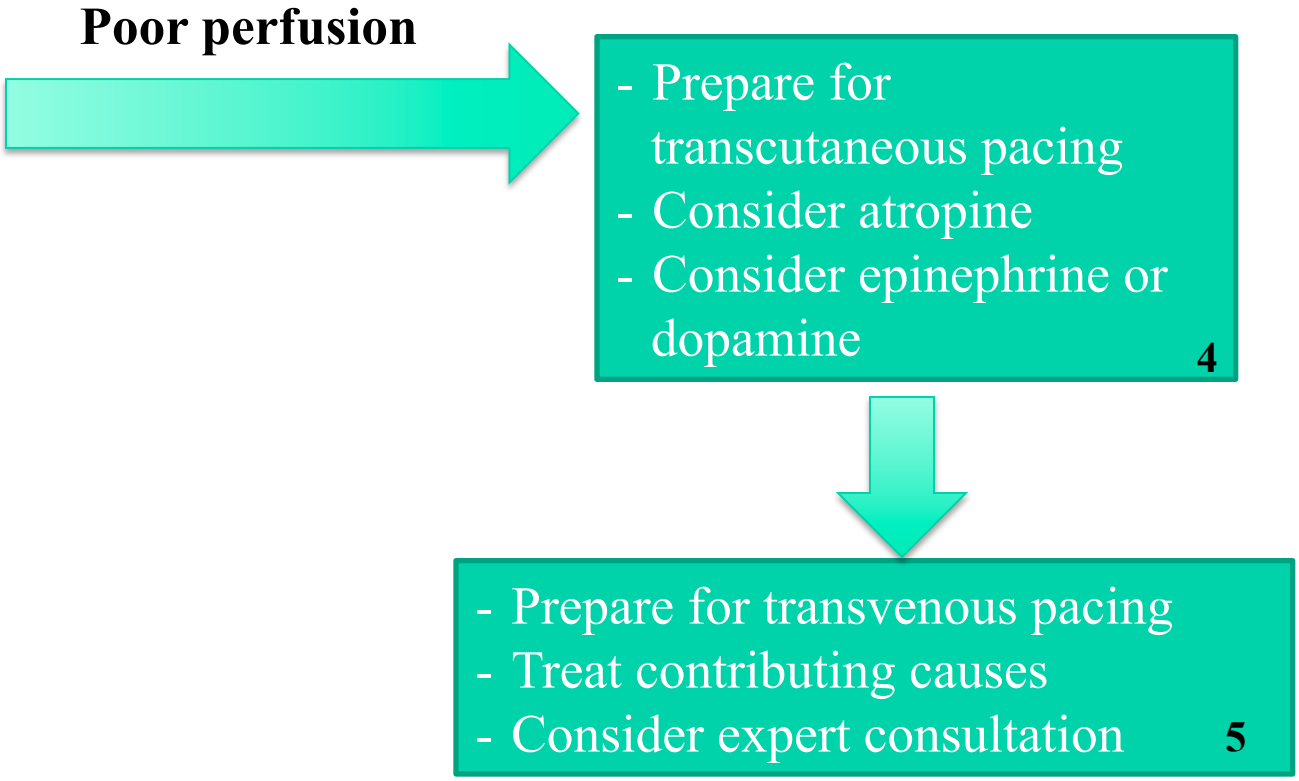
- Prepare for transvenous pacing
- Treat contributing causes
- Consider expert consultation **5**

REMINDERS

- If pulseless arrest, go to pulseless arrest algorithm
- Search for and treat possible contributing factors:

- Hypovolemia
- Hypoxia
- H+ ion (acidosis)
- Hypo/hyperkalemia
- Hypoglycemia
- Hypothermia
- Toxins
- Tamponade, cardiac
- Tension pneumothorax
- Thrombosis (coronary/pulmonary)
- Trauma (hypovolemia/⇧ICP)

Unstable/Poor Perfusion



Geo Swan, Wikimedia Commons

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Reminders

- If pulseless arrest develops, go to pulseless arrest algorithm
- Search for and treat possible contributing factors:

Hypovolemia

Hypoxia

Hydrogen ion (acidosis)

Hypo/hyperkalemia

Hypoglycemia

Hypothermia

Toxins (drugs)
Tamponade (cardiac)
Tension PTX
Thrombosis (coronary or pulmonary)
Trauma (hypovolemia, increased ICP

Tachy-Arrhythmias

NOTE: If patient becomes unstable at any point, go to Box 4

During evaluation:
- Secure and verify airway and vascular access
- Consider expert consult
- Prepare for cardioversion

Treat possible contributing factors:
- Hypovolemia
- Hypoxia
- H+ ion (acidosis)
- Hypo/hyperkalemia
- Hypoglycemia
- Hypothermia
- Toxins
- Tamponade, cardiac
- Tension pneumothorax
- Thrombosis (coronary/ pulmonary)
- Trauma (hypovolemia/⇧ICP)

TACHYCARDIA With Pulses **1**

- Assess and support ABC's
- Give oxygen
- Monitor EKG, blood pressure, oximetry
- Id and treat reversible causes **2**

Symptoms persist

Stable / **Unstable**

Is patient stable? **3**

Perform immediate, synchronized cardioversion **4**

- Establish IV access
- Obtain 12 lead EKG
- Is QRS narrow (<0.12 sec)? **5**

Narrow QRS

Wide QRS

WIDE QRS -> is rhythm REGULAR? **12**

NARROW QRS-> is rhythm REGULAR? **6**

Regular / **Irregular**

- Attempt vagal maneuvers
- Give adenosine IV push **7**

- Irregular Narrow Complex Tachycardia
- Likely: A. fib, A. flutter, MAT
- Consider: expert consult, B-blockers to control HR **11**

Does rhythm convert? Consider: expert consult **8**

Converts / **Does Not Convert**

- Likely reentry SVT
  - * Observe for recurrence
  - * Treat recurrence with adenosine, diltiazem, B-blockers **9**

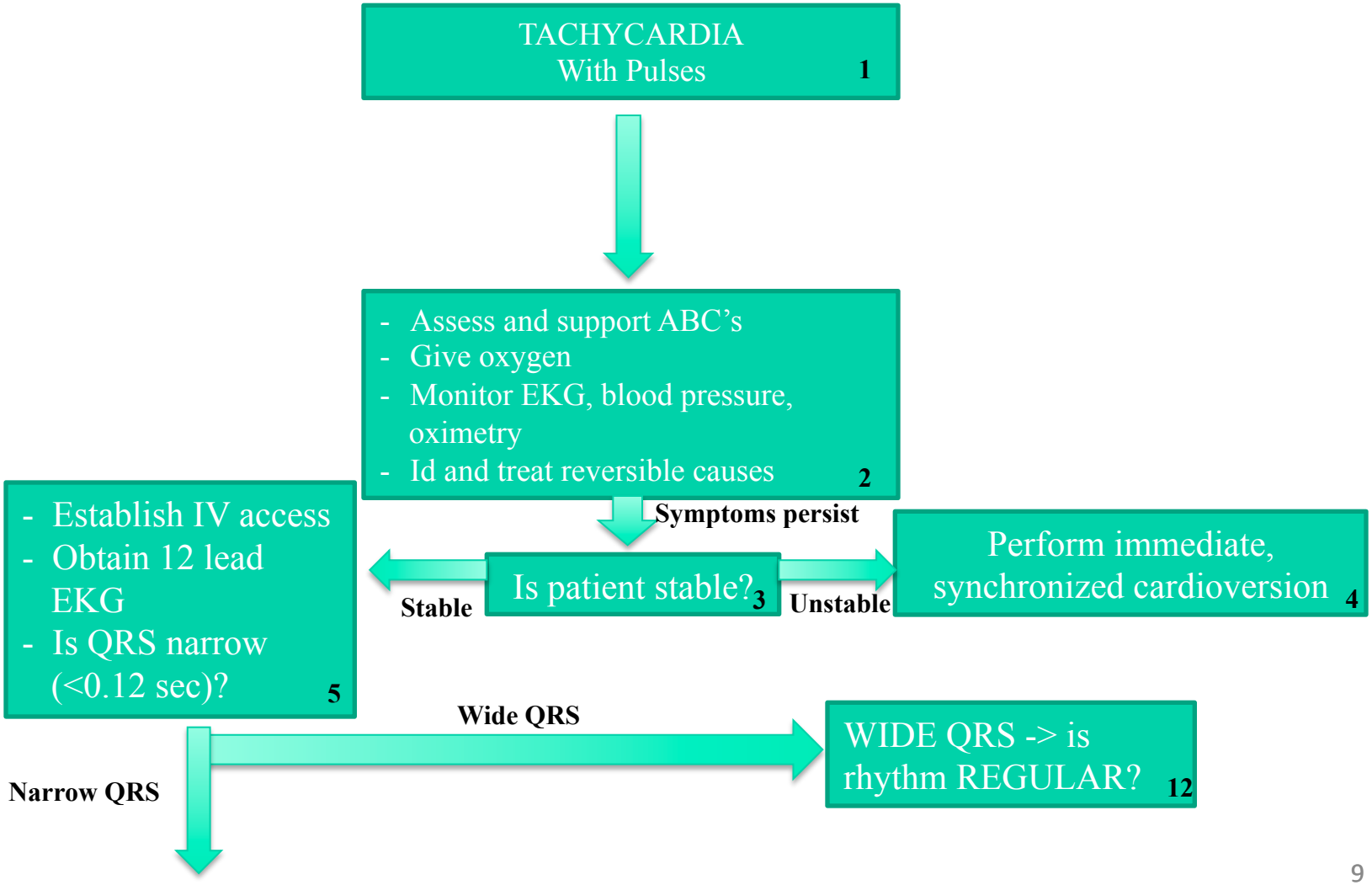
- Likely A. flutter, ectopic atrial tachycardia, or junctional tachycardia
- Consider diltiazem and B-blockers to control HR
- Treat underlying cause
- Consider expert consult **10**

Regular / **Irregular**

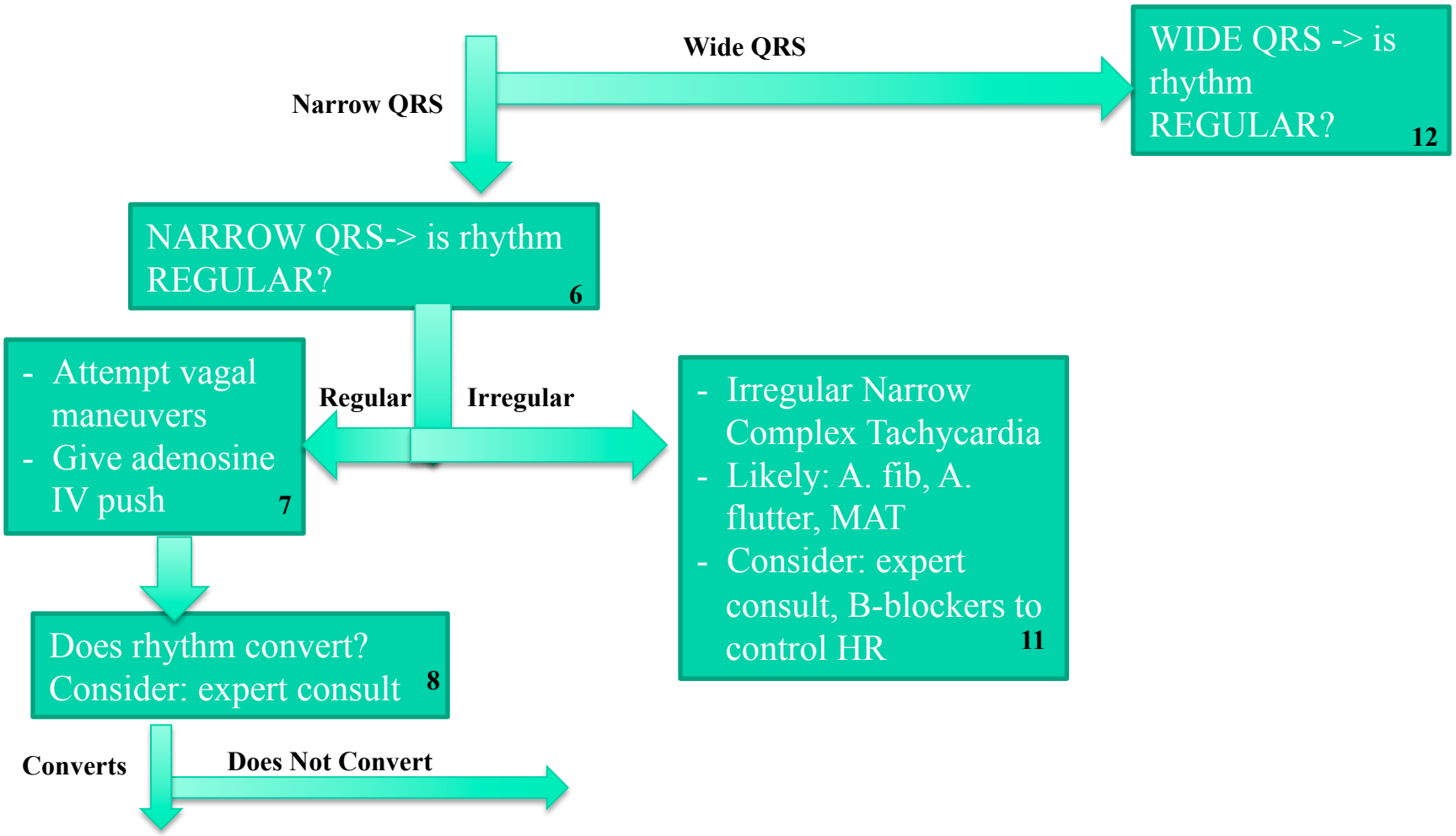
- If V. tachycardia or uncertain rhythm:
  - * Amiodarone
  - * Synchronized cardioversion
- If SVT with aberrancy:
  - * Adenosine (Box 7) **13**

- If A. fibrillation with aberrancy:
  - * See Box 11
- If pre-excited A. fibrillation:
  - * Expert consult advised
  - * Avoid adenosine, digoxin, diltiazem, verapamil
  - * Consider amiodarone
- If recurrent polymorphic VT
  - * Seek expert consult
- If torsades de pointes
  - * Give magnesium **14**

Stable or Unstable?
Narrow or Wide?



Stable and Narrow



SVT – Mechanism

Reentry via accessory pathway

A) Normal conduction

B) PAC

C) Orthodromic reentrant pathway

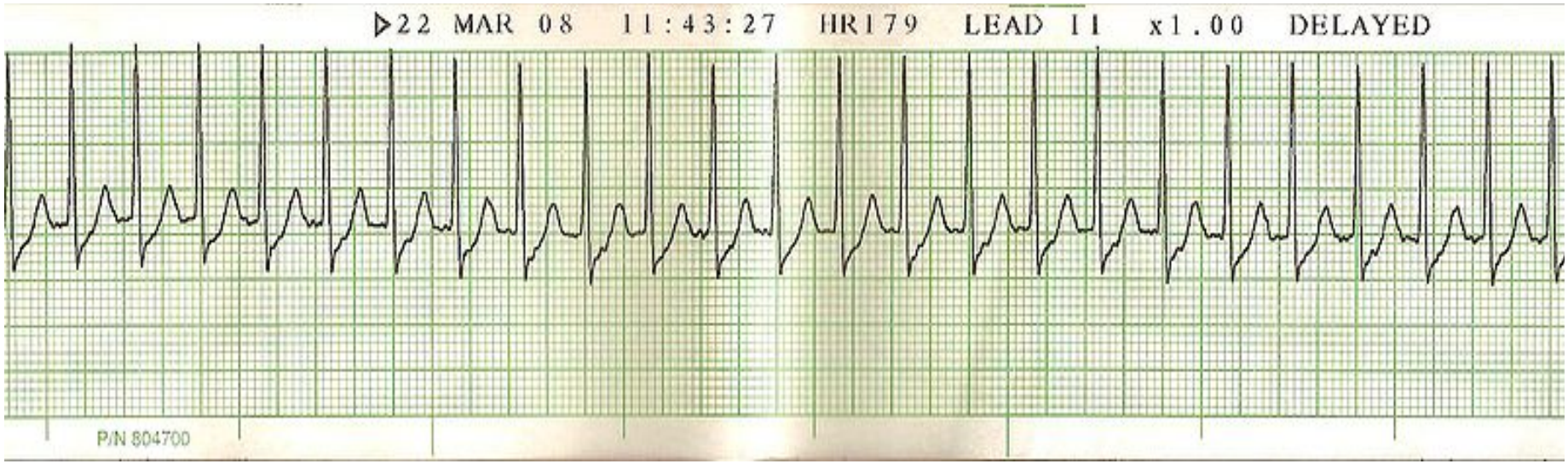
SVT – Mechanism

- AV nodal reentrant circuit - 60%
- Atrio-ventricular reentrant circuit w/ accessory pathway - 30%
- Atrial tachycardia – 10%
- Other rare forms: Sinus-node reentrant tachycardia, inappropriate sinus tachycardia, ectopic junctional tachycardia, and non-paroxysmal junctional tachycardia.

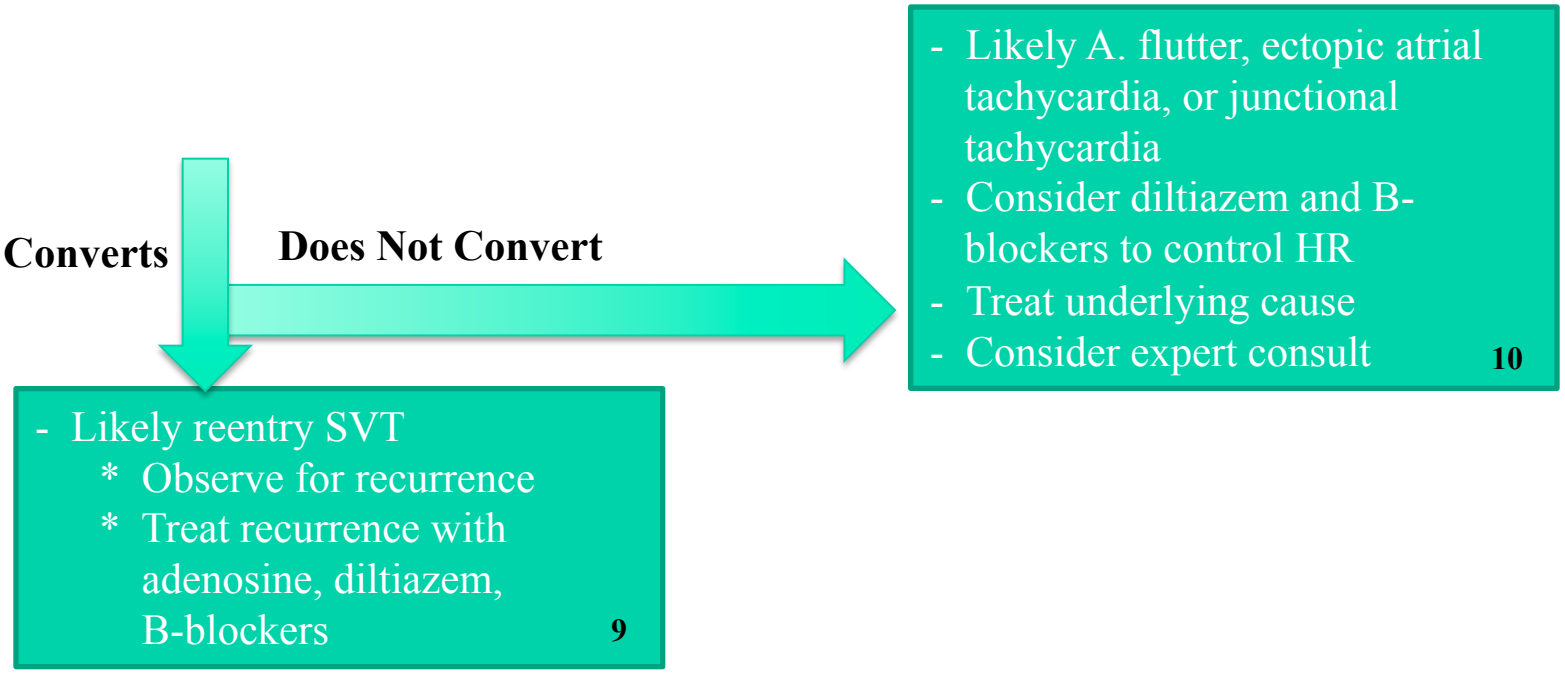
SVT - Treatment

- Adenosine:
  - 6 mg - termination in 60-80%
  - 12 mg - termination in 90-95%
  - Contraindicated in heart transplant, COPD/asthma, and wide complex tachycardia (unless 100% certain is SVT w/ aberrancy)
  - Avoid with evidence of pre-excitation
- Beta blockers or Ca++ channel blockers - contraindicated in antidromic WPW
- Last resort: procainamide, ibutilide, propafenone, or flecainide
- If unstable - electricity!

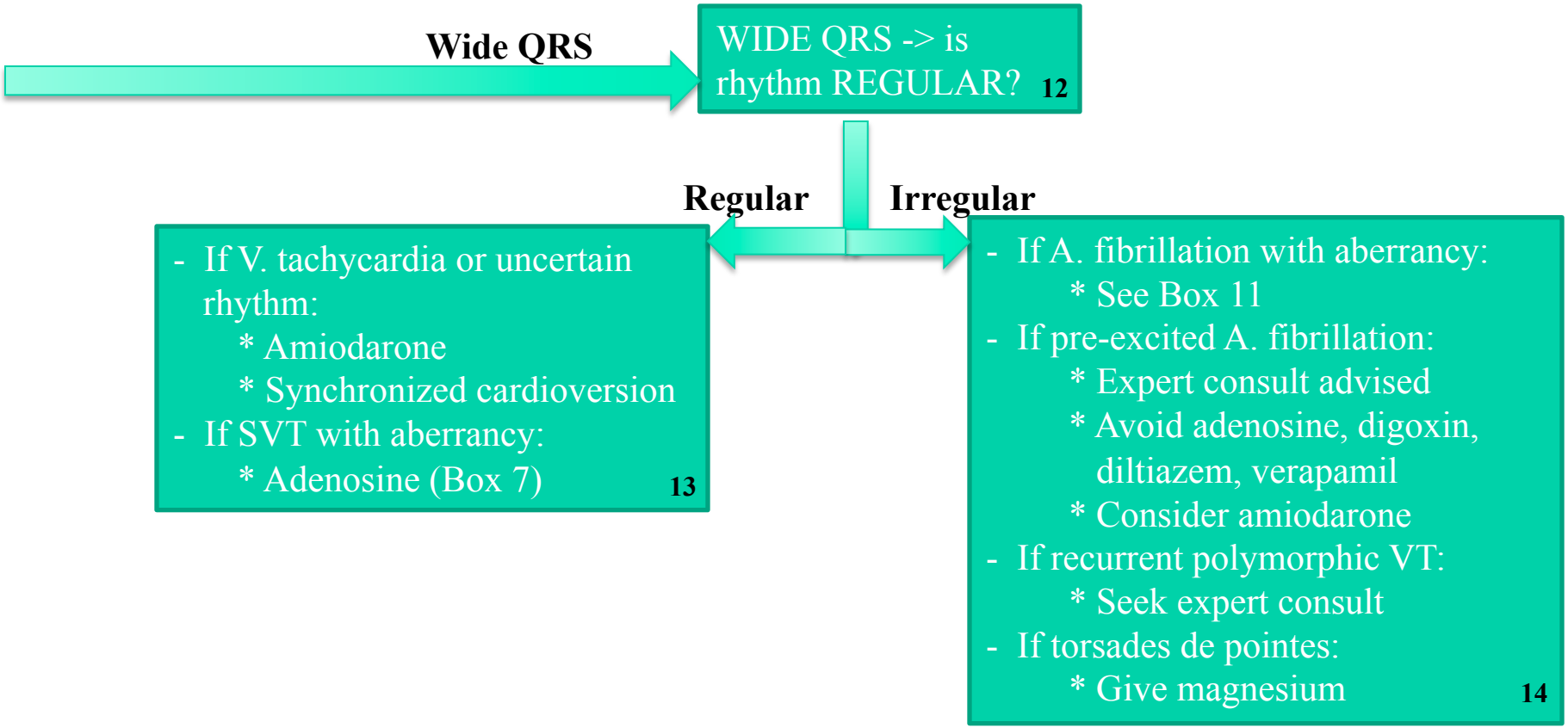
SVT - Treatment w/ Adenosine



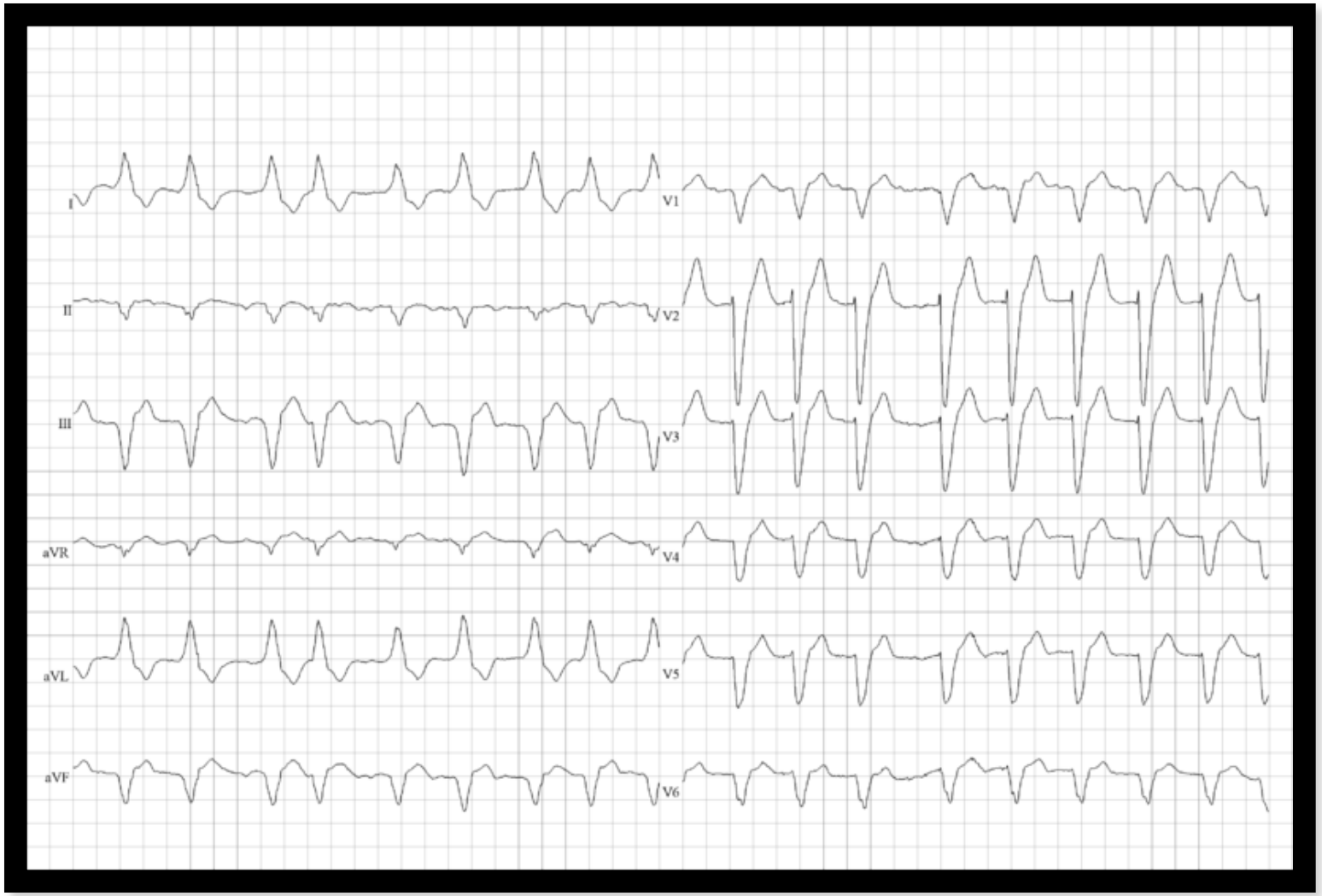
After Adenosine



Stable and Wide Regular or Irregular?



Wide Complex Tachycardia



Afib with LBBB

Wide Complex Tachycardia

- Stable
  - Amiodarone 150 mg over 10 min or other anti-arrhythmics
  - Prepare for synchronized cardioversion
- Unstable
  - ABC's/Call for help/Start CPR
  - Defibrillate: Biphasic 120-200 J (When in doubt pick 200 J), monophasic 360 J
  - Epinephrine 1 mg IV q3-5 min
  - Vasopressin 40 Units IV
  - May try amiodarone or lidocaine after 3 attempts at defibrillation
    - Amiodarone 300 mg, may repeat w/ 150 mg x1
    - Lidocaine 1-1.5 mg/kg, then 0.5-0.75 mg/kg, max is 3 mg/kg

H's and T's

During Evaluation

- Secure, verify airway and vascular access when possible
- Consider expert consultation
- Prepare for cardioversion

Treat contributing factors:

Hypovolemia

Hypoxia

Hydrogen ion (acidosis)

Hypo/hyperkalemia

Hypoglycemia

Hypothermia

Toxins (drugs)

Tamponade (cardiac)

Tension PTX

Thrombosis (coronary/ pulmonary)

Trauma

Review

Bradycardias
Tx of Bradycardias

- Stable
  - MI
  - Adequate perfusion?
  - Monitor BP!!

- Unstable
  - Poor perfusion
  - Immediate transcutaneous pacing
  - Consider atropine while awaiting pacer, 0.5-1.0 mg
  - Consider epi or dopamine if pacing ineffective

Tachycardia's
Stable vs. Unstable

- Stable
  - MI
  - 12 lead
  - Narrow complex
  - Wide complex
  - Treat causes
    - H's and T's
- Unstable
  - Altered MS
  - CP
  - Hypotension
  - Signs of shock

Tx of Stable Tachycardias

- A-fib/flutter
  - Diltiazem (Ca++ channel blocker)
  - Consider cardioversion
- SVT
  - Vagal maneuvers
  - Adenosine
    - 6 mg then 12 mg then 12 mg
- V-Tach (WITH PULSE)
  - Antiarrhythmic: Lidocaine, Amiodarone, (Mg+ for torsades)

Tx of Unstable Tachycardias

- Stable
  - Amiodarone 150 mg over 10 min or other anti-arrhythmics
  - Prepare for synchronized cardioversion
- Perform immediate synchronized cardioversion
  - MI
  - Sedate if conscious
  - DO NOT DELAY CARDIOVERSION

Contributing Factors
H's and T's

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo/hyperkalemia
- Hypoglycemia
- Hypothermia
- Toxins (drugs)
- Tamponade (cardiac)
- Tension PTX
- Thrombosis (coronary or pulmonary)
- Trauma