**Exercise Arrhythmias, Pt 2**
*Tachyarrhythmias, Asystole, PEA, Pulseless VT/VF*

- Atrial tachyarrhythmias
- Ventricular tachyarrhythmias
- Treatment of tachyarrhythmias
- Asystole
- Pulseless Electrical Activity
- Defibrillation

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**SVT: Case Study**

- 28-yr-old woman suddenly has rapid palpitations and chest pain while playing her cello
- In the emergency room, she has
  - HR 190
  - BP 82/54
- EKG shows regular tachycardia with a narrow QRS and no apparent P waves

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**Treatments**

- Try cardiac sinus pressure or other vagal maneuvers
- Try intravenous adenosine
- If all fails, and tachycardia is recurrent and causes symptoms, treatment may be catheter ablation to destroy an accessory pathway

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**Ablation Treatment**

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**Causes of Tachycardias**

- Supraventricular tachycardia
- PACs
- Atrial flutter/atrial fibrillation
- Ventricular tachycardia
- PVCs

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**Atrial Arrhythmias**

- Tend to “go away” with vagal withdrawal at the start of exercise
- Re-appear during recovery
- Occurs in 4-18% of patients
  - 5% in normals
  - 40% in CAD
- Reduces “atrial kick” to increase stroke volume
Premature Atrial Contractions

• Occur at low exercise intensity and have little clinical significance

Atrial Flutter or Fibrillation

• Transient Atrial flutter or fibrillation occur frequently in patients
• Associated with
  – CAD
  – rheumatic heart disease
  – thyrotoxicosis
  – myocarditis
  – sometimes in normal people with no disease

Exercise Response with Atrial Flutter or Fibrillation

• Cardiac output is compromised
  – 5-30% lower stroke volume
  – elevated heart rates
  – greater incidence of ischemia (inadequate perfusion time)
• Atrial flutter rate 220-300
• Atrial fibrillation, rate indeterminant

Paroxysmal Supraventricular Tachycardia (PSVT or PAT)

• 2-3 beats of PAT or junctional tachycardia occasionally occur with exercise
• rate of ~160 to 220
• Not associated with increased mortality
• Sustained PAT is rare
• Sometimes, but not always associated with ischemia with ST depression
Premature Ventricular Contractions

- PVCs at Rest
  - controversy over significance
  - most agree that PVCs at rest are not significant in healthy people
  - Patients with CAD who have PVCs have a “small” increase in mortality
  - PVCs during recovery, usually are not significant

Single PVC

- Cause by excess catecholamines and vagal withdrawal
- May be caused by electrical re-entry and ectopic beats
- Occur in 36-42% of normal subjects during intense exercise
- Occur in 50-60% of CAD patients and at lower HR
- Not significant, if asymptomatic

Ominous PVCs

- Multi-focal, multiform, repetitive
- Moderate increase in mortality in CAD patients
Exercise Guidelines and PVCs?

- Relative contra-indications to stop exercise
  - sustained VT (4 or more PVCs)
  - multi-focal PVCs
  - Triplets of PVCs

Non-Sustained Ventricular Tachycardia

- 4 or less = non-sustained
- usually not a problem unless accompanied by other signs or symptoms

Sustained VT

- Relatively rare
- Usually portray serious underlying cardiac disease
- Often deteriorates to VF

VT vs. V flutter

- VT rate is 140 to 250
- VF > 250

Torsades de Pointes

- Often related to hypoxia, electrolyte disturbances such as hypokalemia, or drugs

Tachycardia Algorithm

- Immediate assessment: stable or unstable?
- Unstable= chest pain, shortness of breath, shock, heart failure, pulmonary congestion
**Treatment for Unstable Tachycardia**

- HR < 150, usually try anti-arrhythmic medications, vagal maneuvers
- HR > 150, immediate cardioversion
- Cardioversion used for
  - VT
  - paroxysmal supraventricular tachycardia
  - atrial fibrillation
  - atrial flutter

**Stable Tachyarrhythmias**

- Vagal maneuvers
  - Massage carotid sinus to stimulate vagus nerve
  - Apply pressure at level of the cricoid cartilage for about 5 sec in a circular motion
  - Valsalva
  - Ice to face
- Adenosine: causes a transient a-v block
  - don’t use with wide-complex tachycardia!
- Use Ca+ channel or beta-blockers

**Cardioversion**

- Use defib with low levels of energy (50-360 J)
- Medicate first
  - sedatives (diazepam, barbiturates)
  - analgesic (morphine)

**Treatments for Atrial fib or flutter**

- atrial fibrillation or flutter
  - control rate (calcium channel blockers, beta blockers)
  - control rhythm (amiodarone, lidocaine)
  - cardioversion
  - CAUTION, use anti-coagulants for 3 wks before converting with electricity or drugs, if atrial fib or flutter has persisted for >48hrs

**Tachycardia Summary**

- Name 3 conditions that result in atrial-initiated VT.
- When are PVCs during exercise a concern?
- When cardiovert?
  - Tach > 150 with signs/symptoms
  - AFI or Afib < 48hrs or after coagul rx
  - VT, PSVT, AFI, AFi

**Asystole!**

Think TEA
**Asystole Algorithm**

- Confirm non-responsiveness and asystole

![Asystole Algorithm Diagram]

**Pulseless Electrical Activity**

- Presence of some type of electrical activity but no detectable pulse
- VF/VT and PEA are “rhythms of survival” if
  - VF/VT--resuscitated with a defibrillator
  - PEA--cause is treated in time
- PEA treatment, think PEA
  - Problem, Epinephrine, Atropine

![Pulseless Electrical Activity Diagram]

**PEA Algorithm**

- Hypovolemia
  - volume infusion, vasoconstrictor
- Hypoxia
  - oxygen
- Hydrogen ion
  - bicarbonate infusion
- Hyper/hypokalemia
- Hypothermia

![PEA Algorithm Diagram]

**The 5 Hs**

- Tablets (antidepressants, beta blockers, ca channel blockers, digitalis)
- Tamponade
- Tension Pneumothorax
- Thrombosis, coronary
- Thrombosis, pulmonary embolism

![The 5 Hs Diagram]

**The 5 Ts**

- Survivable rhythm if defibrillation is performed quickly
- Use CPR skills
- Use AED or get defibrillator

![The 5 Ts Diagram]
Primary ABCs

Focus: basic CPR and defibrillation

- Check responsiveness
- Activate emergency response system
- Call for defibrillator
- A: Airway: open the airway
- B: Breathing: provide positive-pressure ventilations
- C: Circulation: give chest compressions
- D: Defibrillation: assess for and shock VF/pulseless VT, up to 3 times (200 J, 200 to 300 J, 360 J, or equivalent biphasic) if necessary

Secondary ABCD

Conclusions

- When do you cardiovert, when do you use a defibrillator?
- What are the 5 Hs and the 5 Ts?
- Name 2 times you would consider using a pacer
  - bradycardia and asystole