DEFIBRILLATION

Objectives

To understand:

- What is meant by defibrillation
- The indications for defibrillation
- How to deliver a shock safely using:
  - a manual defibrillator
  - an automated external defibrillator (AED)

Mechanism of defibrillation

- Definition

  "The termination of fibrillation or absence of VF/VT at 5 seconds after shock delivery"
- Critical mass of myocardium depolarised
- Natural pacemaker tissue resumes control

Defibrillation

Success depends on delivery of current to the myocardium

Current flow depends upon:

- Electrode position
- Transthoracic impedance
- Energy delivered
- Body size

Transthoracic Impedance

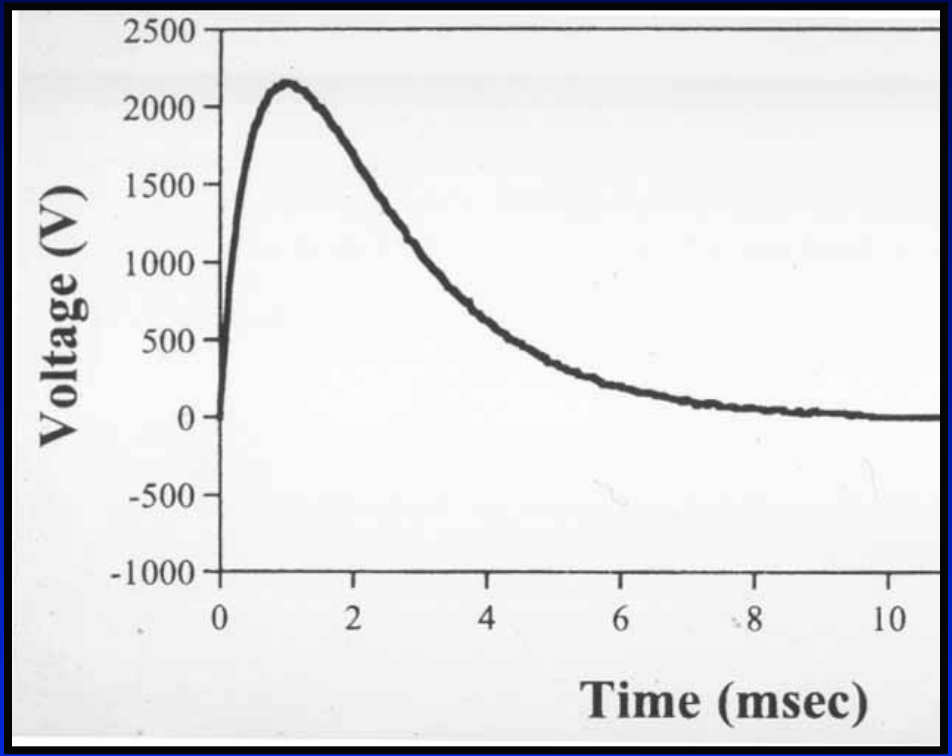
Dependent upon:

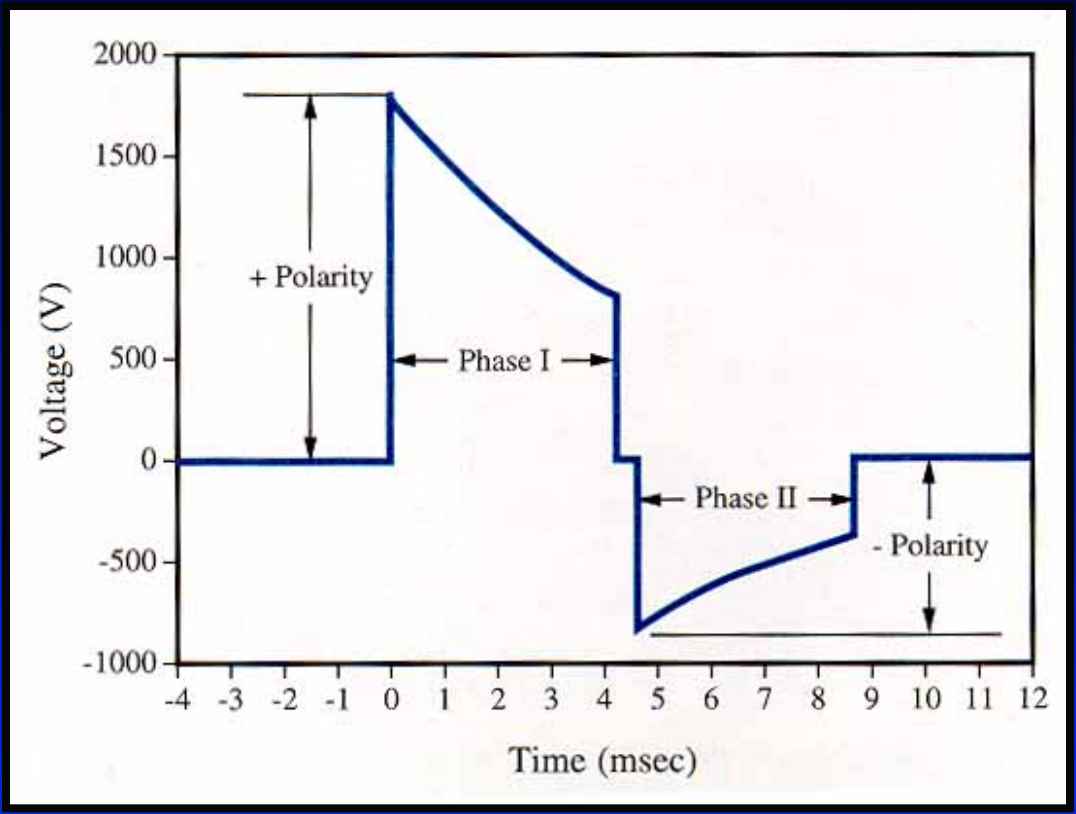
- Electrode size
- Electrode/skin interface
- Contact pressure
- Phase of respiration
- Sequential shocks

Defibrillators

- Design
  - Power source
  - Capacitor
  - Electrodes
- Types
  - Manual
  - Automated
  - Monophasic or Biphasic waveform

Defibrillator waveforms





Damped Monophasic

Truncated Biphasic

Biphasic Defibrillators

- Require less energy for defibrillation
  - smaller capacitors and batteries
  - lighter and more transportable
- Biphasic shocks have higher success rate for terminating VF/VT than monophasic shocks

Goals for in-hospital defibrillation

- “Healthcare providers with a duty to perform CPR should be trained, equipped, and authorised to perform defibrillation”
- “The goal should be a collapse-to-shock interval of less than 3 minutes in all areas of the hospital”

Automated external defibrillators

- Analyse cardiac rhythm
- Prepare for shock delivery
- Specificity for recognition of shockable rhythm close to 100%

Automated external defibrillators

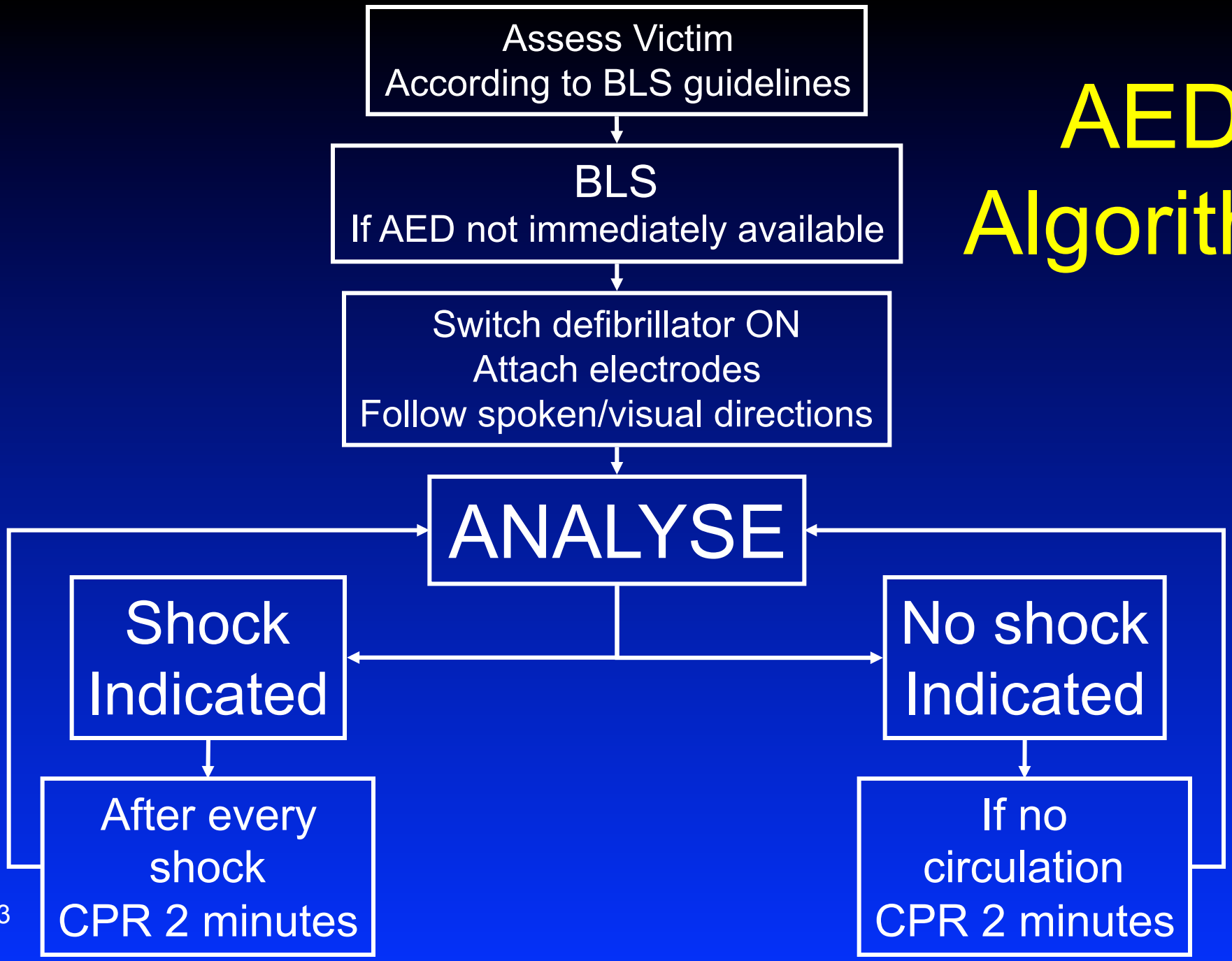
Advantages:

- Less training required
  - –no need for ECG interpretation
- Suitable for “first-responder” defibrillation
- Public access defibrillation (PAD) programs

Automated External Defibrillation

- Attach adhesive electrodes
- Follow audible and visual instructions
- Automated ECG analysis - stand clear
- Charges automatically if shockable rhythm
- +/- manual override

AED Algorithm



Manual Defibrillation

Relies upon:

- Operator recognition of ECG rhythm
- Operator charging machine and delivering shock
- Can be used for synchronised cardioversion

Defibrillator Safety

- Never hold both paddles in one hand
- Charge only with paddles on casualty's chest
- Avoid direct or indirect contact
- Wipe any water from the patient's chest
- Remove high-flow oxygen from zone of defibrillation

Shock Energy

- Shocks energy 200 J, if biphasic
- Shocks energy 360 J, if monophasic

Manual Defibrillation (1)

- Diagnose VF/VT from ECG ***and*** signs of cardiac arrest
- Select correct energy level
- Charge paddles on patient
- Shout “stand clear”
- Visual check of area
- Check monitor
- Deliver shock

Synchronised cardioversion

- Convert atrial or ventricular tachyarrhythmias
- Shock synchronised to occur with the R wave
- Short delay after pressing discharge buttons - keep defibrillator electrodes in place
- Conscious patients: sedation or anaesthesia
- Check mode if further shock/s required

Pulseless VT is treated with an unsynchronised shock using the VF protocol

Any Questions?

Summary

- Defibrillation is the only effective means of restoring cardiac output for the patient in VF or pulseless VT
- Defibrillation must be performed promptly, efficiently and safely
- New technology has improved machine performance and simplified use