TACHYARRHYTHMIA

(Last updated October 2020; Reviewers: Aysun Tekin, MD; Ognjen Gajic, MD)

PRESENTING COMPLAINT: Palpitations, shortness of breath, lightheadedness.

FINDINGS

- **A** Check airway
- **B** N/↑ breathing
- **C** ↑HR, rapid uncoordinated heart rate >100/min, ↓/N BP
- **D** Altered variable (V,P,U,D)* Presyncope/syncope
- **E** Pallor, diaphoresis
- **UPC** Cardiac structural defects, pulmonary edema, LV/RV function, IVC (intravascular volume status)
- **LPC** CBC, ↓potassium, ↓magnesium, cardiac enzymes (in selected cases)
  - Other labs: thyroid function

* V (verbal), P (pain), U(unconscious), D (delirious)

PC: (point-of care)

OTHER HISTORY

Signs and symptoms

- Tachycardia
- Hypotension
- Tachypnea
- Distressed patient

Predisposing Conditions/ Underlying Etiology

- Hypoxemia
• Hypo/hypervolemia
• Sepsis
• Myocardial infarction
• Congestive heart failure
• Electrolyte imbalances (hypokalemia, hypomagnesemia)
• Hyperthyroidism
• Positive chronotropic medications
• Pulmonary embolism

DIFFERENTIAL DIAGNOSIS

Based on the QRS complex on ECG:

• Wide QRS:
  o Ventricular tachycardia (VT)
  o Supraventricular tachycardia with aberrancy (SVT)

• Narrow QRS:
  o Irregular
    ▪ Atrial fibrillation (AFib)
    ▪ Multifocal atrial tachycardia (MAT)
  o Regular
    ▪ Sinus tachycardia
    ▪ Atrial flutter (Aflutter)
    ▪ AV nodal reentrant tachycardia (AVNRT)
    ▪ Reentry SVT
    ▪ Wolff-Parkinson-White (WPW) syndrome
    ▪ Accelerated junctional rhythm

Assess duration and stability.
THERAPEUTIC INTERVENTIONS

General:

- Assess and treat underlying cause.
- Consider urgent electrical cardioversion regardless of the type if hemodynamically unstable due to arrhythmia.
- Narrow complex tachycardia:
  - Consider adenosine or vagal maneuvers as a diagnostic/therapeutic modality.
  - If relative hypotension present, consider IV calcium prior Ca channel blockers to decrease propensity for hypotension.

Specific:

- Stable VT:
  - Polymorphic VT
    - No adenosine
    - IV Beta blockers (BB) or amiodarone
    - Consider myocardial ischemia
  - Stable Torsades de pointes (prolonged QT)
    - Correct electrolytes
    - Beta blockers, Magnesium IV
    - Acute pacing
  - Stable Monomorphic VT
    - Pharmacologic cardioversion: amiodarone, lidocaine, procainamide, sotalol

- SVT and AVNRT:
  - Junctional Tachycardia (JT)
    - Rate control with amiodarone/Beta blockers/Calcium channel blockers
    - No electrical cardioversion
  - Paroxysmal SVT
    - Amiodarone, procainamide, sotalol, flecainide, propafenone
    - If LV dysfunction: amiodarone/digoxin/diltiazem
    - If persists, electric cardioversion
  - Atrial Tachycardia (AT)
    - No electrical cardioversion
- Rate control: amiodarone/Beta blockers/Calcium channel blockers
- If LV dysfunction: amiodarone/digoxin/diltiazem

- **AFib, or Aflutter, or non-specific unknown SVT:**
  - Rate control: if duration >48h (or unknown)
    - Beta-blockers
    - Calcium channel blocker,
    - Digoxin (if impaired LVF <40%)
    - Amiodarone
  - Consider cardioversion if duration <48h, on anticoagulation (INR 2-3) or no clots on transoesophageal ECHO.
    - DC cardioversion, or
    - Pharmacological
      - Ibutilide/flecainide/propafenone/BB/procaainamide/amiodarone
  - If duration >48h: consider delayed cardioversion
    - Echocardiogram (TEE if possible before cardioversion)
    - Anticoagulation: UFH or LMWH
    - Rate control

- **WPW**
  - Avoid adenosine, BB, CCB, digoxin
    - If <48h: electrical or pharmacological cardioversion (procainamide, ibutilide or amiodarone)

**ONGOING MANAGEMENT**

- **Consider**
  - Long-term rate vs rhythm control (Afib/Aflutter >48h)
  - Permanent pacing/catheter ablation

- **Further diagnostics:**
  - CHADS2 score (stroke risk, need for chronic anticoagulation)
  - Echo: LV function
  - Consider electrophysiological study
Regular

Paroxysmal SVT
- Use vagal maneuvers
- Give adenosine 6 mg rapid bolus
  - If unsuccessful;
    - 2nd dose: 12 mg
    - 3rd dose: 12 mg

Atrial flutter
- Control rate with:
  - Beta blocker
  - Diltiazem
- If evidence of heart failure, consider:
  - Digoxin
  - Amiodarone

Irregular

Atrial fibrillation (AF)
- Control rate with:
  - Beta blocker
  - Diltiazem
- If evidence of heart failure, consider:
  - Digoxin
  - Amiodarone
  - Anticoagulation:
    - If duration > 48h

50-100 J biphasic

120-200 J biphasic

100 J biphasic

Defibrillation dose (not synchronized)

Increase energy level if normal sinus rhythm is not restored
(50 J - 100 J - 200 J - 300 J - 360 J)

After 3 attempts give amiodarone and repeat shock
(300 mg IV over 20-30 minutes - repeat shock - followed by 900 mg over 24 hours)

Antiarrhythmic medication

Narrow QRS

Regular

Paroxysmal SVT

Irregular

Atrial fibrillation (AF)

Wide QRS

Regular

Ventricular tachycardia
- Amiodarone
  - 300 mg over 20-60 min, followed by;
  - 900 mg over 24h

Irregular

SVT with bundle block bl.
- Give adenosine as for regular narrow complex tachycardia

AF with bundle branch bl.
- Treat as for narrow complex tachycardia
  - Pre-excited AF
  - Consider amiodarone
  - Polymorphic VT

Torsades de pointes
- Give Magnesium 2 gr over 30 minutes
REFERENCES & ACKNOWLEDGEMENTS

-This card was developed by Authors: Benjamin Bonneton, MD; Reviewers: Ognjen Gajic, MD; Emir Festic, MD - ACC/AHA/HRS 2008 guidelines for device-based therapy of cardiac rhythm abnormalities. It was also reviewed by Emir Festic, MD and Courtney E. Bennett, DO in 2016.

-2012 ACCF/AHA/HRS Focused Update of the 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities

-Adult tachycardia algorithm – Resuscitation Council (UK)

-ERC Resuscitation Guidelines-2010

-AHA Resuscitation Guidelines-2010