American Heart Association
Fighting Heart Disease and Stroke

Case 3

Shock-Resistant VF/Pulseless VT

Case 3

A 60-year-old ECG technician collapses while attaching a 12-lead ECG to a patient. The technician has not complained of discomfort before her collapse. A colleague begins CPR immediately. Describe how you would direct the management of this patient.

Learning Objectives

Describe the steps of the **ACLS Approach**.

- Describe the ***Primary ABCD Survey*** used to assess and give initial treatment (CPR and initial defibrillation shocks) to a victim who is unresponsive and breathless, with no signs of circulation.
- Describe how with unsuccessful attempts at defibrillation you immediately apply the ***Secondary ABCD Survey*** and provide advanced management of the airway, effective ventilation, continued chest compressions, and appropriate IV drugs—all integrated with repeated attempts to defibrillate.

Learning Objectives

The successful ACLS provider should be able to

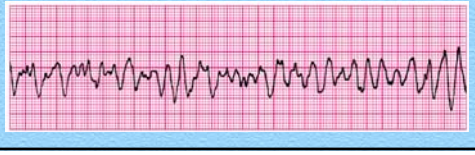
- Manage 1st 10 minutes of a witnessed VF/pulseless VT arrest (guided by Primary and Secondary ABCD Surveys)
- Initiate CPR if not already started
- Use an AED or manual defibrillator when available
- Assign resuscitation team roles as more ACLS providers become available:
  - 2nd rescuer: helps with CPR
  - 3rd rescuer: assumes airway control
  - 4th rescuer: obtains IV access
- Select appropriate adrenergic agents and antiarrhythmics, other agents

Skills to Learn

- At the end of Case 3 the ACLS provider should be able to demonstrate
  - Correct attachment of ECG monitor leads
  - Defibrillation with conventional defibrillator
  - Administration of medications by tracheal tube
  - Delivery of IV fluids and medications
  - Ability to provide direction to resuscitation team

New Rhythms to Learn

- At the end of Case 3 the ACLS provider should be able to recognize:
  - Ventricular fibrillation (VF)
  - Ventricular tachycardia (VT)
  - ECG artifact that looks like VF



Drugs to Learn

Describe *indications*, *contraindications*, *dosages* for:

- Epinephrine
- Vasopressin
- Amiodarone
- Lidocaine
- Magnesium sulfate
- Procainamide
- Sodium bicarbonate

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Primary ABCD Survey

Focus: Basic CPR and Defibrillation

A = Airway: open the airway

B = Breathing: check breathing, provide positive-pressure ventilations

C = Circulation: check circulation, give chest compressions

D = Defibrillation: assess for and shock VF/pulseless VT

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VF/Pulseless VT

Primary ABCD Survey

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

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Rhythm after first 3 shocks?

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What's New in Defibrillation?

(Walcott et al. *Circulation.* 1998;98:2210-2215)

A= monophasic (damped sinusoidal [Edmark])
B= biphasic (quasisinusoidal [Gurvich])
C= biphasic (truncated exponential)

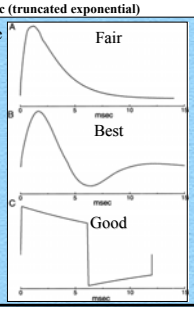
Biphasic waveform defibrillators: great promise

Different waveforms: acceptable

- Most common: monophasic (DpSn) (A)
- Seldom used: monophasic (TrEx)
- Multiple new brands: biphasic (B and C)

All are currently acceptable

New waveforms: "OK" if supported by human clinical trials



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Secondary ABCD Survey

A = Airway: place airway device as soon as possible

B = Breathing: confirm proper placement

B = Breathing: confirm proper placement by 2nd method

- End-tidal CO_2 and/or
- Esophageal detector devices

B = Breathing: prevent airway device dislodgment:

- Use purpose-made tube holder
- Proven tape-and-tie or other technique

B = Breathing: monitor oxygenation and ventilation

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Secondary ABCD Survey (cont'd)

C = Circulation: establish IV access

C = Circulation: identify rhythm

C = Circulation: give rhythm- and condition-appropriate drugs

D = Differential Diagnosis: search for and treat identified reversible causes

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VF/Pulseless VT (cont'd)

Persistent or recurrent VF/VT

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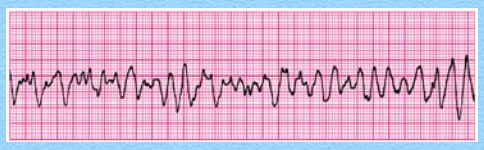
Secondary ABCD Survey

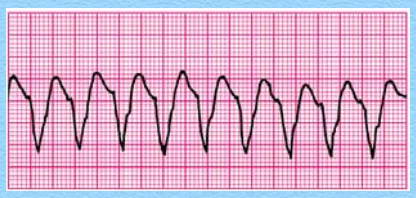
Focus: *more advanced assessments and treatments*

- **A** **Airway**: place airway device as soon as possible
- **B** **Breathing**: confirm airway device placement by exam plus confirmation device
- **B** **Breathing**: secure airway device; purpose-made tube holders preferred
- **B** **Breathing**: confirm effective oxygenation and ventilation
- **C** **Circulation**: establish IV access
- **C** **Circulation**: identify rhythm → monitor
- **C** **Circulation**: administer drugs appropriate for rhythm and condition
- **D** **Differential Diagnosis**: search for and treat identified reversible causes

Ventricular Fibrillation



Ventricular Tachycardia



Shock-Resistant VF/Pulseless VT

- Does patient show ***persistent*** or ***recurrent*** VF/VT?
- After IV is started: ***vasopressin*** or ***epinephrine***?
- Consider antiarrhythmics: use ***amiodarone***? ***lidocaine***? ***procainamide***? ***magnesium***?

VF/Pulseless VT (cont'd)

?

→ • ***Epinephrine*** 1 mg IV push, repeat every 3 to 5 minutes
or
• ***Vasopressin*** 40 U IV, **single dose**, 1 time only

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Resume attempts to defibrillate
1 x 360 J (or equivalent *biphasic*) within 30 to 60 seconds

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Consider antiarrhythmics:
- ***Amiodarone*** (IIb for persistent or recurrent VF/pulseless VT)
- ***Lidocaine*** (Indeterminate for persistent or recurrent VF/pulseless VT)
- ***Magnesium*** (IIb if known hypomagnesemic state)
- ***Procainamide*** (Indeterminate for persistent VF/pulseless VT; IIb for recurrent VF/pulseless VT)

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Resume attempts to defibrillate

VF/Pulseless VT (cont'd)

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Resume attempts to defibrillate

VF/Pulseless VT:
Return of Spontaneous Circulation

Let Secondary ABCD Survey Guide Postresuscitation Care

- **A** = maintain open, protected airway
- **A** = stabilize airway devices during transport; avoid dislodgment
- **B** = monitor ventilation (CO_2) and oxygenation (O_2)
- **C** = monitor rhythm; give rhythm-appropriate medications
- **D** = if defibrillation occurred after use of antiarrhythmic agent, then continue maintenance infusion of same agent
- **C** = to maintain BP and HR: use **dopamine** or **dobutamine** (avoid epinephrine, isoproterenol, norepinephrine)