

Lesson ACLS-Traditional 7A

Learning Station: Acute Coronary Syndromes— Video Discussion 1

30 minutes

Learning Objective

- Discuss early recognition and management of acute coronary syndromes, including appropriate disposition

Instructor Tips

- Allow students to work together to answer questions and allow for self-discovery
- When summarizing what the video has covered, be sure to allow students to lead this discussion at times by asking for what they observed/learned during the video segment
- Students are often hesitant to answer questions at first. Before this lesson, write down additional leading questions to help prompt discussion. These video-based lessons are designed to allow you to challenge students, whether they are novice or experienced providers. Adjust the difficulty of your questions based on the knowledge level of the students in the course



Play ACS Video

- Address what students will learn from the video
- Play the video (automatically pauses)
 - Address pause 1 questions 1, 2, and 3
- Refer to Part 2 of the provider manual
- Lead the discussion with the group



Discussion

- Advise students to refer to Part 2, ACS in the *ACLS Provider Manual*. Capture key concepts from the discussion



Pause 1

1. What is the difference between stable angina, unstable angina, and myocardial infarction?

Angina is a tightness or discomfort (not a sharp pain) in the center of the chest and/or the surrounding area. The onset of discomfort associated with stable angina is often predictable; in many cases, it begins during exertion or with strong emotions. It is a symptom, not a diagnosis of coronary artery disease or acute ischemic symptoms. While often associated with myocardial ischemia, chest discomfort may have other causes. In the presence of coronary disease, the most common cause of angina is an obstructing or disrupted coronary plaque.

Angina may be stable and predictably produced by exertion or emotion. At rest, a fixed coronary plaque generally allows enough blood supply. However, blood flow is insufficient during stress. When a plaque becomes unstable, ACS occurs. Due to a sudden reduction in the cross-sectional area of the blood vessel, blood flow is insufficient. This causes a clinical presentation called *unstable angina*, which is characterized by prolonged anginal pain that occurs at rest or with minimal effort. When the lack of blood flow is severe enough to cause damage to the heart muscle, a myocardial infarction is said to occur. This event often correlates with angina episodes of 15 minutes or longer.

2. This patient is having chest discomfort. What are the possible causes of chest discomfort that may be life threatening?

Although most *life-threatening* chest discomfort is due to ACS, the initial emergency diagnosis may include several other disorders. When a diagnosis of ACS is uncertain, the following possible diagnoses should be considered in the initial evaluation as well as the continuing assessment:

- Aortic dissection
- Pulmonary embolism
- Acute pericarditis with effusion and tamponade
- Spontaneous pneumothorax
- Esophageal rupture

3. What are the classic symptoms of acute ischemic chest discomfort?

The predominant symptom in most patients with ischemic syndromes is chest discomfort. This discomfort is often not described as a pain. Brief episodes of chest discomfort may be due to ischemia and may or may not progress to infarction. However, when symptoms are constant (ie, last for more than 15 to 20 minutes), myocardial infarction may be present. Symptoms suggestive of ACS include

- Uncomfortable pressure, fullness, squeezing, or pain in the center of the chest lasting several minutes (infarction: usually more than 15 minutes)
- Pain spreading to the shoulders, neck, arms, or jaw, or pain in the back or between the shoulder blades
- Chest discomfort with light-headedness, fainting, sweating, or nausea
- Shortness of breath with or without chest discomfort
- Denial that they are having chest pain/discomfort and minimizing severity

Lesson ACLS-Traditional 7B

Learning Station: Acute Coronary Syndromes— Video Discussion 2



Play ACS Video

- Address what students will learn from the video
- Play the video (automatically pauses)
 - Address pause 2 questions 1, 2, and 3
- Refer to Part 2 in the provider manual
- Lead the discussion with the group



Discussion

- Advise students to refer to Part 2, ACS in the *ACLS Provider Manual*. Capture key concepts from the discussion



Pause 2

1. Half of ACS patients do not arrive at the hospital by EMS.

Why is early EMS dispatch important for patients with ACS?

Patients with a STEMI have a complete occlusion of a coronary artery. Early opening of the artery reduces mortality and the size of infarction. In many cases, EMS can begin symptom-stabilizing care before the patient arrives at the hospital, which will permit earlier reperfusion therapy. *Early opening of the artery reduces mortality and the size of infarction.* Patients arriving by EMS receive earlier reperfusion. EMS providers should consider the risk of VF in the early hours after a STEMI.

What are the most important components of a community ACS recognition program?

ACS is the most common cause of cardiac arrest in adults. Every community should develop a program to respond to cardiac arrest and identify patients with possible ACS. Components of this program include

- Recognizing symptoms of ACS
- Activating the EMS system
- Providing early CPR
- Providing defibrillation with AEDs available through lay rescuer CPR and defibrillation programs

2. What are the goals of therapy for patients with ACS?

Improving systems of care enables early initiation of reperfusion therapy for patients with possible ACS and increases the likelihood of target goal achievement. These goals (discussed in detail in the ACS video) are

- Relief of ischemic chest discomfort
- Prevention of major adverse cardiac events, such as death, nonfatal myocardial infarction (MI), and the need for postinfarction urgent revascularization

- Treatment of acute, life-threatening complications of ACS, such as VF/pulseless VT, symptomatic bradycardia, and unstable tachycardia

Reperfusion therapy opens an occluded coronary artery with either drugs or mechanical means. "Clot buster" drugs are called *fibrinolytics*—a more accurate term than *thrombolytics*. Percutaneous coronary intervention (PCI) is a procedure used to open blocked or narrowed coronary (heart) arteries. PCI, performed in the heart catheterization suite following coronary angiography, allows balloon dilation and/or stent placement for an occluded coronary artery. PCI performed as the initial reperfusion method is called primary PCI.

3. What role does aspirin play in ACS? What are the indications and contraindications?

The most common cause of ACS is the rupture of a lipid-laden plaque with a thin cap. After rupture, a monolayer of platelets covers the surface of the ruptured plaque (platelet adhesion). Additional platelets are recruited (platelet aggregation) and activated. Aspirin irreversibly binds to platelets and partially inhibits platelet function.

Studies have shown that aspirin reduces mortality during MI. The recommended dose is 162 to 325 mg. Aspirin is indicated in all patients with possible ACS.

Contraindications include true aspirin allergy and recent or active gastrointestinal bleeding.

Lesson ACLS-Traditional 7C

Learning Station: Acute Coronary Syndromes— Video Discussion 3



Play ACS Video

- Address what students will learn from the video
- Play the video (automatically pauses)
 - Address pause 3 questions 1, 2, and 3
- Refer to Part 2 in the provider manual
- Lead the discussion with the group



Discussion

- Advise students to refer to Part 2, ACS in the *ACLS Provider Manual*. Capture key concepts from the discussion



Pause 3

1. **Let's review. What is the initial drug therapy for ACS? We have already discussed aspirin.**

Other initial agents may include oxygen (to keep the saturation 90% or greater), nitroglycerin, and opiates (eg, morphine).

What are the doses and indications/contraindications/cautions for nitroglycerin?

Nitroglycerin is administered via the sublingual route, either in a tablet or spray form. Three doses may be administered after repeating assessments of blood pressure and heart rate. Conditions where nitroglycerin administration should be used with caution or withheld in patients with ACS include

- **Inferior MI and right ventricular (RV) infarction:** Use nitroglycerin with caution in patients with known inferior wall STEMI. For these patients, perform a right-sided ECG to assess the degree of RV involvement. If RV infarction is confirmed by right-sided precordial leads or clinical findings by an experienced provider, nitroglycerin and other vasodilators (morphine) or volume-depleting drugs (diuretics) are contraindicated. Patients with acute RV infarction are very dependent on RV-filling pressures (preload) to maintain cardiac output and blood pressure.
- **Hypotension, bradycardia, or tachycardia:** Avoid use of nitroglycerin in patients with hypotension (systolic blood pressure less than 90 mm Hg), extreme bradycardia (less than 50/min), or marked tachycardia.
- **Recent use of phosphodiesterase inhibitor (often used for erectile dysfunction):** If the patient has recently taken a phosphodiesterase inhibitor (eg, sildenafil or vardenafil within 24 hours; tadalafil within 48 hours), nitrates may cause severe hypotension refractory to vasopressor agents.

2. **What are the possible ECG groups that help triage initial ACS? What are they called?**

Analysis of the ECG ST segment allows triage of ACS patients into 1 of 2 diagnostic and treatment groups: STEMI and NSTEMI-ACS (high-risk unstable angina/non-ST-segment elevation MI and normal or nondiagnostic ECG). (Refer to the ACS Algorithm.)

Why is it recommended that EMS send advance notification of the ECG to the receiving facility?

Time is a critical factor in producing a positive outcome for an ACS patient, especially for STEMI patients. The American Heart Association recommends that EMS systems implement 12-lead ECG programs to assist in the early recognition of those patients who could benefit most from treatment at a specialty cardiac center. EMS providers who lack training in advanced ECG interpretation can still acquire and transmit the 12-lead ECG to the emergency department for interpretation there. With an ECG diagnostic for STEMI, EMS providers should activate the local STEMI response plan at the earliest opportunity.

Early ECG interpretation and notification of the receiving hospital speeds the time to reperfusion therapy, saves heart muscle, and may reduce mortality.

3. Why is STEMI special and the focus of this case?

Reperfusion therapy for STEMI is perhaps the most important advance in the treatment of cardiovascular disease in cardiovascular therapy. Early fibrinolytic therapy or direct catheter-based reperfusion has been established as a standard of care for patients with acute myocardial infarction.

Reperfusion therapy reduces mortality and saves heart muscle. The shorter the time to reperfusion, the greater the benefit. For example, a 47% reduction in mortality was noted when fibrinolytic therapy was provided in the first hour after onset of symptoms.

Guidelines have set goals for first medical contact to balloon inflation within *90 minutes*. STEMI systems of care (EMS systems and emergency department initial triage) have a major impact on these goals.