10-1-2011

Ventricular Fibrillation

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Ventricular fibrillation

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October 14 2011

Ventricular fibrillation (VF) is the most commonly identified arrhythmia in patients in cardiac arrest. VF is a disorganized ventricular rhythm with a poorly defined QRS complex. Those with this condition demonstrate an unsteady baseline and a very irregular QRS segment with varying shapes and sizes. Unless corrective measures are taken promptly, VF is malignant and usually ends in death within minutes.

Cardiovascular events, including sudden cardiac death (SCD) from VF, occur most frequently in the morning, and the number of SCDs appears to spike during the winter months. VF is most often associated with coronary artery disease (CAD) and is often preceded by rapid ventricular tachycardia. VF can occur during any of the following conditions or situations: antiarrhythmic drug administration, hypoxia, ischemia, atrial fibrillation, very rapid ventricular rates during preexcitation syndrome, and electrical shock administered during cardioversion.

Symptoms and risk factors Patients at risk for VF may have symptoms of chest pain, fatigue, or palpitations as well as other nonspecific complaints. Risk factors related to CAD and subsequent MI and ischemic cardiomyopathy are also important and include a family history of premature CAD, smoking, dyslipidemia, hypertension, diabetes, obesity, and sedentary lifestyle.

Treatment Emergency treatment of patients with VF is with direct current electrical defibrillation. The number of survivors of cardiac arrest has increased with widespread use of automatic external defibrillators (AEDs) and increasing numbers of clinicians trained in cardiopulmonary resuscitation (CPR). In the event of cardiac arrest, the immediate execution of ACLS guidelines is indicated. Successful defibrillation largely depends on the duration between the onset of VF and the start of defibrillation.

ECG CHALLENGE

While shopping at a local hardware store, an obese 55-year-old male collapsed. The patient had no puls and was not breathing. A bystander started CPR and called 911. When EMS arrived at the scene, the defibrillator was placed on the man. Below is the rhythm strip that was obtained.
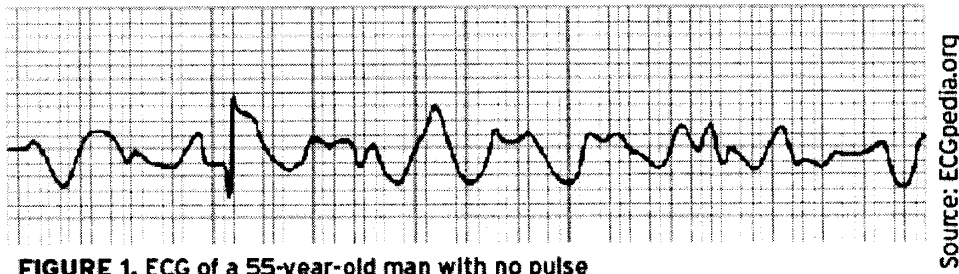

FIGURE 1. ECG of a 55-year-old man with no pulse

Using the stepwise approach to analyze the ECG, we observe the following:

1. Is the heartbeat **regular**? No.
2. What is the heart **rate**? Find a QRS near a dark line. There is no discernable QRS segment.
3. There is no **P wave** preceding the QRS.
4. With no P wave, there is **no PR interval**.
5. The **QRS complexes** are very irregular with varying shapes and sizes.
6. There are **no ST segments** or **T waves**.
7. There are **no U waves**.

The ECG confirmed ventricular fibrillation. This patient requires immediate defibrillation and implementation of the ACLS protocol. If this rhythm is present and the patient is responsive, check the leads of the ECG machine.

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