Lesson 4-3: Cardiac Emergencies

CARDIAC EMERGENCIES
Angina, AMI, CHF and AED
THREE FAMILIAR CARDIAC CONDITIONS

- Angina Pectoris
- Acute Myocardial Infarction
- Congestive Heart Failure
ANGINA PECTORIS

- Chest pain
- No permanent damage
- Signs and symptoms
  - Dyspnea
  - Nausea
  - Sweating
  - Weakness
  - Squeezing
ACUTE MYOCARDIAL INFARCTION (AMI)

- Oxygen can’t reach the heart
- Injury and Death of heart muscle

Signs and symptoms
- Radiating pain (not always)
- Dyspnea
- Indigestion
- Weakness or fatigue
CONGESTIVE HEART FAILURE (CHF)

- The left ventricle, when weakened by a heart attack may cause fluid to back up into the lungs.
  - This is a simplified pathophysiological explanation of CHF.

- Failure to pump blood effectively
  - Results in systemic edema or pulmonary edema and rales
CHF

- Difficulty breathing while supine, not associated with fever may be indicative of CHF.

- Treatment for patients in respiratory distress with associated crackles and other symptoms of CHF requires that you place the patient in an upright position, unless the patient is not comfortable in that position.
What’s the Difference???

- **CHF**
  - **Left-sided** Heart Failure
    - Hypertension with Rales
      - *Rales*: are the clicking, rattling, or crackling noises heard on auscultation of the lung caused by the "popping open" of small airways and alveoli collapsed by fluid, exudate, or lack of aeration during expiration.
    - Possible JVD
    - Peripheral Edema/ Central Edema
  - **Cor Pulmonale**
    - **Right-sided** Heart Failure
      - Normotensive to Hypotensive patient.
      - Clear Lungs
      - Flat or non-distinct Jugulars
Traumatic Chest Pain

- Often affects the chest wall, but can affect the heart.
- **Chest pain associated with blunt force trauma may result in failure of the chest cavity to fully expand.**
  - This can lead to hypoxia and can result in death if the patient does not receive rapid care and transport.
EMERGENCY MEDICAL CARE

Pulseless

- Adult Patients
  - CPR with AED

- Child & Infant Patients
  - Pulse Rate <60 in an infant indicates
    - CPR
  - Check with Equipment Manufacturer and Local Protocol for AED
    - Newer AED's have pediatric attenuators for the child/infant.
  - **New AHA CPR guidelines indicate the use of the AED in the child and infant.**
EMERGENCY MEDICAL CARE

Responsive

- Perform initial assessment
  - Don’t forget OPQRST

- Focused HX and PE

- Place patient in position of comfort

- Cardiac - c/o pain or discomfort
  - 100% oxygen
  - Assess vitals
AUTOMATED EXTERNAL DEFIBRILLATION - AED

- The Chain of Survival
  - Early access
  - Early CPR
  - Early defibrillation
  - Early ACLS
AUTOMATED EXTERNAL DEFIBRILLATION

Implementation of early defibrillation programs increases survival outcomes
AUTOMATED EXTERNAL DEFIBRILLATORS

- Fully automated
  - Operates without any action once in place
- Semi-automated
  - Requires EMT to utilize action buttons
RHYTHMS

- AED evaluates and confirms shockable rhythm
- High accuracy
- Dependent on properly charged batteries
INAPPROPRIATE SHOCKS

- Human error
- Mechanical error
SHOCKABLE RHYTHMS

- Ventricular fibrillation
- Ventricular tachycardia
  - (Without a Pulse only for AEDs)
AEDs do not determine if the patient is in cardiac arrest or not
  - they only determine whether to shock based upon the patient’s heart rhythm
  - AEDs are also proven to be quicker at delivering the first shock than manual defibrillators.

Stop CPR, BVM or any pt contact during analysis or when shocking
  - Prior to shocking a patient using the AED ensure that no one is touching the patient or anything that might conduct the shock that is in contact with the patient, such as metal.
AED - CARDIC PT

- Take BSI techniques
- Stop CPR - verify pulselessness
- Resume CPR
- REMOVE ANY NITRO PATCHES
- If a patient has a transdermal medication patch on his/her chest remove it and wipe the area prior to delivery of a shock.
  - For a pacemaker, do not put the AED pads directly over the device.
  - Place them at least 1 inch away.
  - Moving hair away can be accomplished by removing the electrodes quickly from the chest or using a sterile razor.
- Attach device to patient
  - White to the Right
  - Red to the Ribs

- Turn on power
- Stop CPR and clear patient
- Initiate rhythm analysis
If AED advises shock

- Deliver shock and resume CPR.
- Newer AED's follow AHA 2010 guidelines. Older models may not.

Do not defibrillate on top of a pacemaker - keep 2-3” clearance.
- If pulse, check ABC’s
- Airway Clear?
  - If breathing adequately - rate?
  - Provide 100% oxygen and transport
  - If not breathing adequately, ventilate with 100% oxygen and transport
- **If no pulse, resume CPR for two minutes**

  - Start with Chest Compressions, then breaths. (30:2)
    - Transport

- NOTE: Do not touch patient during rhythm analysis or shock delivery

- Follow manufacturer’s recommendations on when and how often to shock and/or perform CPR.
ON-GOING TRANSPORT

- Unconscious, reassess ABC’s every 30 seconds
- If patient becomes pulseless, stop the rig
  - Cannot analyze while in motion
  - Not safe to defibrillate in moving ambulance
Monitor patient and do the following:

- Continue chest compressions if required
- Ventilate with oxygen, advanced airways, and suctioning
- Leave the AED in place

**Contact ALS - Consider pronouncement according to protocol**
The Care and Feeding of DEFIBRILLATORS

- Regular maintenance is necessary
- Daily operator’s shift checklist daily batteries, cables, patches, operation
- Failure is related to improper maintenance, usually battery failure
Summary of Key Issues and Major Changes

American Heart 2010 Guide Lines

CPR CAB sequence – Not to be confused with the ABCs of Patient Assessment
For the last 50 years, American Heart Association has taught A–B–C Airway, Breathing, and chest Compressions.

Now, A–B–C has changed to C–A–B: Chest Compressions, open the Airway, and give 2 rescue Breaths.
Change in CPR Sequence: C-A-B Rather Than A-B-C

The sequence of adult CPR began with opening of the airway, checking for normal breathing, and then delivery of 2 rescue breaths followed by cycles of 30 chest compressions and 2 breaths.

Initiate chest compressions before ventilations.

By changing the sequence to C-A-B, chest compressions will be initiated sooner and the delay in ventilation should be minimal (ie, only the time required to deliver the first cycle of 30 chest compressions, or approximately 18 seconds.
Elimination of “Look, Listen, and Feel for Breathing”

“Look, listen, and feel” was used to assess breathing after the airway was opened.

“Look, listen, and feel” was removed from the CPR sequence. After delivery of 30 compressions, the lone rescuer opens the victim’s airway and delivers 2 breaths.

...Breathing is briefly checked as part of a check for cardiac arrest; after the first set of chest compressions, the airway is opened, and the rescuer delivers 2 breaths.
Chest Compression Rate: At Least 100 per Minute

Compress at a rate of about 100/min.

*It is reasonable for lay rescuers and healthcare providers to perform chest compressions at a rate of at least 100/min.*

The number of chest compressions delivered per minute during CPR is an important determinant of return of spontaneous circulation (ROSC) and survival with good neurologic function... An inadequate compression rate or frequent interruptions (or both) will reduce the total number of compressions delivered per minute.
Chest Compression Depth

The adult sternum should be depressed approximately 1.5 to 2 inches (approximately 4 to 5 cm).

The adult sternum should be depressed at least 2 inches (5 cm).

Rescuers often do not compress the chest enough despite recommendations to “push hard.” In addition, the available science suggests that compressions of at least 2 inches are more effective than compressions of 1 inch.
Changes in Child / Pediatric CPR
Change in CPR Sequence (C-A-B Rather Than A-B-C)

Cardiopulmonary resuscitation was initiated with opening of the airway and the provision of 2 breaths before chest compressions.

Initiate CPR for infants and children with chest compressions rather than rescue breaths (C-A-B rather than A-B-C). CPR should begin with 30 compressions (any lone rescuer) or 15 compressions (for resuscitation of infants and children by 2 healthcare providers) rather than with 2 ventilations. For resuscitation of the newly born, see the Neonatal Resuscitation section.

2005 (Old)
Most pediatric cardiac arrest victims do not receive any bystander CPR, so any strategy that improves the likelihood of bystander action may save lives.

2010 (New)
Elimination of “Look, Listen, and Feel for Breathing”

“Look, listen, and feel” was used to assess breathing after the airway was opened.

“Look, listen, and feel” was removed from the sequence for assessment of breathing after opening the airway.

With the new chest compression–first sequence, CPR is performed if the infant or child is unresponsive and not breathing (or only gasping) and begins with compressions (C-A-B sequence).
Defibrillation and Use of the AED in Infants

2005 (Old)

Data have shown that AEDs can be used safely and effectively in children 1 to 8 years of age. However, there are insufficient data to make a recommendation for or against using an AED in infants <1 year of age.

2010 (New)

For infants, a manual defibrillator is preferred to an AED for defibrillation. If a manual defibrillator is not available, an AED equipped with a pediatric dose attenuator is preferred. If neither is available, an AED without a pediatric dose attenuator may be used.

Newer case reports suggest that an AED may be safe and effective in infants. Because survival requires defibrillation when a shockable rhythm is present during cardiac arrest, delivery of a high-dose shock is preferable to no shock. Limited evidence supports the safety of AED use in infants.