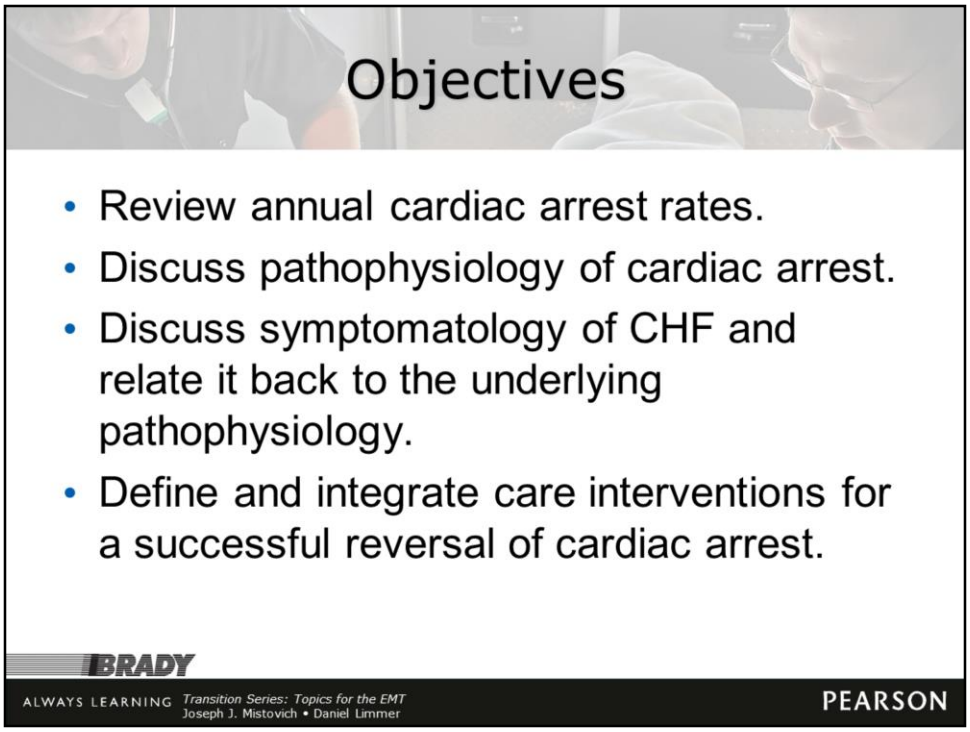
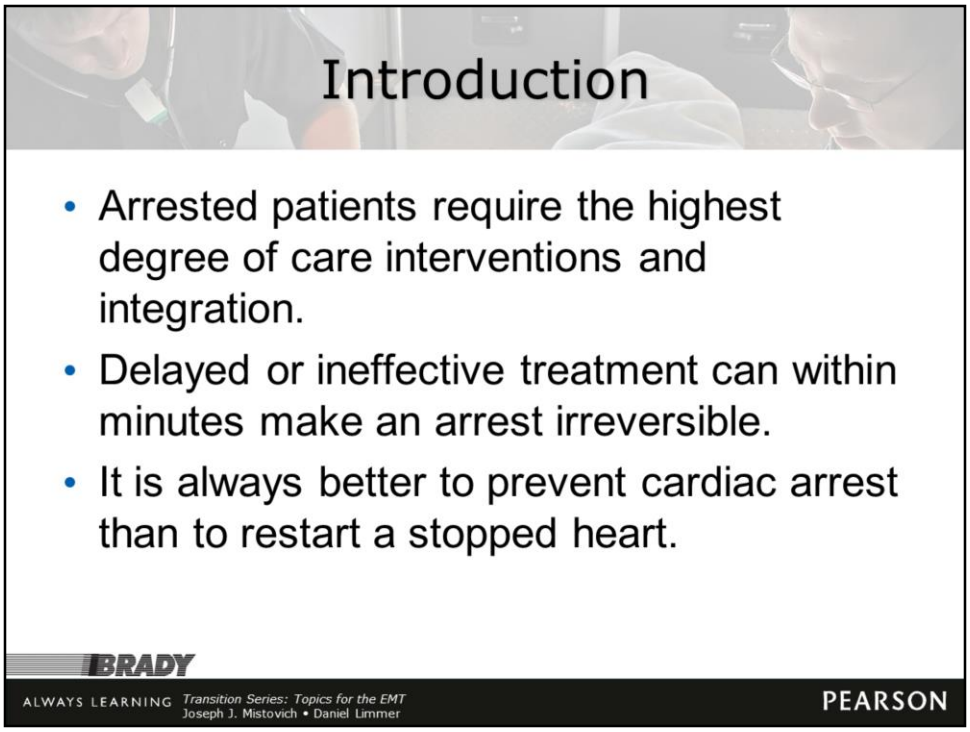

BRADY
TRANSITION SERIES
TOPICS FOR THE EMT
assault
TOPIC 35
Issues in Cardiac Arrest and Resuscitation
ALWAYS LEARNING
PEARSON



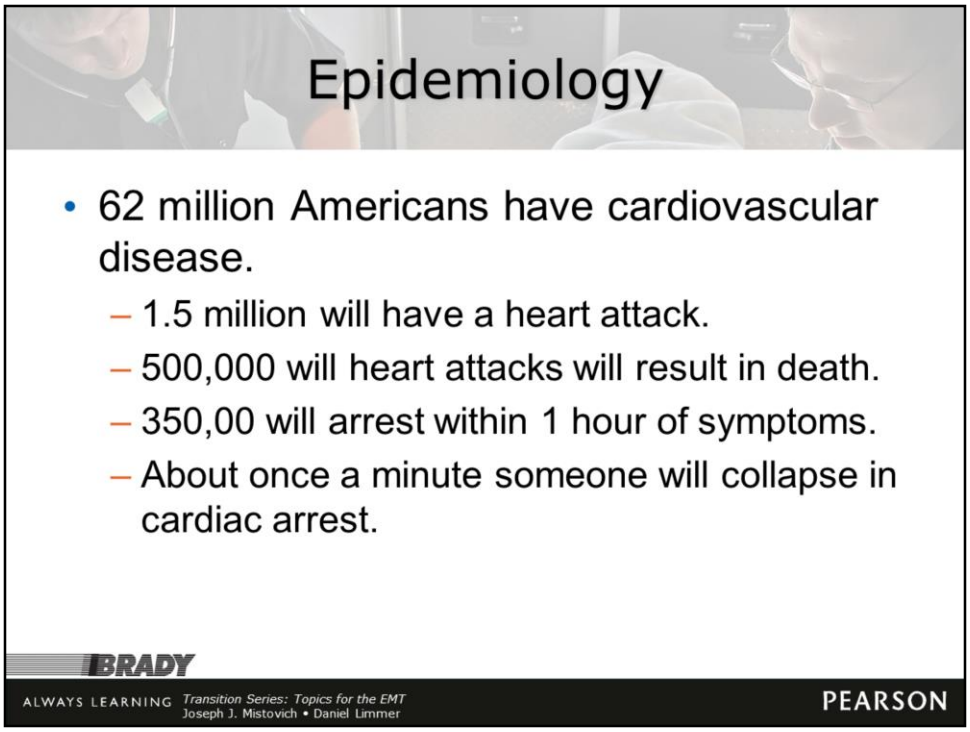
Discuss objectives.



When faced with a patient either deteriorating into cardiac arrest or already in cardiac arrest, the skills the EMT provides must be measured by both efficacy and time, as this patient may suffer irreversible cardiac and brain injuries in a matter of minutes if care is either delayed or inappropriate.

If the EMT can have a dramatic impact on both the patient and the patient's family in any one situation, it is here.

Whether the patient ultimately lives or dies, this situation will leave a permanent emotional mark in the memories of all.

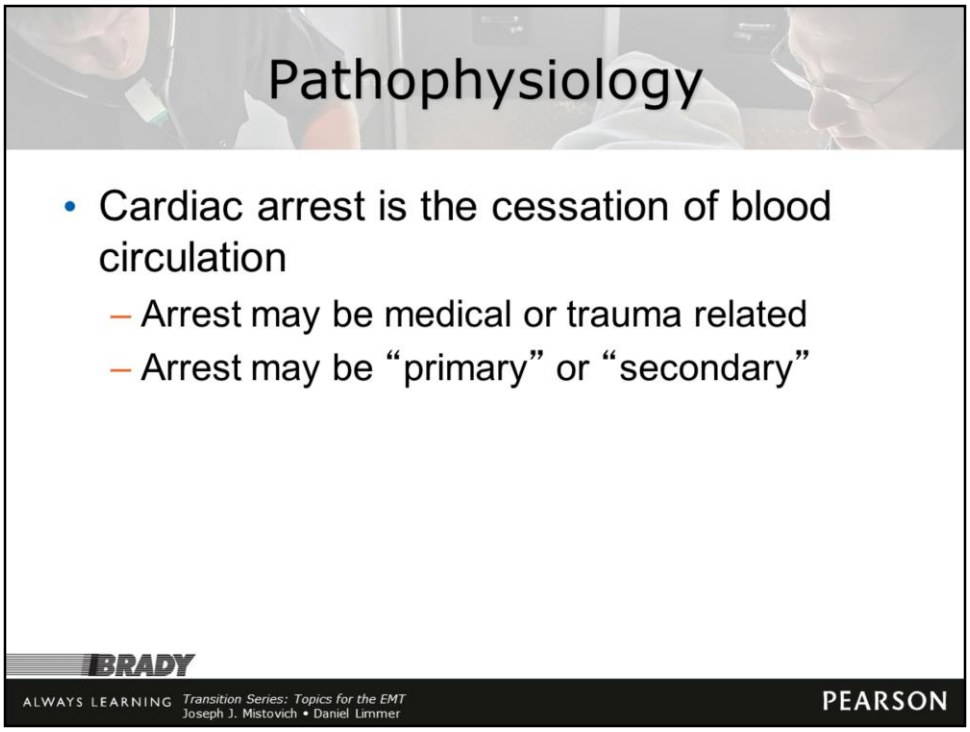


Cardiovascular disease is the most prevalent chronic condition in the United States as well as the leading contributor to death.

It has been said that cardiovascular disease is actually a "young person's" disease process that results in "old age" complications.

In other words, how a younger person treats their body in the present time will have a direct impact on disease presence and progression by the time they reaches late adulthood.

In fact, with many cardiovascular disease processes, the first clinical indication of its presence may well be the patient's first heart attack, stroke, or even sudden cardiac arrest.



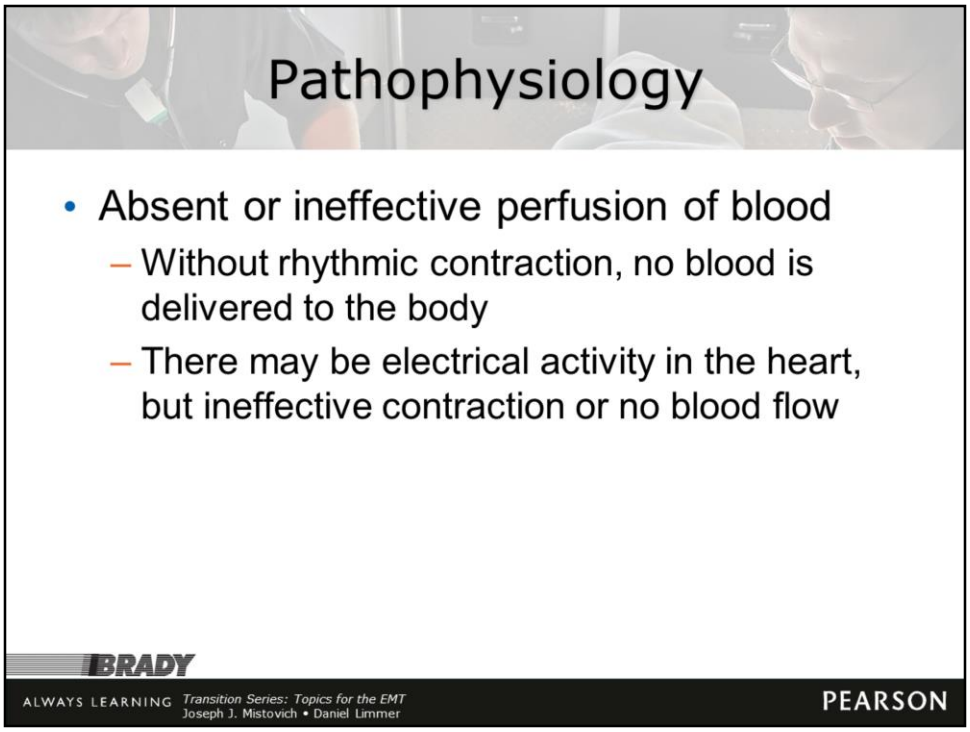
With cessation of blood and the delivery of oxygen and metabolic substrates, cells become hypoxic.

There will be a shift from aerobic to anaerobic metabolism. This leads to severe acidosis, hypoxemia, ATP depletion, an cellular death.

Although cells may die at a different rate, brain cells are most susceptible to the damage from cardiac arrest—and tend to start dying within minutes of arrest.

Although a medical or traumatic incident is the "cause", the "result" is cardiac arrest.

A "primary" arrest is when the cause of arrest is the heart itself (e.g., MI, sudden dysrhythmia), a "secondary" arrest is when another body system failed and the heart stopped due to that (e.g., sepsis, MODS, massive CVA).

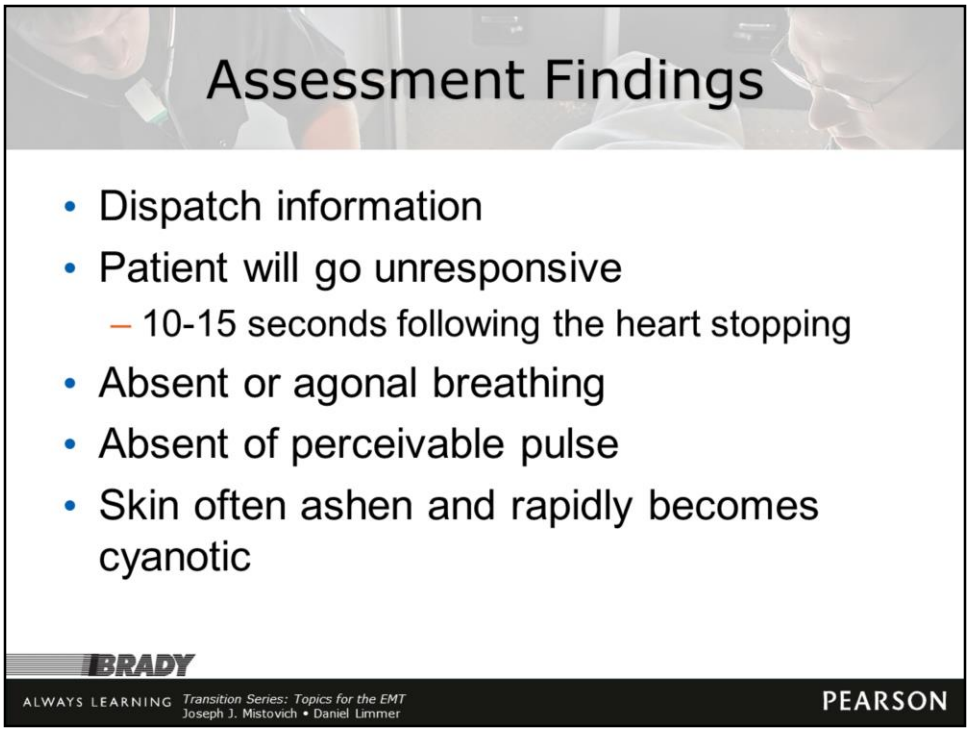


With cardiac arrest, ventricular contraction is absent or ineffective, resulting immediately in the cessation of blood flow and systemic circulatory failure—in fact, it is the final common pathway to human death.

Although it is often difficult to determine the cause of cardiopulmonary arrest at the time of presentation, a working differential diagnosis of the causes can be formulated based on the patient's history, physical examination, and automated external defibrillator () rhythm analysis.

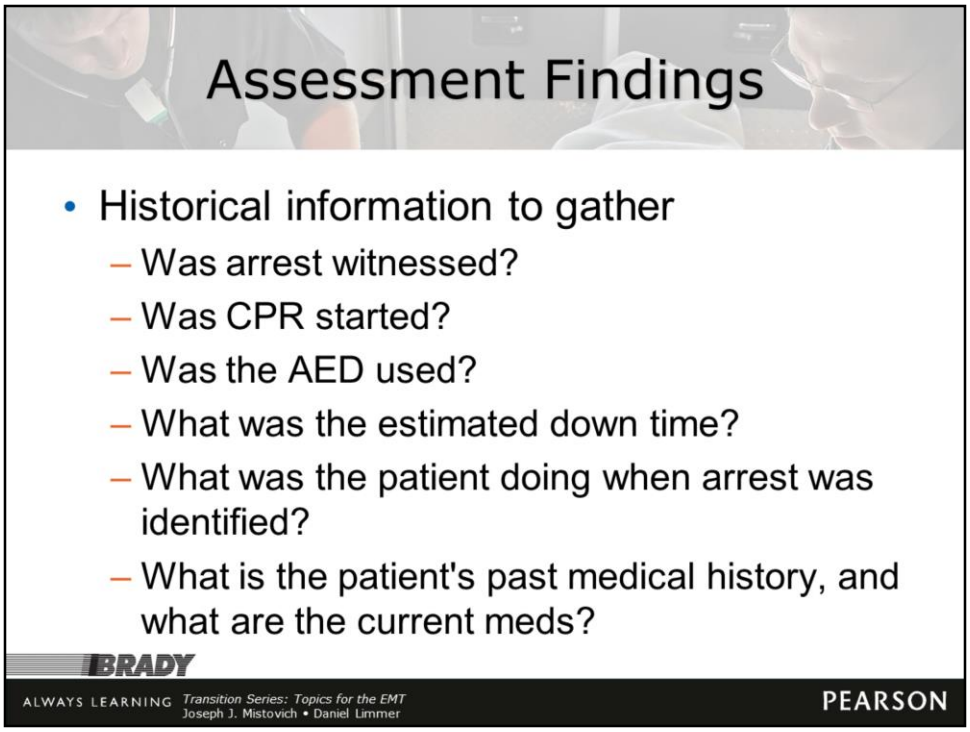
With stoppage of the heart, blood flow ceases and no oxygenated blood is being delivered to the capillary beds of the body.

Lack of blood flow initially causes pulselessness and unresponsiveness in the patient, but the lack of oxygen supply to the body's cells results in irreversible tissue damage and death.



Discuss basic findings for a patient in cardiac arrest.

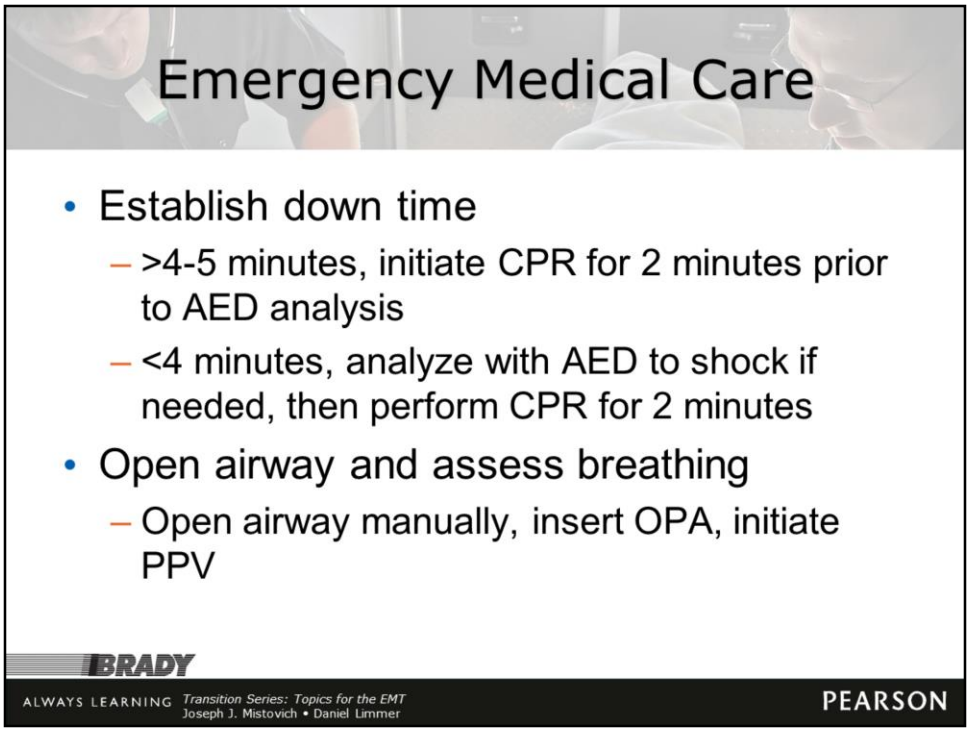
Usually this is a straight forward assessment.



Historical information gathered from on scene family or bystanders may provide key information regarding etiology and potential outcome.

If the cardiopulmonary arrest is witnessed, there exists a potential for bystander/heath care provider CPR, which increases the likelihood of a successful resuscitation.

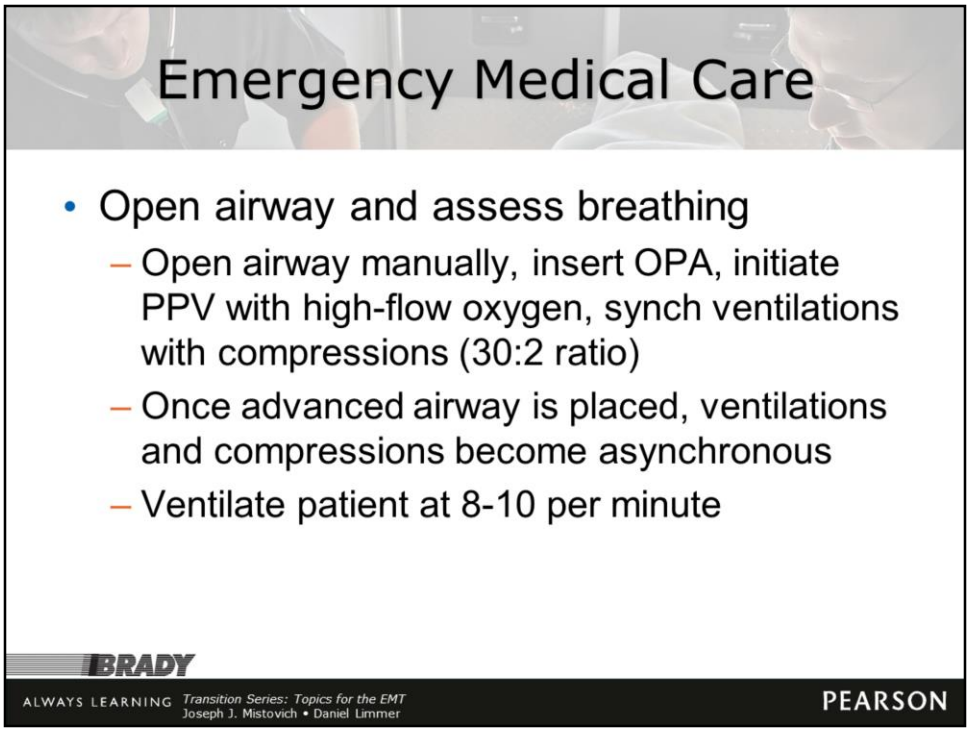
If the cardiac arrest occurs prior to arrival of the EMT, then information obtained from family, bystanders, or other emergency personnel may provide key information that will assist in resuscitation of the patient.



The standard ABC sequence of initial assessment is altered to CAB in suspected cardiac arrest patients.

In cardiac arrest, chest compressions (C) are immediately initiated and continued for one cycle, followed by opening the airway (A) and the first two ventilations (B).

This sequence reduces the delay to first compressions.

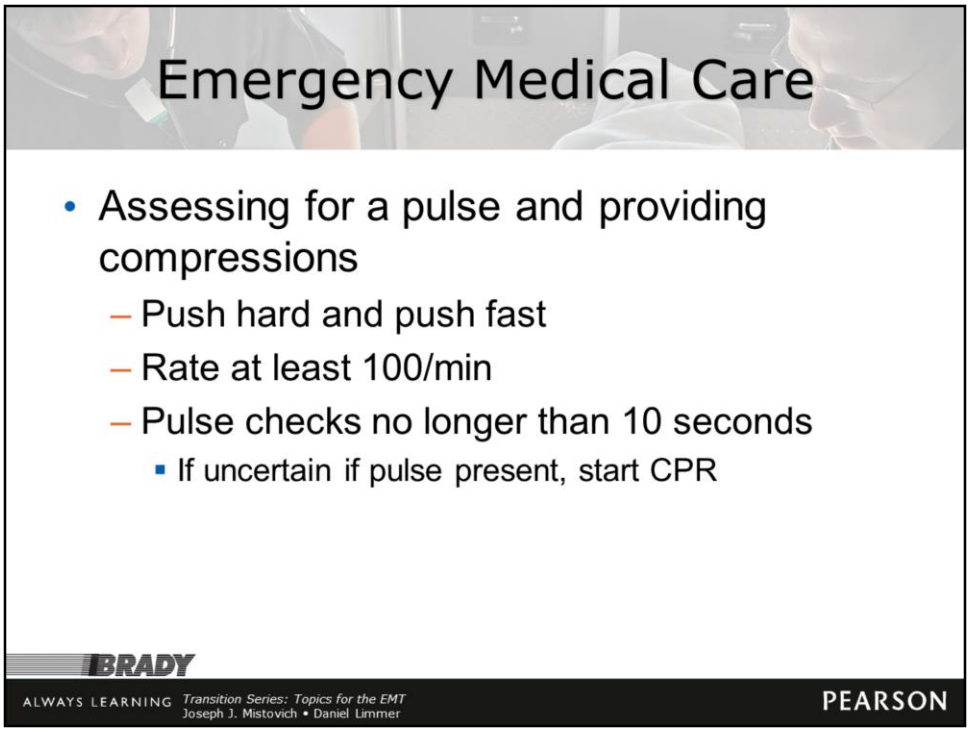


Remember, in the cardiac arrest patient, chest compressions precede opening the airway and ventilation (CAB).

Adequate resources are often available in the prehospital setting to perform airway management simultaneously with chest compressions.

The key is to not interrupt or compromise the chest compressions.

Figure 35-1 Direct ventilation with high-concentration oxygen.

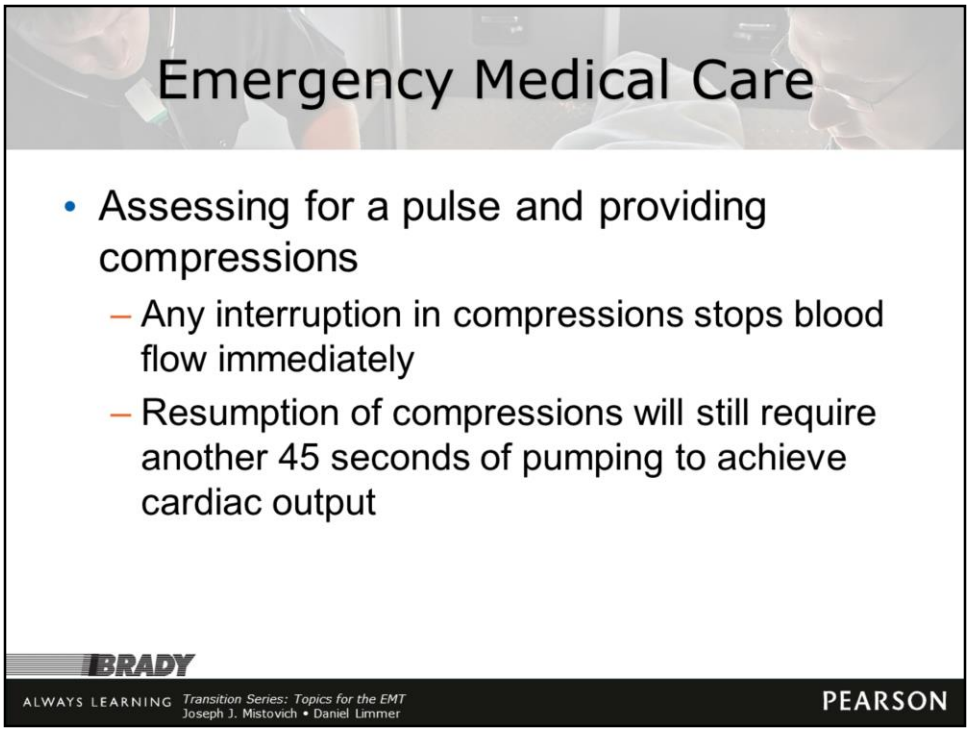


Pulse checks should be done at carotid location, by provider on that side of the patient (never reach across).

It has been well-documented in previous research that even perfectly performed compressions can achieve only a small portion of normal cardiac output.

It has been more recently documented in the literature that shallow compressions, slow compressions, or frequent interruptions of compressions results in reduced cardiac output, which ultimately translates into poor survival rates.

Figure 35-2 Checking the patient's carotid pulse (maximum 10 seconds).

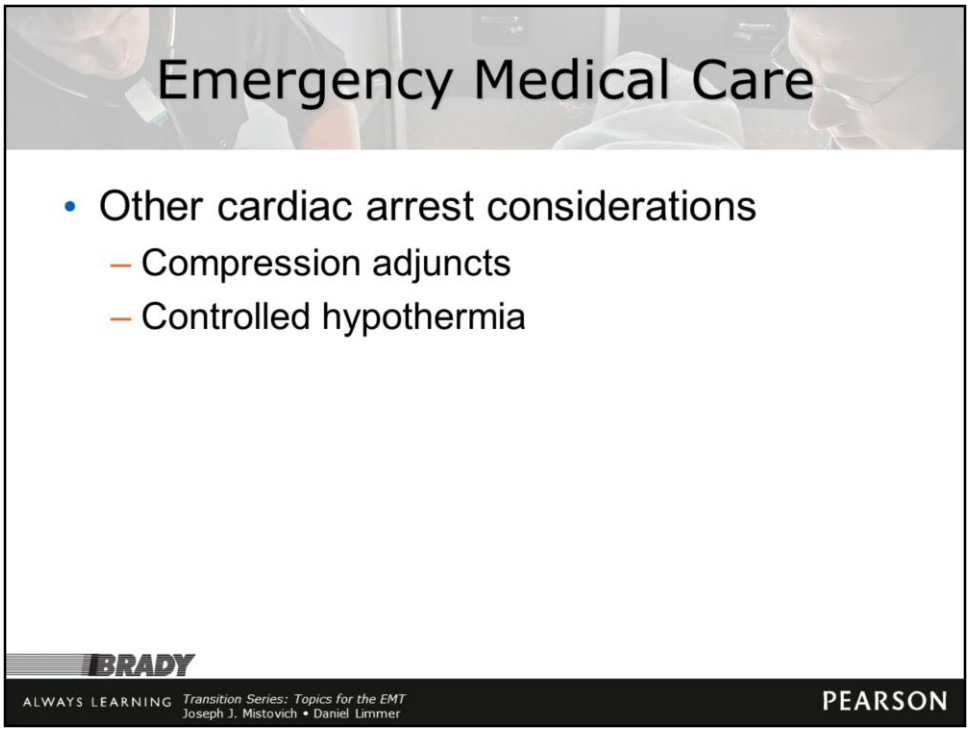


The EMT must also realize that any interruption of compressions, even for brief periods, causes the cardiac output and coronary perfusion to drop to nothing.

On resumption of compressions it can take up to 45 seconds of constant compressions to return cardiac output to what it was prior to ceasing compressions.

As such, always minimize the number of times you have to stop compressions and minimize the length of time compressions have to be stopped (this is also why the compression/ventilation ratio is now 30:2 and why the initial focus in cardiac arrest is on chest compressions).

Over ventilation of the patient in cardiac arrest can cause decrease in cardiac output achieved through compressions.



One device is a mechanical CPR adjunct that will alleviate one EMT from performing CPR; because it is mechanical in nature, it may provide more consistent compressions; however, no adjunct to date has been proven to be superior to standard manual CPR.

Another intervention is the use of "controlled hypothermia" during the post arrest resuscitation phase. It has been learned through controlled clinical trials that by carefully lowering the body core temperature, metabolic demands decrease, edema diminishes, and increased survival rates have been realized.

Figure 35-3 The AutoPulse™ Model 100: (A) applied to a patient

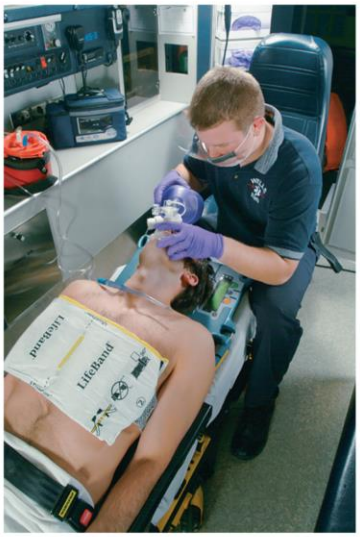
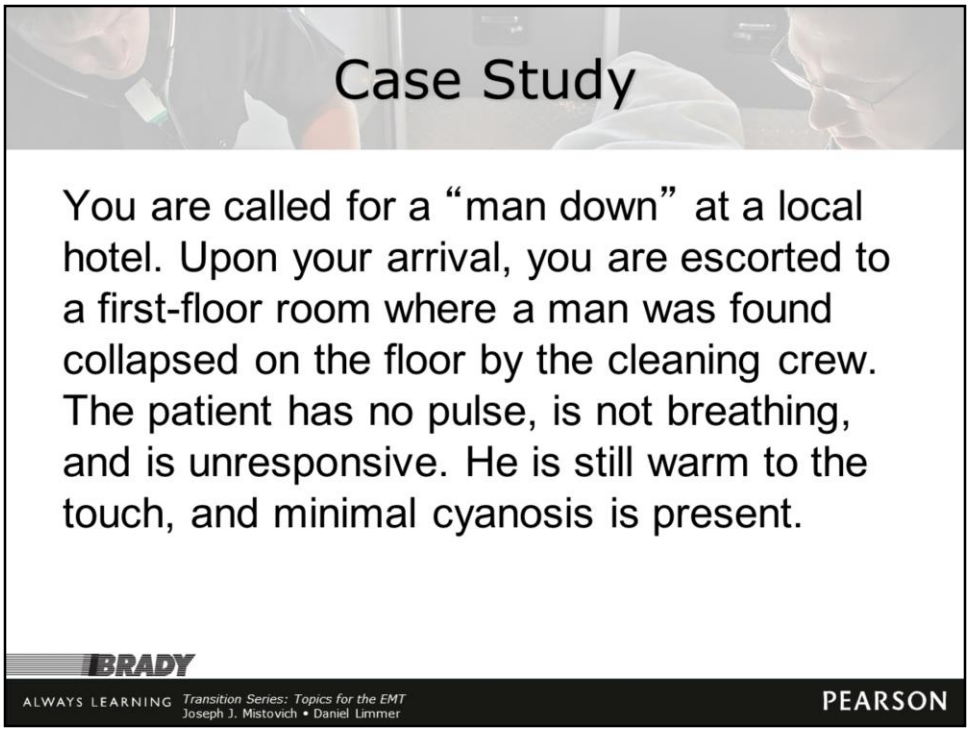
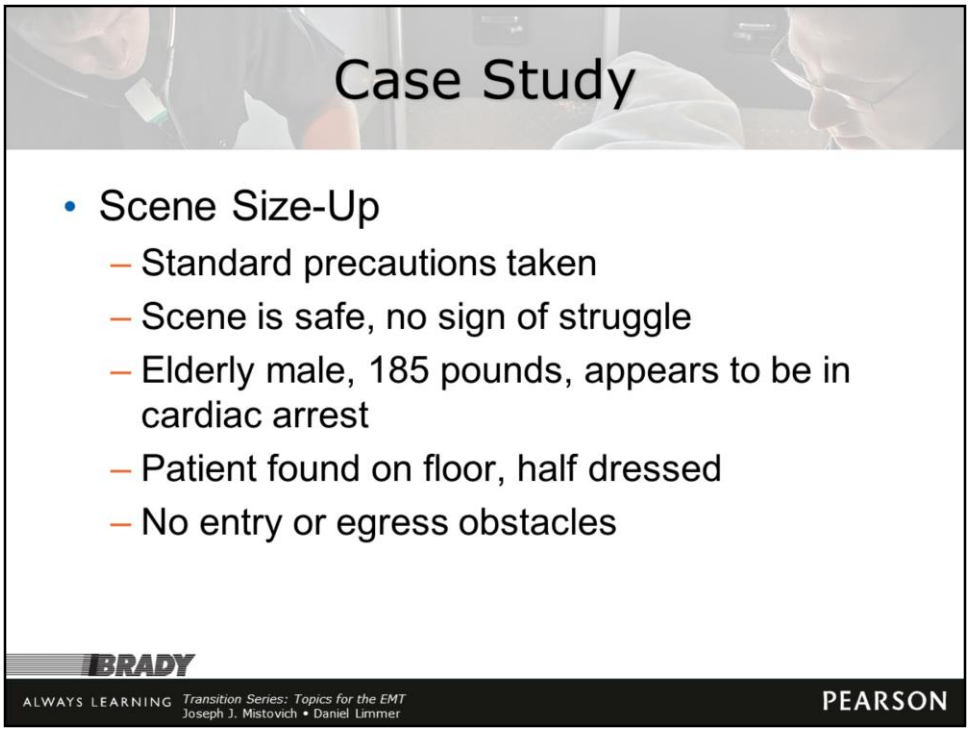


Figure 35-3 (continued) The AutoPulse™ Model 100: (B) close-up view.



Present case study.



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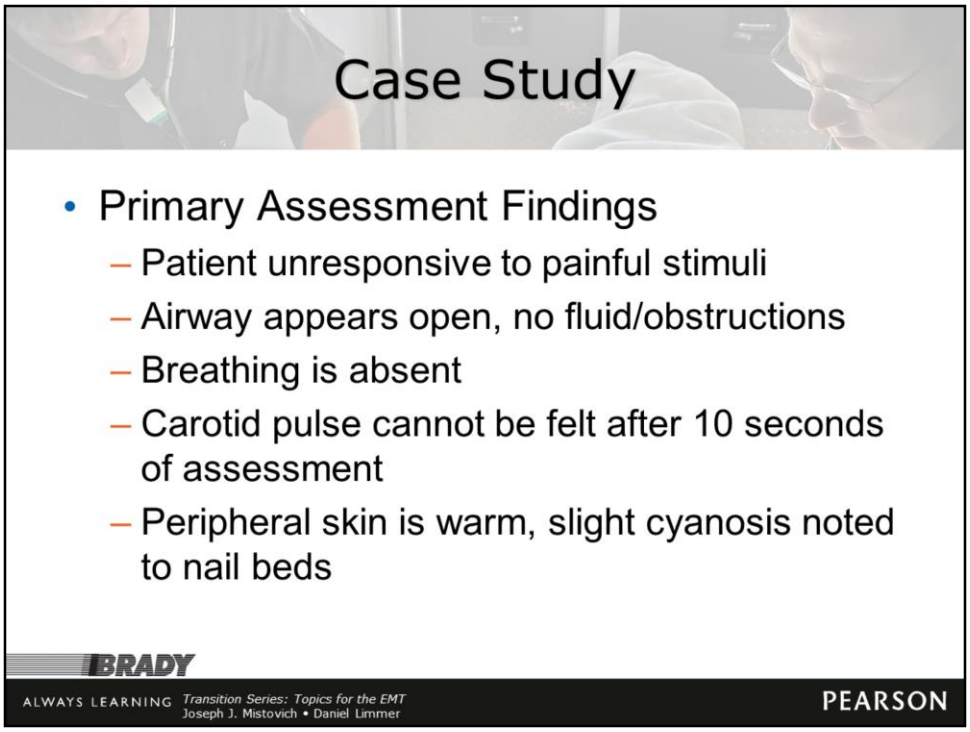
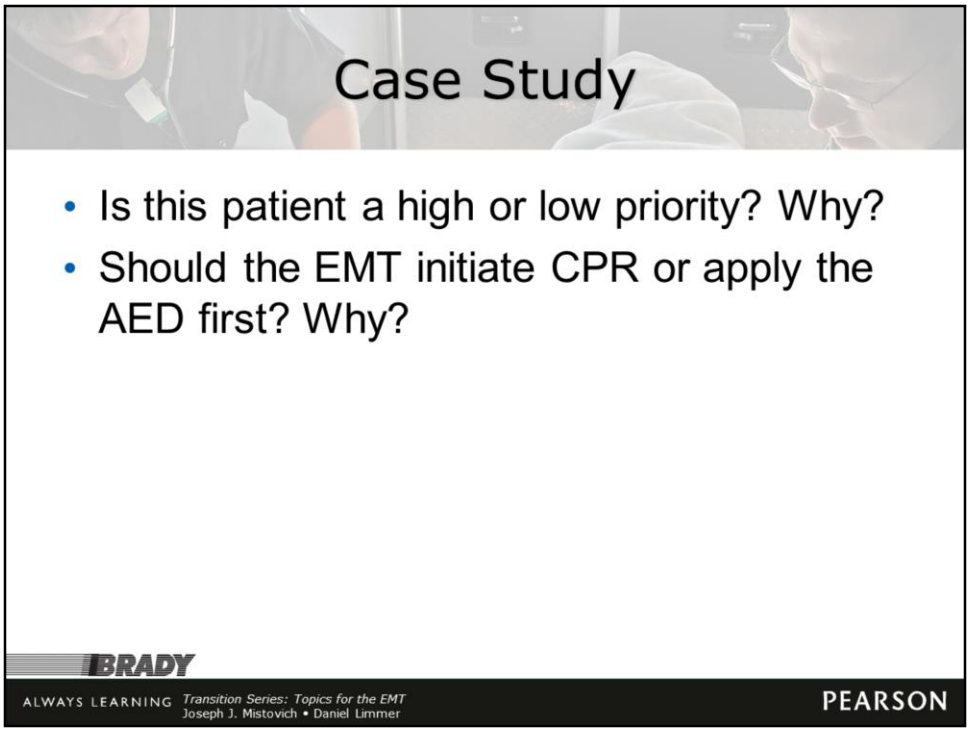


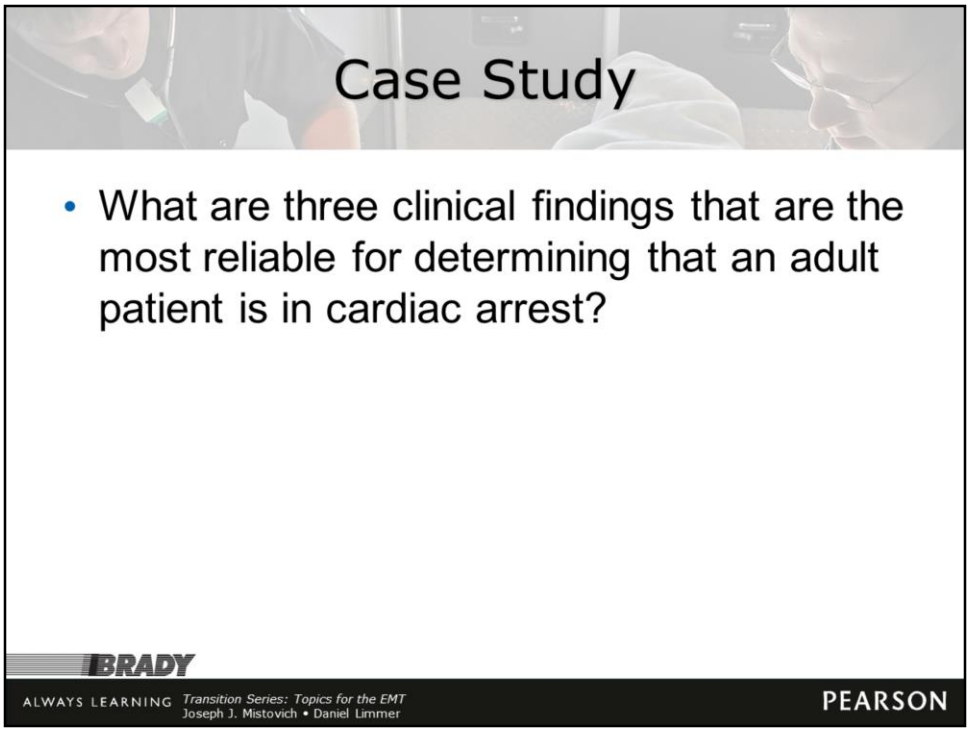
Appears this patient just went into cardiac arrest.



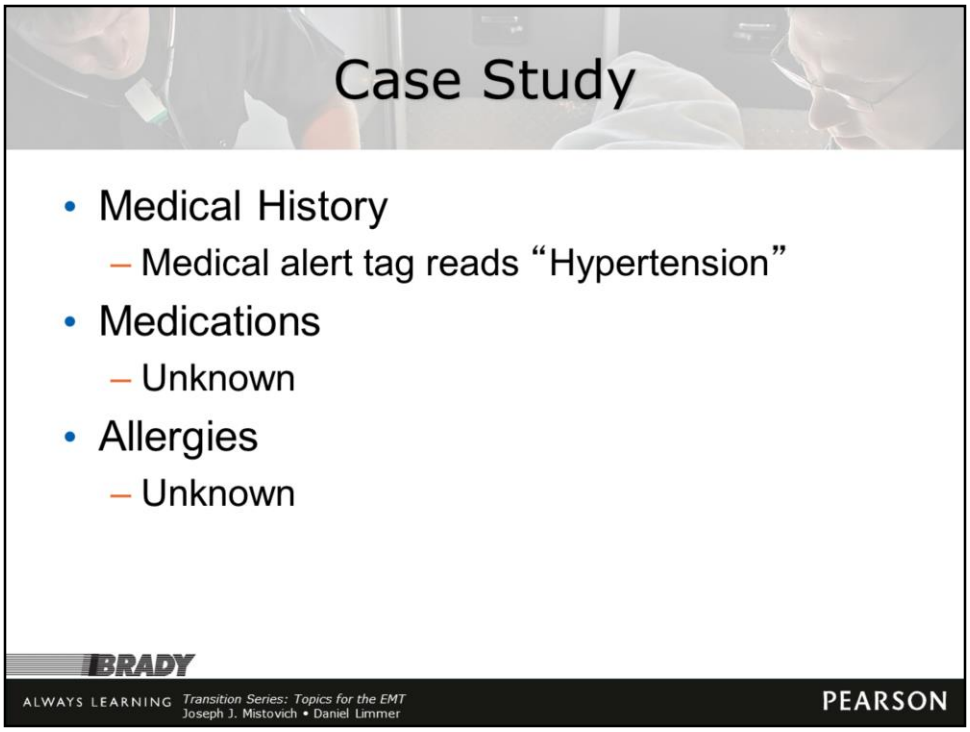
This is obviously a high priority patient!

The EMT should initiate CPR first because there is no way to document a "down time" of < 4 minutes.

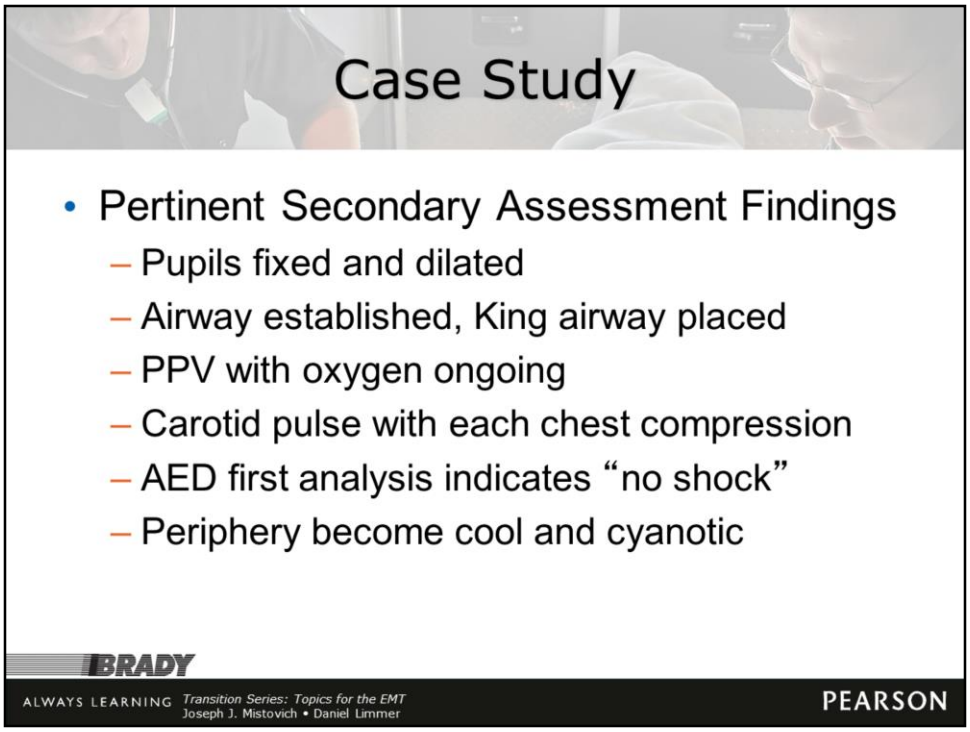
Plus, if it took 5 or 10 minutes for EMS to arrive, its already exceeded the 4 minute marker used to decide if CPR or AED is utilized first.



- Unresponsive
- No breathing
- No pulse



Discuss case study.



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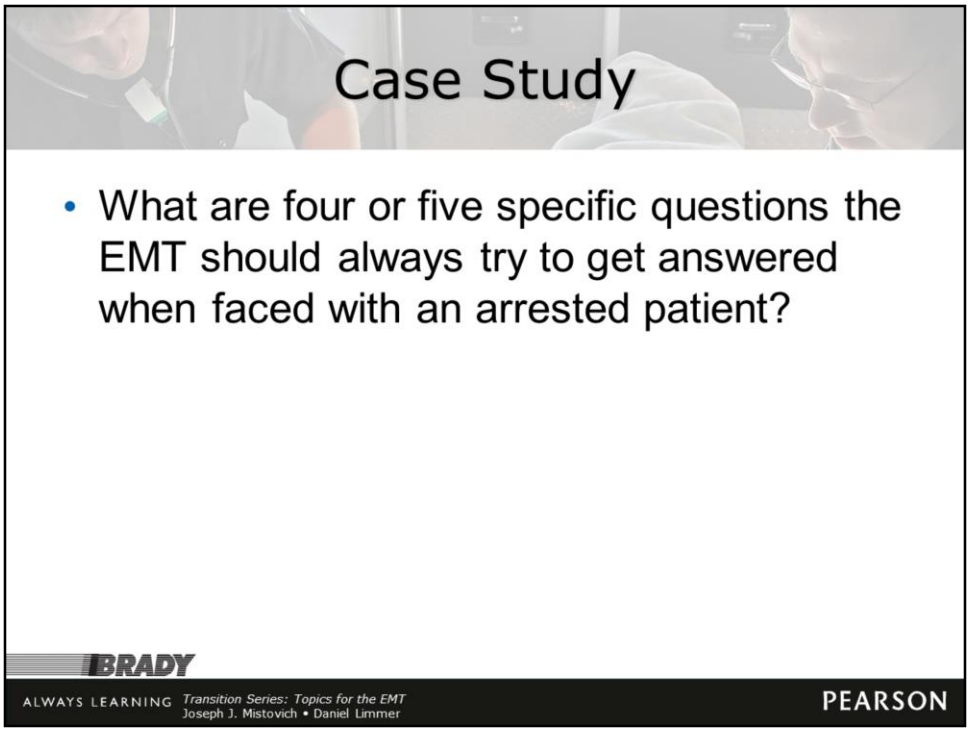
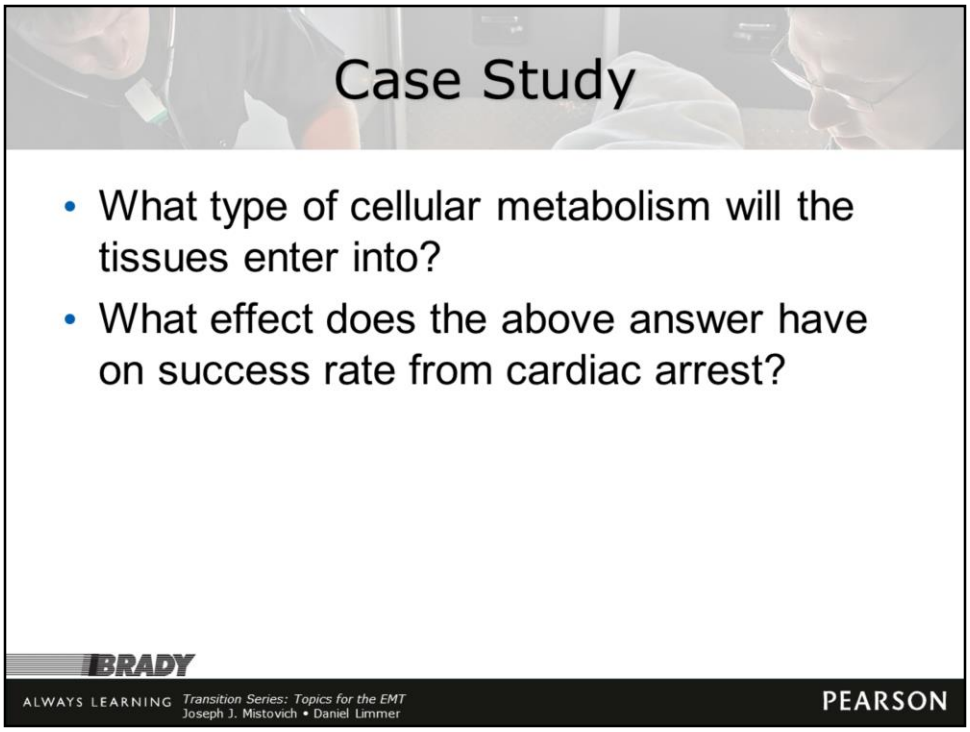


Historical information to gather:

- Was arrest witnessed?
- Was CPR started?
- Was the AED used?
- What was the estimated down time?
- What was the patient doing when arrest was identified?
- What is the patient's past medical history, and what are the current meds?

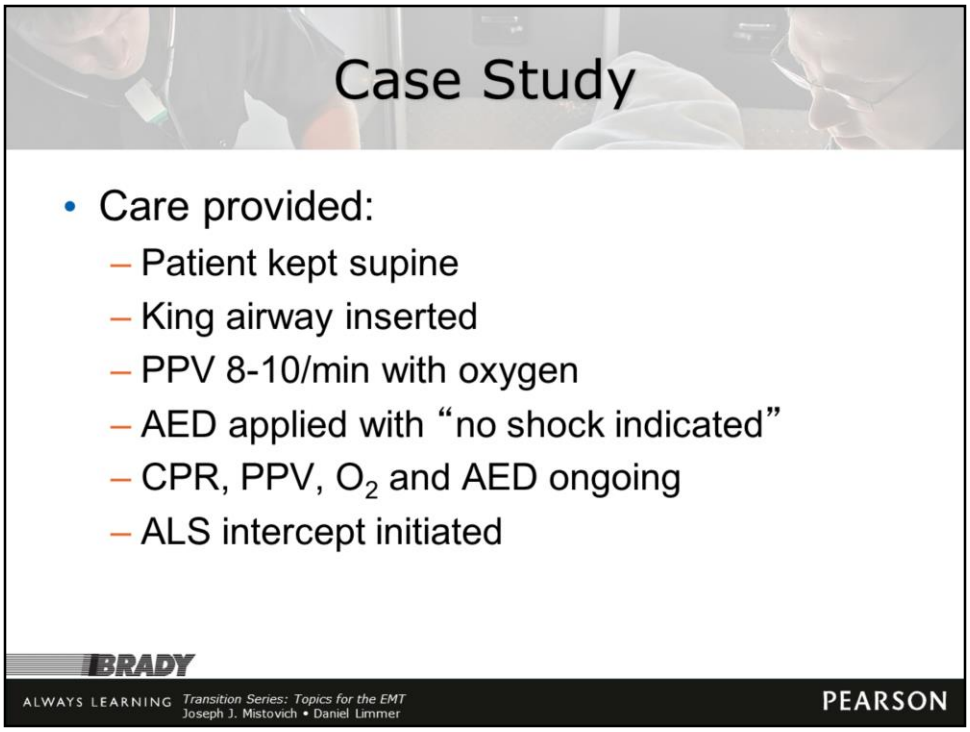


With no management, improper management, or delayed management - the patient will shift from aerobic to anaerobic metabolism.

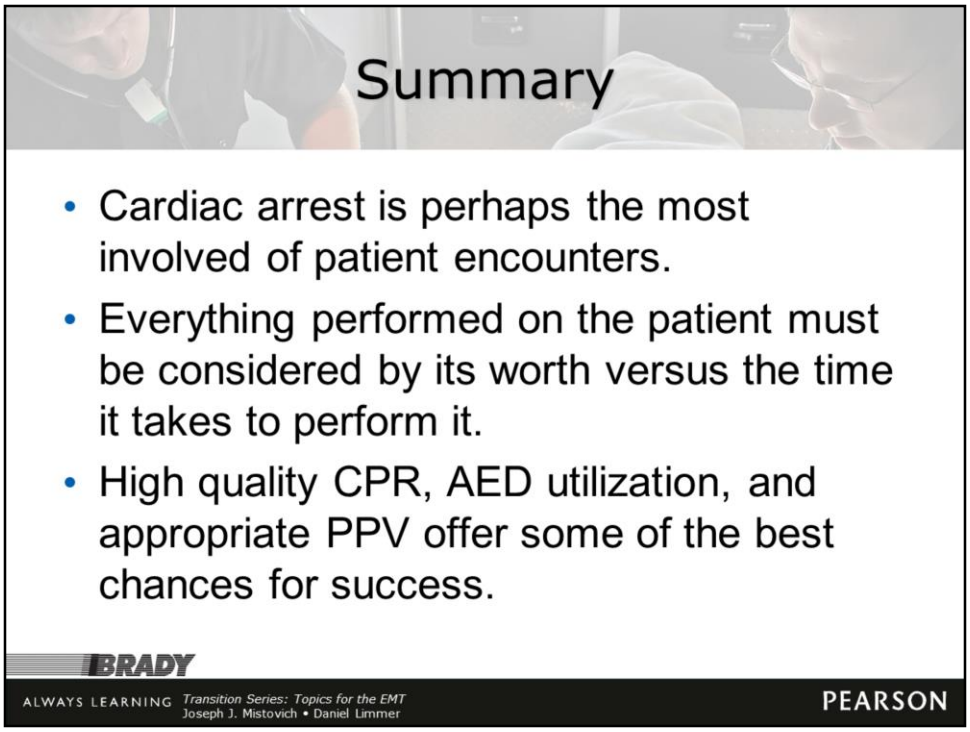
Anaerobic metabolism causes acid buildup and does not yield sufficient ATP.

As such, cell will start to die as the it becomes more acidic.

Both of these findings are counterproductive to successful arrest management.



Discuss the approach to management for an arrested patient.



Review as appropriate.