ACLS Primer

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This Presentation is AARC Approved for 1.0 CRCE Credit Hour

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Learning Objectives:

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  1) Identify treatment options for Acute Coronary Syndrome

  2) Identify treatment options for stroke.

  3) Identify heart rhythms associated with cardiac emergencies.

  4) Discriminate between treatment algorithms for bradycardia, tachycardia, cardiac arrest, and ROSC.

- Does not replace taking an AHA course
  - You will not get an ACLS card
  - This course is meant to get you started learning, or remind you, of the major concepts in an ACLS course.

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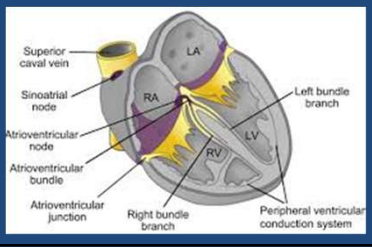
Cardiac A & P

- You have 2 lungs & 1 heart
  - Left ventricle high pressure 120 mmHg – systemic circulation
  - Right atria (CVP) 4-12 mmHg
  - Right ventricle low pressure 25 mmHg – pulmonary circulation



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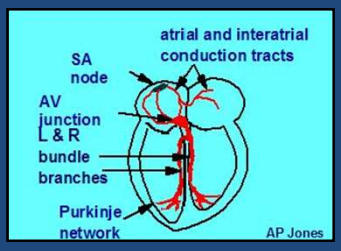
Conduction Pathway



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Pacemaker Cells

- Heart rates for different sites

SA Node	60 - 100/min
AV Node	40 - 60/min
Bundle branches	30 - 40/min

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Definitions

- Ectopic beats arise from fiber or group of fibers outside the SA node; e.g., irritable ventricular tissue.
- Escape beats originate from alternate sites when higher ones are depressed; e.g., junctional beats when the SA node is suppressed.

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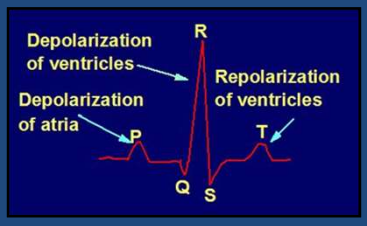
ECG Waves



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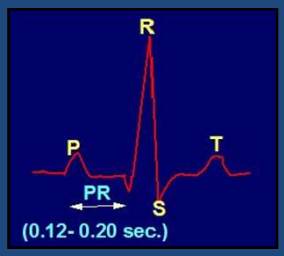
ECG Wave Intervals



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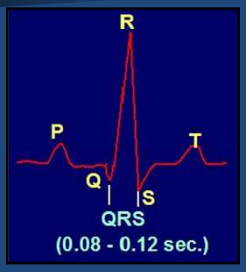
ECG Wave Intervals



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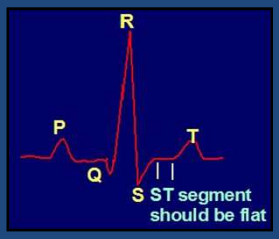
ECG Wave Intervals



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Rhythm Review

- Sinus bradycardia
  - Beats originate in SA node
  - Normal wave configurations
  - Rate < 60/min

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Rhythm Review

- Sinus tachycardia
  - Beats originate in SA node
  - Normal wave configurations
  - Rate > 100/min

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Rhythm Review

- Normal
  - Rate 60- 100/min

300/60=5
300/100=3

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Rhythm Review

- Sinus dysrhythmias
  - Beats originate in SA node
  - Normal wave configurations
  - Irregular rhythm with breathing

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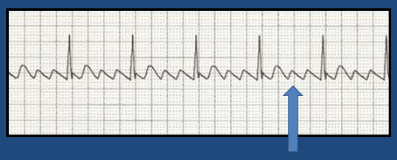
Rhythm Review

- Atrial flutter



Saw tooth P waves

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Rhythm Review

- Atrial fibrillation
  - Non-discernible P waves
  - Promotes thrombus formation

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Rhythm Review

- Junctional bradycardia
  - SA node suppression
  - Absent P waves

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Rhythm Review

- Junctional tachycardia
  - Causes:
    - Digitalis toxicity
    - Recent cardiac surgery
    - Acute myocardial infarction
    - Medications; e.g. beta adrenergics
  - P waves absent, inverted, after QRS

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Rhythm Review

- Premature junctional complexes
- Most common causes:
  - Heart disease
  - Digitalis toxicity
- P waves absent, inverted, after QRS

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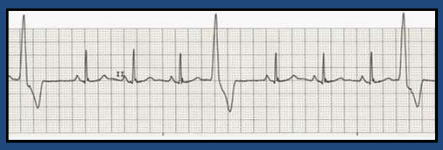
Rhythm Review

- Unifocal – similar configurations → one originating site



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Rhythm Review

- Multifocal – variable configurations → more than one originating site

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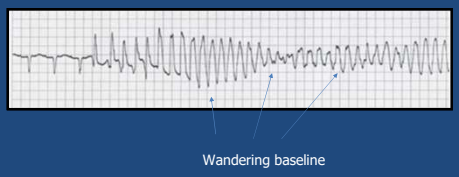
Rhythm Review

- Torsades des Pointes



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Heart Blocks

- Blockage of conduction between atria and ventricles at:
  - Lower atrial tissue
  - AV junction
  - Bundle of His
  - Bundle branches

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Heart Blocks

- Causes:
  - Enhanced vagal tone
  - Congenital heart defects
  - Myocardia ischemia/infarction
  - Congestive heart failure
  - Cardiomyopathy
  - Cardiac surgery
  - Medications, e.g. digitalis, antidysrhythmics

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First Degree Heart Block

- Benign
- P-R interval > 0.20 sec.

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Second Degree Heart Block Type 1

- AKA Wenckebach, Mobitz Type I
- Progressive lengthening of PR, then dropped beat

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Second Degree Heart Block Type 2

- AKA Mobitz Type II
- Constant PR intervals
- QRS dropped at fixed ratio

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Third Degree (Complete) Heart Block

- Very slow ventricular rate
- No consistent association between P wave and QRS complex

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Bundle Branch Block

- Conduction blocked at one of the branches, left or right
- Bradycardia with wide, (sometimes) notched QRS complex

Left BBB

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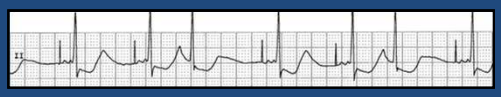
Artificial Pacemaker

- Atrial pacemaker



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Artificial Pacemaker

- Atrial-ventricular pacemaker

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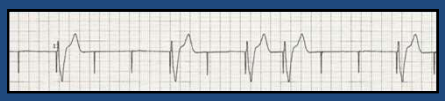
Artificial Pacemaker

- Pacemaker capture failure



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Systematic Approach

- Primary Assessment – Are they conscious? Do they need CPR?
  - A – Airway
  - B – Breathing
  - C – Circulation
  - D – Disability
  - E – Exposure (temp)
  - Secondary Assessment
    - S – Signs/Symptoms
    - A – Allergies
    - M – Medications
    - P – Past Medical History
    - L – Last Meal
    - E – Events

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Team Dynamics

- Roles and responsibilities
  - Know what to do before the code starts
  - Know your limitations
  - Constructive interventions
- What to communicate
  - Knowledge sharing
  - Ask for observations from team members for oversights
  - Summarize and reevaluate
- How to communicate
  - Closed-Loop
  - Clear messages
  - Stay calm – panic is contagious
  - Mutual respect
- Debrief

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Adult BLS/CPR Numbers

- Scene Safety – Best reason to withhold care
- 1 or 2 rescuers 30:2
- Compression rate – 100-120/min
- 2 inches deep - Allow chest recoil
- BVM for 2+ rescuers
- Intubate if needed
  - 1 breath/6 seconds (1 tube = 1 breath)
  - 500-600 ml (half a bag squeeze)
    - Do not hyperventilate
  - Non-stop compression (asynchronous)
- Has HR – not breathing
  - Rescue breathing
  - 1 breath / 5-6 seconds (10-12 /minute)
- End-tidal CO2 – use to monitor CPR quality

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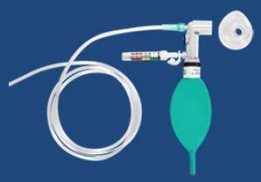
Know Your Equipment



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Airway Management

- Oropharyngeal Airway
  - Unconscious patients only

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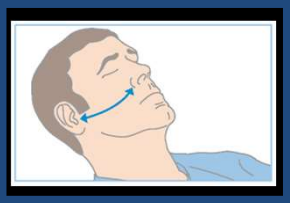
Airway Management

- Nasopharyngeal Airway
  - Conscious or Unconscious patients



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Airway Management

- Advanced Airway
  - ET Tube
  - LMA
  - Combitube

Check End-tidal CO2 – CXR only shows up and down, not depth

CO2 10-15 do better compressions

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First Four

- Check SAT
- Give O2 if needed
- Cardiac Monitor
- Drug Access
  - I.V. or I.O.

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Acute Coronary Syndrome (ACS)

- VS. Heart Failure
- Thrombosis – blood clot

- First 4
  - Pulse Ox
  - O2 if needed – keep SAT 94-99%
  - I.V.
  - Monitor

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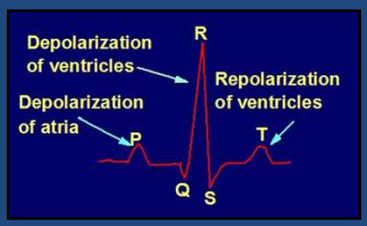
ECG Waves - Normal



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STEMI

- S-T segment elevation

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MONA

- Morphine
- Oxygen
- Nitroglycerin
- Aspirin (160-325 mg)

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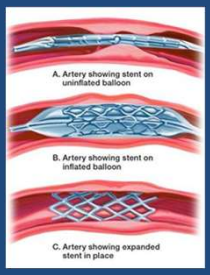
Interventions

- I.V. Thrombolytics – 30 minutes
- PCI – 90 minutes (Cath lab)



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Ischemic Stroke

- VS. Hemorrhagic Stroke

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Interventions

- Pre-hospital stroke assessment
- Check glucose
- Transport to stroke center – go to the right hospital
- FDA 3 hours treatment window with thrombolytics

- At stroke center
  - Repeat glucose check
  - 25 minutes CT/MRI
  - 45 minutes total CT/MRI + Read - R/O Bleed

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Cardiac Arrest Algorithm

- Only 2 shockable (defibrillate) rhythms
  - F-Fib & Pulseless V-Tach
  - Only shock asystole on T.V.
  - Most drugs are given every 3-5 minutes

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Cardiac Arrest Algorithm

- You hear a loud noise in a room and upon entering find a 73 y/o male on the floor.
- Cool/Moist/Cyanotic
- No pulse
- No respirations
- No response

GET HELP FIRST!

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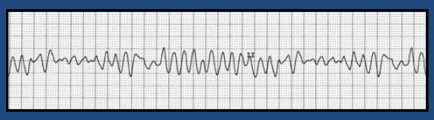
Cardiac Arrest Algorithm

- Chest compressions
- Monitor



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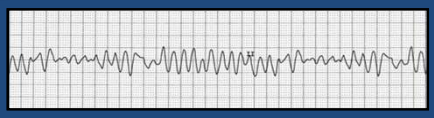
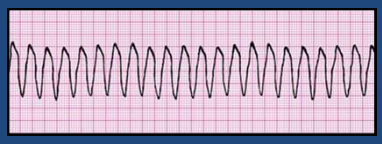
Cardiac Arrest Algorithm

- Rhythm check - Shock or no shock





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Cardiac Arrest Algorithm

- 1st drug – Epi 1 mg – every 3-5 minutes
- After 2 shocks give Amiodarone 300 mg
- 2nd dose 3-5 minutes later 150 mg
- Search for & treat reversible causes H & Ts

- Hypovolemia
- Hypoxia
- Hydrogen ions (acidosis)
- Hypo/Hyperkalemia
- Hypothermia
- Tension Pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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Cardiac Arrest Algorithm

- Next rhythm check

- Good or bad?

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Cardiac Arrest Algorithm

- Next rhythm check

- Good or bad?
- No pulse – Now is it good or bad?

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Cardiac Arrest Algorithm

- 30 Minutes later

- Now what?

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Bradycardia Algorithm

- No symptoms – History and physical
- Symptomatic (unstable) - treat

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Bradycardia Algorithm

- 55 y/o male is brought to the ER by private car complaining of chest pain.
- Pale/Diaphoretic/Clammy
- No palpable radial or brachial pulse
- RR 9

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Bradycardia Algorithm

- Atropine 0.5 mg, every 3-5 minutes, max 3 mg
- Do one of these:
- Epi drip 2-10 mcg/min
- Dopamine drip 2-10 mcg/kg/min
- External pacer
- Call an expert

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Tachycardia Algorithm

- 65 y/o male is found in the lobby. Weak radial pulse 150
- BP 75/palpation RR 26

- Unstable – synchronized cardioversion
  - Sedate if possible
  - Be on guard for heart failure

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Tachycardia Algorithm

- Stable
  - Narrow or Wide QRS – need cardiac monitor / EKG
    - Wide > 0.12 Sec
    - Wide get expert
  - Narrow = normal
    - Vagal maneuver
    - Adenosine 6 mg, 2ND Dose 12 mg
    - Beta blockers
    - Calcium channel blockers
- Call an expert

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Post ROSC Algorithm

- Airway management
  - Intubation
  - Keep SAT 94-99
  - Capnography
  - Do not hyperventilate
- Treat Hypotension
  - Treat SBP < 90 w/ 1-6 liters of fluids
  - Vasopressor infusion

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Post ROSC Algorithm

- Treat reversible causes
- ECG
  - Reperfusion therapy
    - PCI
    - Thrombolytics (Fibrinolytics)
- Targeted temperature management
  - 32-36 degrees for at least 24 hours
  - Only treatment proven to save neuro
  - Out cold – make him cold
- Send to ICU

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Evaluations & Certificates

- Be sure to fill out the evaluation
- Submit, then Mark Complete
- Certificates will be available immediately

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