

Understanding Defibrillators



Lecturer: Dr Salma Al Qazzaz

Medical instrumentation

4th stage Medical physics students

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Introduction to Defibrillators

Definition and Uses

- A defibrillator is a device that delivers an electric shock to the heart to restore its normal rhythm.
- Primary uses include treating cardiac arrest and certain types of irregular heartbeats.



Why Use Defibrillators?

1

Defibrillators are essential in restoring normal heart rhythm during cardiac arrest.

2

They play a crucial role in increasing the survival rate of individuals experiencing sudden cardiac arrest.

3

Using defibrillators promptly can prevent irreversible brain damage and improve overall outcomes in emergency situations.

Cardiac Arrest & The Role of Defibrillators

Understanding Cardiac Arrest

Cardiac arrest occurs when the heart suddenly stops beating.

Immediate action is required to prevent death or serious brain damage.

The survival rate decreases by 10% with every minute that passes without defibrillation.

The Role of Defibrillators

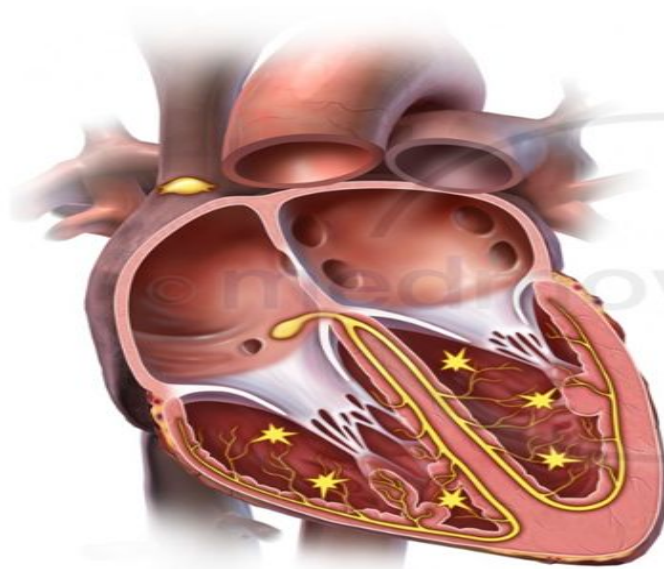
Defibrillators deliver an electric shock to the heart, aiming to restore a normal heartbeat.

They are essential in public places and healthcare settings for immediate response.

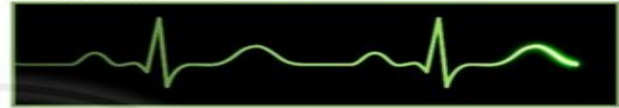
Their use within the first few minutes can dramatically increase survival rates.

Defibrillator requirement

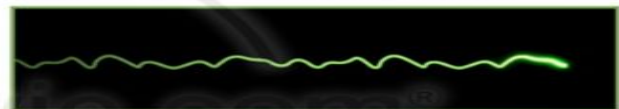
- An asynchronous contraction of the heart muscles causes ventricular fibrillation, a dangerous cardiac emergency.
- Ventricular fibrillation is the cause of the irregularly fast heartbeat.



Normal ECG



Ventricular Fibrillation ECG



Disorganized electrical pulses cause the lower chambers (ventricles) to quiver instead of pumping blood.

If untreated, this can result in sudden cardiac arrest and death.

Arrhythmia Origin = 

- Applying a high-energy shock to the heart can transform ventricular fibrillation into a more efficient rhythm.
- Every muscle fiber in the heart contracts at the same time as a result of this sudden surge.
- The fibers might then start to pulse in response to a typical physiological pacemaker.
- Defibrillators are devices used to deliver shock therapy.

Types of Defibrillators

External Defibrillator

Requires trained medical personnel to analyze heart rhythms and deliver shocks.



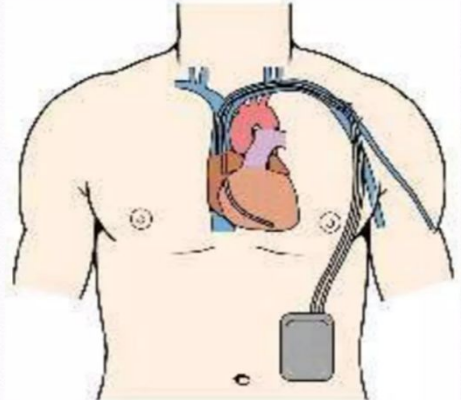
Automated External Defibrillator (AED)

Designed for public use with automated shock delivery after analyzing the heart rhythm.



Implantable Cardioverter Defibrillator (ICD)

Implanted device that monitors heart rhythms and delivers shocks internally.



Components of a Defibrillator

1- Electrodes :

The parts of the defibrillator that deliver the electric shock to the patient's chest to restore normal heart rhythm.

2- Energy Source:

The power supply that charges the defibrillator to deliver the necessary electrical energy to the patient.

3- Control Panel:

The interface on the defibrillator that allows the user to adjust settings, initiate shocks, and monitor the device's status.

4- Monitoring Display:

The screen that shows vital information such as heart rhythm, energy levels, and prompts during the defibrillation process.

Basic Operation of Defibrillators

- 1. Charging: Ensure the defibrillator is fully charged to deliver the necessary energy for the shock.
- 2. Electrode Placement: Properly position the electrodes on the patient's chest for effective electrical contact.
- 3. Energy Delivery: Administer the shock through the electrodes to restore the heart's normal rhythm.
- 4. ECG Monitoring: Continuously monitor the patient's electrocardiogram (ECG) to assess the heart's response to the defibrillation.

How Defibrillators Work

Mechanism of Action



- Defibrillators deliver an electric shock to the heart muscle.
- The shock interrupts chaotic electrical activity in the heart, allowing it to reset and resume a normal rhythm.

Post-Defibrillation Care

After Using a Defibrillator

- Ensure the patient's airway is clear and breathing is stable.
- Monitor the patient's vital signs and provide any necessary medical support.

Considerations

- Assess the patient's response to defibrillation and monitor for any potential complications.
- Document the event and communicate effectively with the medical team for continued care.

Risks and Benefits

Benefits

- Immediate life-saving intervention during cardiac arrest.
- Easy to use, even for non-medical personnel in some cases.
- Can significantly increase the chances of survival and recovery in critical situations.

Risks

- Potential for causing skin burns if not used correctly.
- May not be effective if the underlying cause of cardiac arrest is not addressed.
- Could lead to complications in patients with certain heart conditions.