

Wearable Cardioverter Defibrillator (WCD)

Sudden cardiac arrest (SCA) can happen without warning.

SCA occurs when there is a problem with the heart's electrical system. The electrical system directs the heart to relax (fill with blood) and contract (pump blood). If the electrical impulses are chaotic or too fast, the heart cannot pump blood effectively. When this happens, oxygen-rich blood doesn't reach the brain, which leads to loss of consciousness. If the heart doesn't receive an internal or external shock to restore normal rhythm and pumping, death will occur within minutes.

Treatments

Ventricular Fibrillation (VF) is an abnormal rhythm in the ventricles of the heart. When VF occurs, a defibrillator, which sends an electrical current to the heart, is used to re-start a normal heart

rhythm. Defibrillators can be external (outside the body) or internal (inside the body).

Automated External Defibrillator

An automated external defibrillator (AED) is an external system that provides an electrical current to restore a normal rhythm. The external shock can be sent to the heart through pads placed on the chest. Wires connect the pads to a small computer that determines whether someone is experiencing a life-threatening arrhythmia, such as VF. If so, the computer will give a voice prompt alerting the person operating the AED that a shock should be delivered. AEDs are available in some public places such as schools, malls, airports, and stadiums. However, not every public space has an AED. Because

this is an external device, a bystander is needed to operate the AED.

Implantable Cardioverter-Defibrillator

A shock can also be delivered to the heart from inside the body by an implantable cardioverter defibrillator (ICD). An ICD has two parts: a generator and one or more "leads" (wires). The generator is a small, thin computer that is surgically placed under the skin or muscle near the collarbone. The lead is threaded through a vein in the upper chest and then anchored to the heart. The generator monitors the heart's rhythm and rate. If the heartbeat is too fast or chaotic, it will deliver a jolt of electricity through the lead to the heart.



Wearable Cardioverter Defibrillator (WCD)

In the past, an external shock could be sent to the heart only by a device, such as an AED, that was brought to the patient.

Today, there is also an option of a Wearable Cardioverter Defibrillator (WCD), which can be used by people felt to be at higher than normal risk for VF, but who may not have an ICD for various reasons.

The WCD is a non-invasive, external defibrillator that is used to prevent sudden cardiac death. The WCD has two main pieces: 1. A light-weight vest that is worn under regular clothes, and 2. A small, portable unit that includes a recorder and a generator. Wires covered by tubes connect the electrodes inside the vest to the portable unit, which is carried in a fanny pack or shoulder bag.

How Does the WCD Work?

Electrodes inside the vest continuously monitor the heart rate and rhythm. The data is sent to the portable unit. If the recorder in the portable unit detects a potentially life-threatening arrhythmia, the WCD sounds a siren alarm and the vest vibrates. The alarm and vibration are part of the WCD's "consciousness test." If the patient is conscious, then SCA has not occurred and a shock is not needed. The patient turns off the alarm and diverts the shock by pressing and holding two buttons.

If the patient doesn't respond to the alarm, the WCD assumes the patient is in SCA. The generator inside the portable unit then delivers an electrical current. The electrical current moves from the portable unit through the tubes to the electrodes inside the vest. In this way, the heart is "shocked." It usually takes less than a minute from the start of SCA to delivery of a shock. If the patient does not respond to the first shock, the WCD will deliver up to 5 shocks to the heart to restore normal rhythm.

What Kind of Power Does the WCD Use?

The WCD has a special battery that powers the portable unit (recorder and generator). The WCD comes with two batteries: one is placed within the portable unit, while the other serves as a back up and can be charged in a normal electrical socket in the wall when it is not in the portable unit.

Can the WCD be Removed?

Because the WCD provides protection for SCA, it should only be removed for brief periods, such as while showering or bathing. Otherwise, it should be worn continuously, even during sleep.

Determining the Appropriate Treatment

Patients who are at risk for SCA should discuss treatment options with a doctor who specializes in heart rhythm disorders (an electrophysiologist). ICDs are recommended for patients with high, continuing risk for SCA. However, not all patients can have an ICD implanted, or, in some cases, implantation of an ICD has to be delayed. In some patients, the risk of SCA is temporary. In these instances, the electrophysiologist may prescribe a WCD as part of the continuum of care for patients at risk for sudden cardiac death.