



Automatic External Defibrillation

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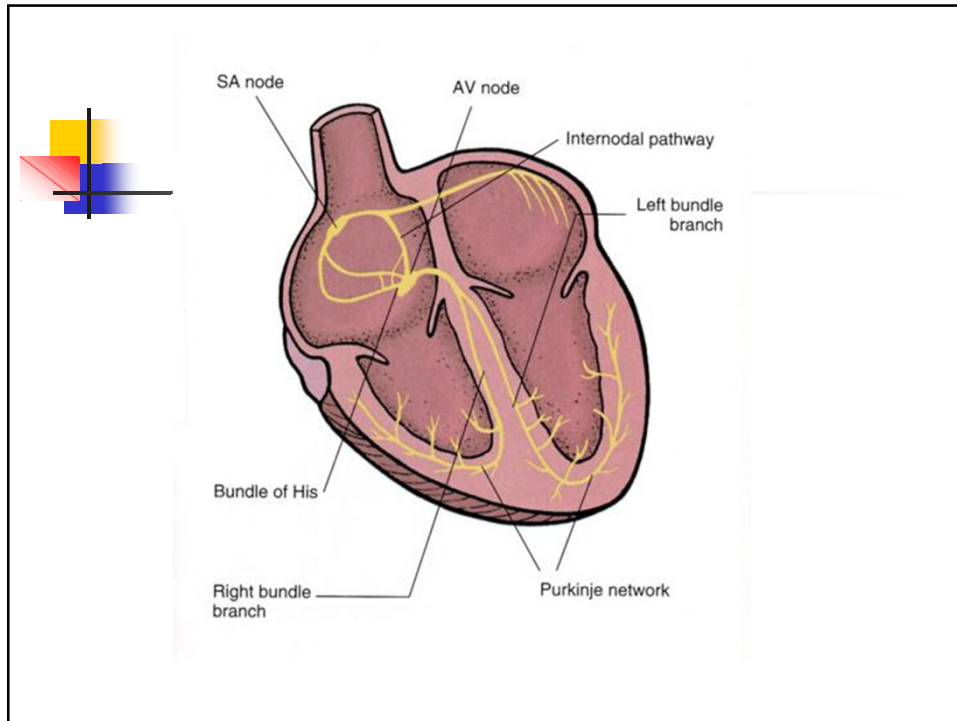
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AHA Chain of Survival

- Early access
- Early CPR
- **Early defibrillation**
- Early ALS



Cardiac electrophysiology

- SA Node
 - "dominant pacemaker"
 - "Fires" 60-100 times per minute
- Internodal pathways
- AV Node
- Bundle of HIS
- Left and right bundle branches
- Purkinje network

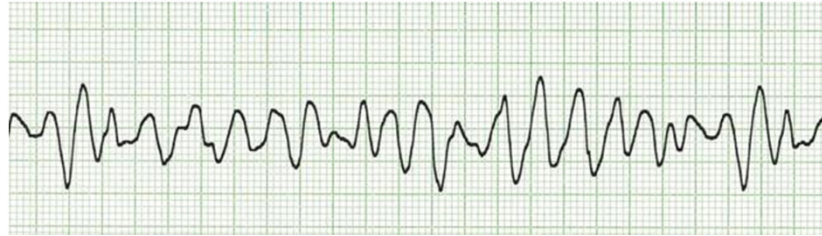
Nonperfusing heart rhythms

- **Ventricular tachycardia (“VTACH”)**
- **Ventricular fibrillation (“VFIB”)**
- Asystole
- Electromechanical dissociation (EMD)
- Pulseless electrical activity (PEA)

VTACH



 VFIB



 Asystole





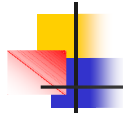
The bottom line

- All the above abnormal heart rhythms can not produce a perfusing pulse
- **Pulseless VTACH and VFIB CAN be successfully converted to a perfusing rhythm using a defibrillator**



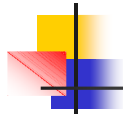
AED – the technology

- Very accurate computer enabling recognition of lethal rhythms (“Analyze”)
- Modern AED will *talk*
- Shocking mechanism (“Shock”)
- Automatic vs. semiautomatic



Common AED errors

- Bad battery
- Patient moving
- AED applied to a responsive patient



Bad battery

- Use fully charged batteries
 - Depends on manufacturer
- **Pay attention to AED warnings about batteries**
- Bad batteries are uncommon today
- **COLD WEATHER**



Patient moving

- Causes inaccurate analysis
- Don't touch the patient
- **Stop the bus when analyzing!**



AED applied to a responsive patient

- If AED is applied to a responsive patient **with a rapid pulse**
 - **AED may falsely interpret as VTACH – and recommend shock**
- **Therefore: only apply AED to an unresponsive pulseless patient**



Complications & solutions

- Patient has a pacemaker
 - Apply pads 1" from pacemaker
- AICD
 - **No danger to EMT!**
 - **Small amount of energy**
 - Apply pads 1" from AICD
- Very hairy chest
 - Shave the area
 - **Keep a disposable razor with your defibrillator**



Integrating AED into CPR



AED integration

- Arrive at the scene
- Assess responsiveness
- Stop CPR (EMTs or bystanders)
 - **Verify Cardiac Arrest**
- Apply AED *while CPR is in progress*



AED integration – cont'd

- Prepare for defibrillation:
 - Bare the chest
 - **Power on AED**
 - **Remove nitro paste/patches**
 - Apply pads to the chest
 - **Look at the pads, they show you how**
 - Right: right of sternum under clavicle
 - Left: under left ribs
 - **Apply them smoothly**
 - STOP CPR



AED integration – cont'd

- Make sure no one is touching the patient
- Either press analyze or “Analyze” may start on its own
 - AED may tell you “analyzing – do not touch the patient”
- Results...



AED integration – cont'd

- Analysis at any time will result in either:
- **Shock advised**
 - AED will charge and tell you to clear the patient and **press shock**
 - First shock within 90 seconds of AED availability
- **No shock advised**
 - Patient may have a pulse
 - Patient has a nonshockable rhythm
 - Asystole, EMD/PEA



Shock advised...

- **Clear!**
- Press Shock
- ***Immediately*** continue CPR for 2 minutes
 - **DO NOT CHECK PULSE UNTIL AFTER 2 MINUTES OF CPR!**
- Check pulse
- Analyze/Shock if advised **up to a maximum of 3 times before initiating transport**
- **No transportation available yet?**



No shock advised

- ***Immediately*** continue CPR for 2 minutes
 - **DO NOT CHECK PULSE UNTIL AFTER 2 MINUTES OF CPR!**
- Check pulse
- Analyze/Shock if advised **up to a maximum of 3 times before initiating transport**
- **No transportation available yet?**



During Transport

- CPR
- Stop the bus!
- Analyze every 2 minutes
 - Shock or no shock advised
 - **Immediately continue CPR**
- **Start the bus!**



Pulse Present?

- Assess Vital Signs
- Support ABCs
- Immediate Transport



AED and Children

- Do not use the AED in pediatric cardiac arrest unless:
 - AED is equipped for and FDA approved for use on children less than 8 years of age
 - **If no pediatric AED is available, use and Adult AED.**
 - **For an adult, DO NOT USE A PEDIATRIC AED.**



Hypothermic patients & AED

- Check pulse for up to 30-45 seconds