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Make Your Own Assessment

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Bradycardia
Brady-Arrhythmias

BRADYCARDIA
Heart Rate <60 bpm and inadequate for clinical condition

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

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?)

Observe/Monitor

Adequate perfusion

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

Poor perfusion

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

REMINDERS
- If pulseless arrest, go to pulseless arrest algorithm
- Search for and treat possible contributing factors:
  - Hypovolemia - Toxins
  - Hypoxia - Tamponade, cardiac
  - H+ ion (acidosis) - Tension pneumothorax
  - Hypo/hyperkalemia - Thrombosis (coronary/pulmonary)
  - Hypoglycemia - Trauma (hypovolemia/ICP)
  - Hypothermia
Unstable/Poor Perfusion

Poor perfusion

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

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

TACHYCARDIA With Pulses

1. Assess and support ABC’s
   - Give oxygen
   - Monitor EKG, blood pressure, oximetry
   - Id and treat reversible causes

2. Symptoms persist
   - Establish IV access
   - Obtain 12 lead EKG
   - Is QRS narrow (<0.12 sec)?

3. Is patient stable?
   - Stable
     - Stable
   - Unstable
     - Perform immediate, synchronized cardioversion

4. Wide QRS
   - WIDE QRS -> is rhythm REGULAR?

5. Narrow QRS
   - NARROW QRS-> is rhythm REGULAR?

6. Regular
   - Attempt vagal maneuvers
   - Give adenosine IV push

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

8. Does rhythm convert?
   - Converts
     - Likely reentry SVT
       * Observe for recurrence
       * Treat recurrence with adenosine, diltiazem, B-blockers
   - Does Not Convert
     - Likely A. flutter, ectopic atrial tachycardia, or junctional tachycardia
       - Consider diltiazem and B-blockers to control HR
       - Treat underlying cause
       - Consider expert consult

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

10. Regular
    - 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

11. Irregular
    - 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

12. Regular
    - 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

13. Irregular
    - 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

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

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

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
- Toxins
- Hypoxia
- Tamponade, cardiac
- H+ ion (acidosis)
- Tension pneumothorax
- Hypo/hyperkalemia
- Thrombosis (coronary/pulmonary)
- Hypoglycemia
- Trauma (hypovolemia/hypothemia)
Stable or Unstable?
Narrow or Wide?

TACHYCARDIA With Pulses 1

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

Is patient stable?

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

Symptoms persist

Perform immediate, synchronized cardioversion 4

Unstable

Stable

Wide QRS

Narrow QRS

WIDE QRS -> is rhythm REGULAR? 12
Stable and Narrow

Wide QRS

Narrow QRS

NARROW QRS -> is rhythm REGULAR?

- Attempt vagal maneuvers
- Give adenosine IV push

Does rhythm convert? Consider: expert consult

Converts

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

Does Not Convert
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

Converts

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

Does Not Convert

- Likely A. flutter, ectopic atrial tachycardia, or junctional tachycardia
- Consider diltiazem and B-blockers to control HR
- Treat underlying cause
- Consider expert consult
Stable and Wide
Regular or
Irregular?

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

WIDE QRS -> is rhythm REGULAR?

- 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
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