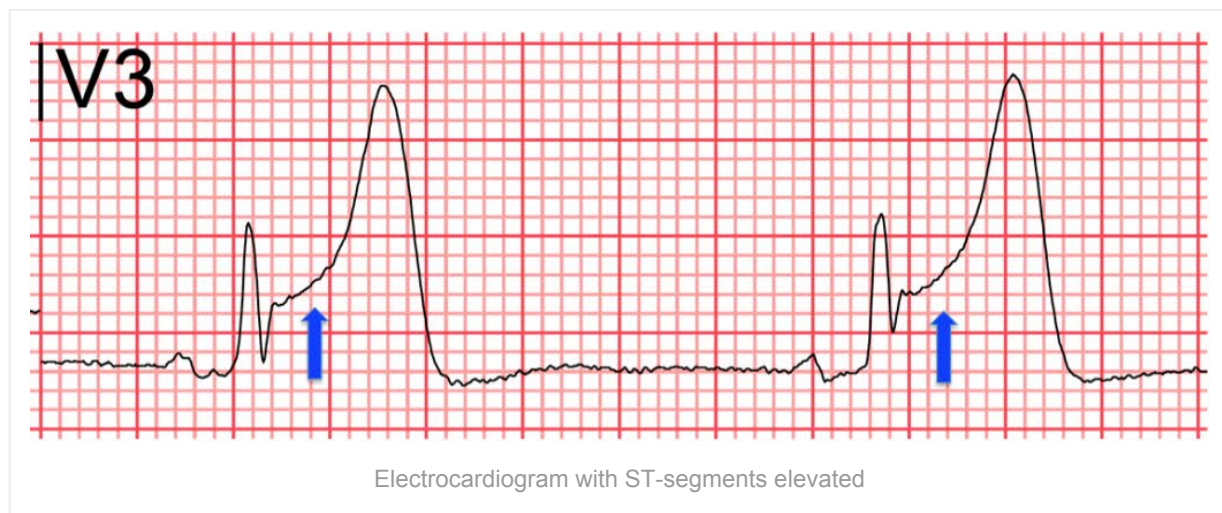




What is a STEMI?

ST-Elevation Myocardial Infarction (STEMI) is a very serious type of heart attack during which one of the heart's major arteries (one of the arteries that supplies oxygen and nutrient-rich blood to the heart muscle) is blocked. [ST-segment elevation](#) is an abnormality detected on the 12-lead ECG.



It is a profoundly life-threatening medical emergency and usually associated with a disease process called atherosclerosis (coronary artery disease). You can find a useful [video](#) about heart disease and heart attacks at the Khan Academy.

Patients experiencing acute STEMI are at risk for developing life-threatening arrhythmias like ventricular fibrillation which causes sudden cardiac arrest, sometimes referred to as a “massive heart attack”. These patients require cardiopulmonary resuscitation (CPR) and defibrillation — a “shock” to restore a normal heart rhythm.

Signs and symptoms of a STEMI include:

- Chest pain or discomfort

Shortness of breath

- Dizziness or light-headedness
- Nausea or vomiting
- Diaphoresis (sweatiness) unexplained by ambient temperature
- Palpitations (uncomfortable awareness of the heart beat)
- Anxiety or a feeling of impending doom

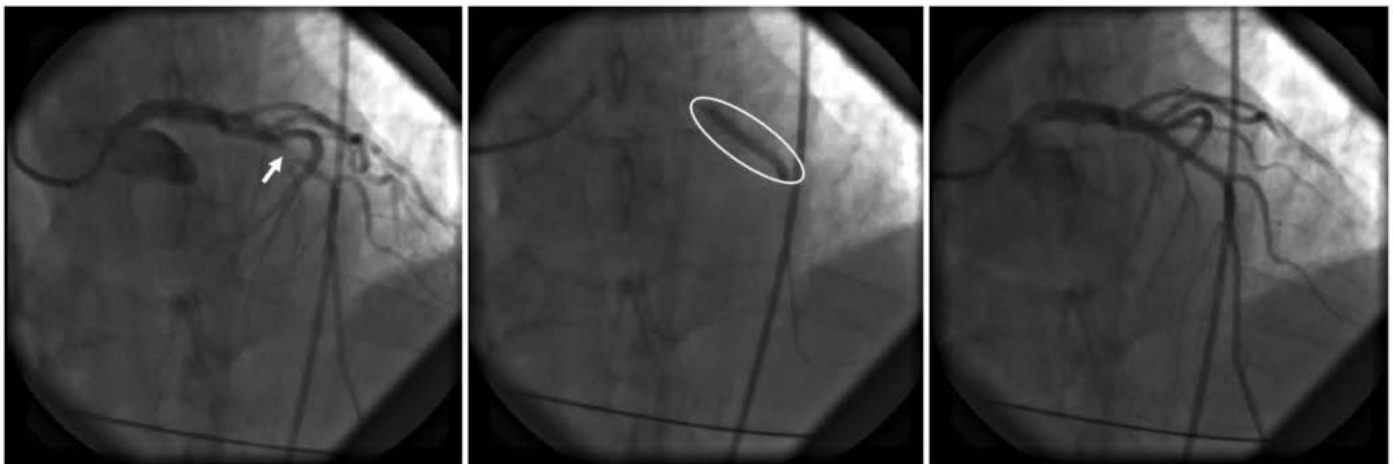
Some patients experience denial and dismiss their symptoms as heartburn or indigestion. When this happens they may delay seeking care for hours.

STEMI can be treated with “clot-busting” drugs called thrombolytics (also called fibrinolytics) or with a primary percutaneous coronary intervention (PCI) in a cardiac catheterization lab. This procedure is also referred to as angioplasty or stenting.

There is a direct relationship between the amount of time a heart artery is blocked and the severity of the heart attack and odds of survival. Cardiologists have a mantra that “time is muscle” to express the importance of early treatment.

One of the quality measures for STEMI care is the “**door-to-balloon**” (D2B) time or the amount of time it takes to successfully re-open the occluded artery. The clock starts when the patient arrives at the hospital and stops when the balloon is inflated in the cardiac cath lab (which is part of the procedure).

In recent years the American Heart Association has encouraged a new quality measure called “first medical contact-to-balloon”. The goal is to have the procedure completed within 90 minutes of EMS arriving at the patient’s side. Some argue that the clock should start with the 9-1-1 call.



Angiograms showing a coronary artery before and after angioplasty or “stenting”

There may be times when coronary artery disease is so severe that angioplasty is not successful. On those occasions the patient may require coronary artery bypass graft (CABG) — pronounced “cabbage” — also referred to generically as “open heart surgery”. When someone says “triple bypass” it means that all 3 of the heart’s main arteries required surgical correction or “revascularization.”

The 12-lead electrocardiogram or “ECG” is an important diagnostic test that is used to screen patients

who present with signs and symptoms of a possible heart attack. EMTs and paramedics may perform this test in the patient's home. They are looking for ST-segment elevation on the 12-lead ECG.

In many systems the ECG will be transmitted to the hospital so that physicians can read the ECG while the patient is still out in the field. Interpreting an ECG can be difficult because a heart attack is not the only condition that can cause ST-segment elevation. That's the **reason** we started ECG Medical Training!

"Code STEMI" is a phrase used in many EMS systems and emergency departments that essentially means "we have identified a patient experiencing an ST-elevation myocardial infarction (STEMI) and we are formally requesting that a life-saving team and equipment be assembled immediately."

On nights, weekends or holidays this may mean calling in the interventional cardiologist and cath lab personnel in from home (while the STEMI patient is still in the field with EMTs and paramedics). Other times it means bypassing the closest hospital for the most appropriate hospital (one capable of prompt, expertly performed primary PCI).



Clinical champions from Duke University and AHA Mission: Lifeline — our founder Tim Henry, M.D. is on the far-right

Regionalized systems of care for acute STEMI have been developing all over the United States, Europe, and other parts of the world. Organizations like the American College of Cardiology's "Door-to-Balloon Alliance" and the American Heart Association's "Mission: Lifeline" have been helping to promote best practices in STEMI care which has resulted in improved outcomes for patients experiencing this life-threatening emergency.