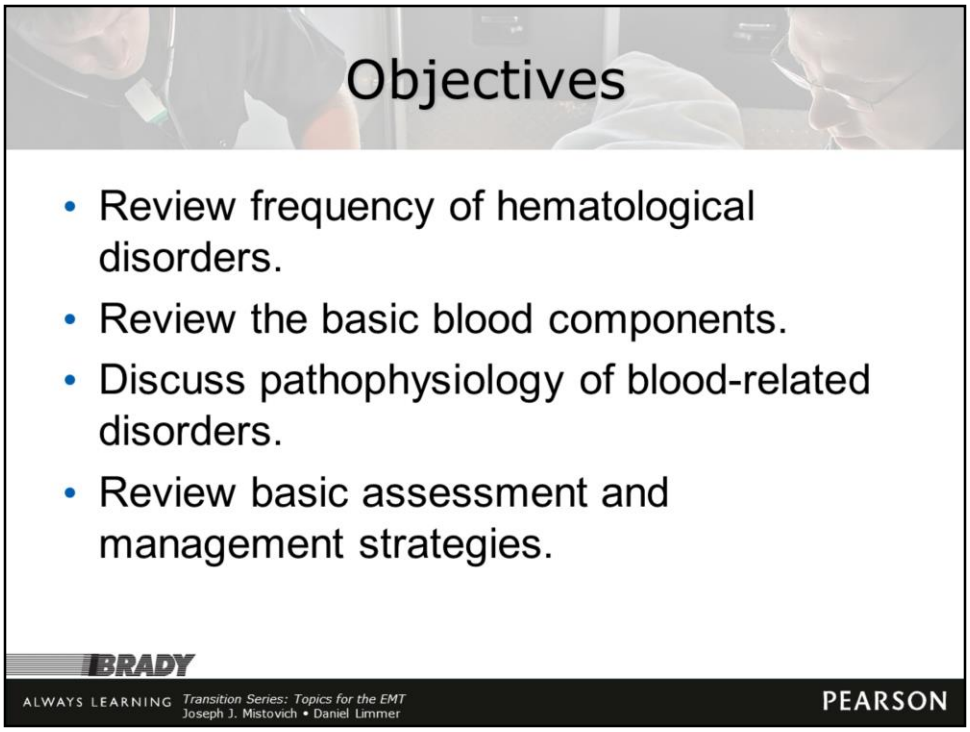
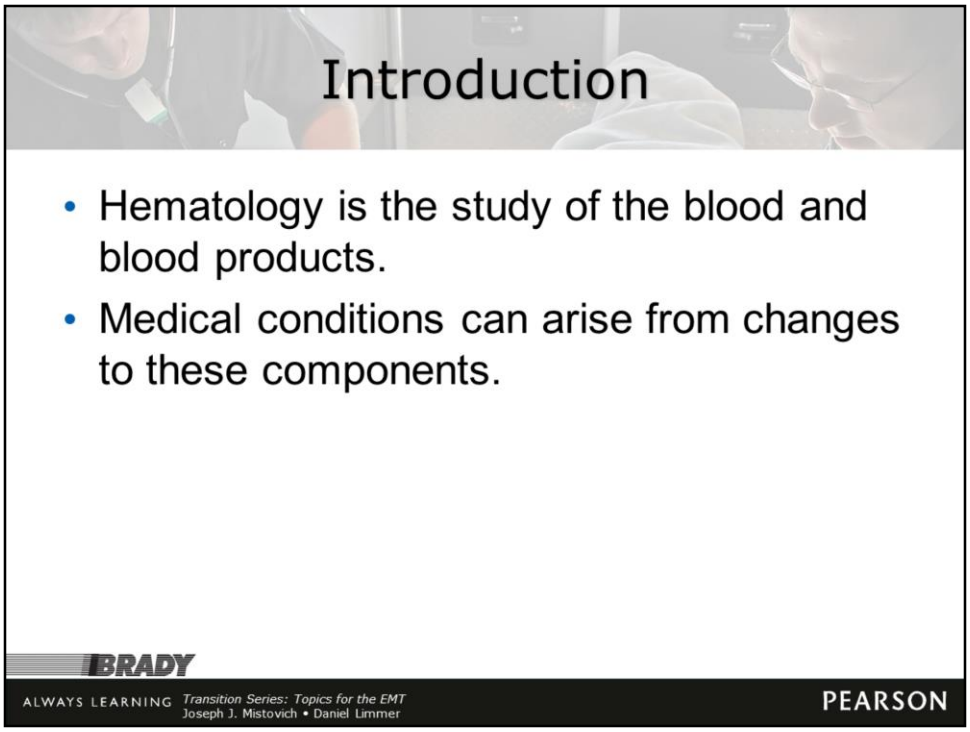

BRADY
TRANSITION SERIES
TOPICS FOR THE EMT
TOPIC 31
Hematology:
Blood Disorders
ALWAYS LEARNING
PEARSON



Discuss objectives.

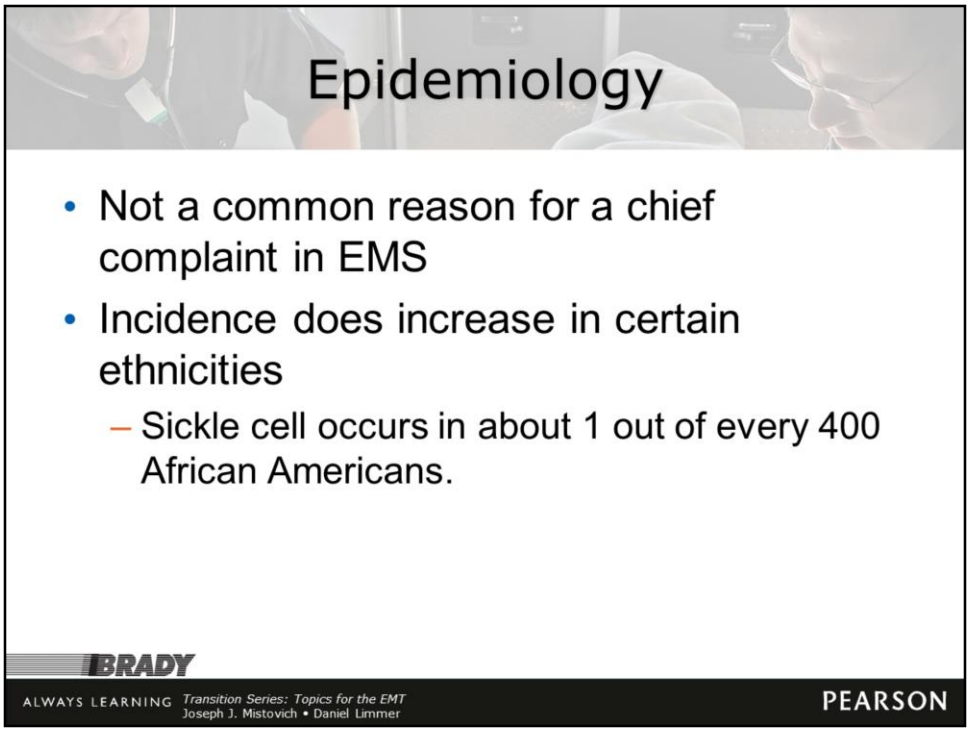


Hematology is the study of the blood and blood products.

Blood consists of:
•Plasma
•Red blood cells
•White blood cells
•Platelets

Various medical conditions result from changes associated with these components.

Lab tests, combined with history and physical exams by physicians, are needed to accurately diagnose hematologic conditions.



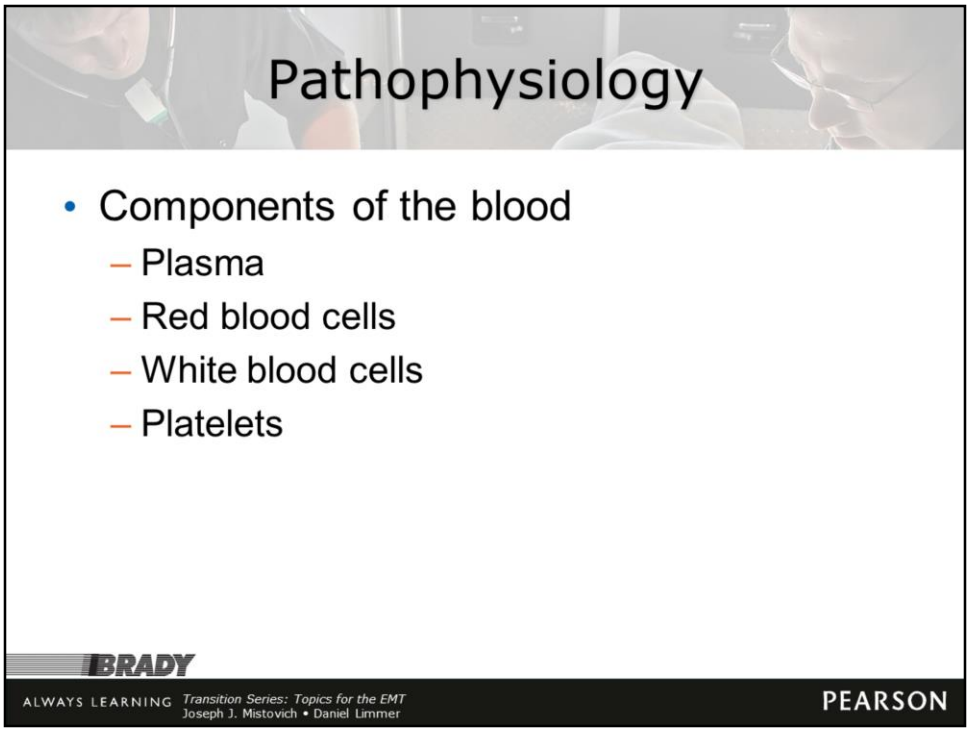
Hematologic conditions are common but do not often present as the primary complaint of patients in the prehospital environment.

Some conditions are not very common in the overall population but are more prevalent in a specific population.

For example, one of the more common hematologic conditions encountered by the EMT in the prehospital environment is sickle cell disease, also known as sickle cell anemia.

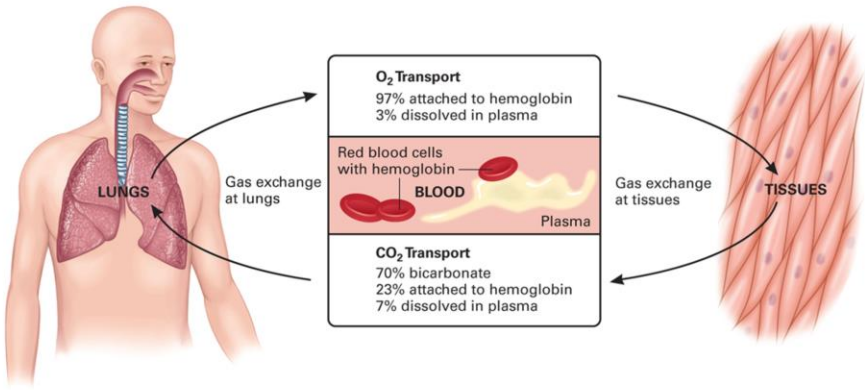
Sickle cell anemia occurs in about one in every 400 African Americans in the United States.

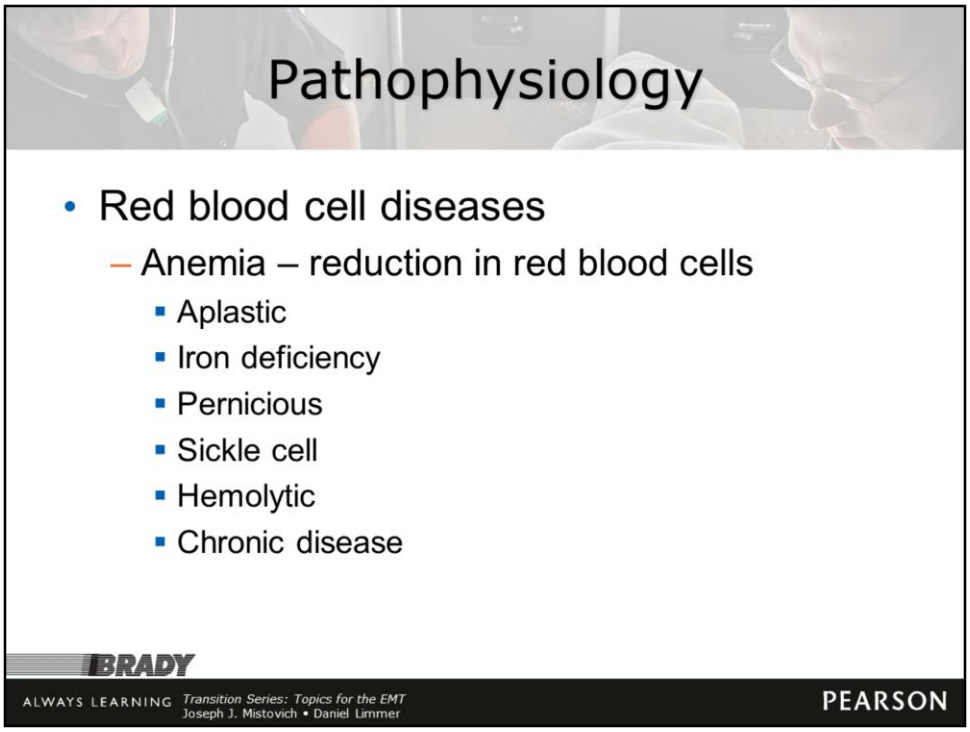
The sickle cell trait is found in 8 percent to 10 percent of African Americans in the United States.



Discuss/overview the components of blood and their basic function.

Figure 31-1 Oxygen is transported in the blood in two ways: attached to hemoglobin and dissolved in plasma. Carbon dioxide is transported in the blood in three ways: as bicarbonate, attached to hemoglobin, and dissolved in plasma.





A reduction in red blood cells (anemia) will reduce the body's ability to carry oxygen.

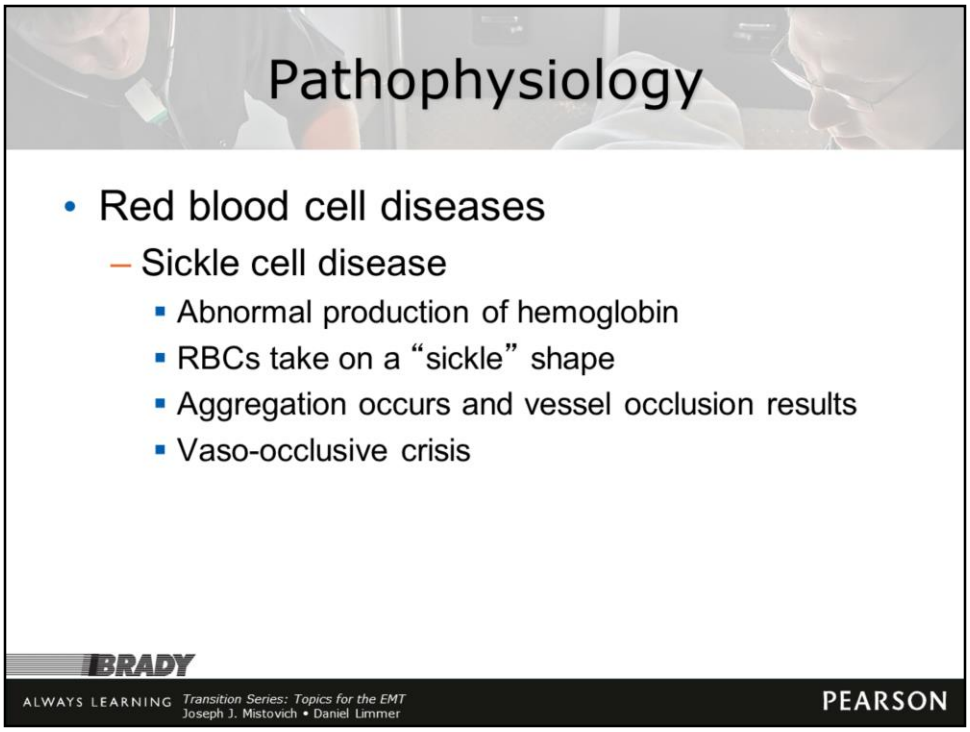
The main causes are:
•Blood loss
•Lack of red blood cell production
•Excessive red blood cell destruction

Feedback mechanisms will include:
•Peripheral vasodilation
•Increased cardiac output
•Preferential distribution of blood to critical organs

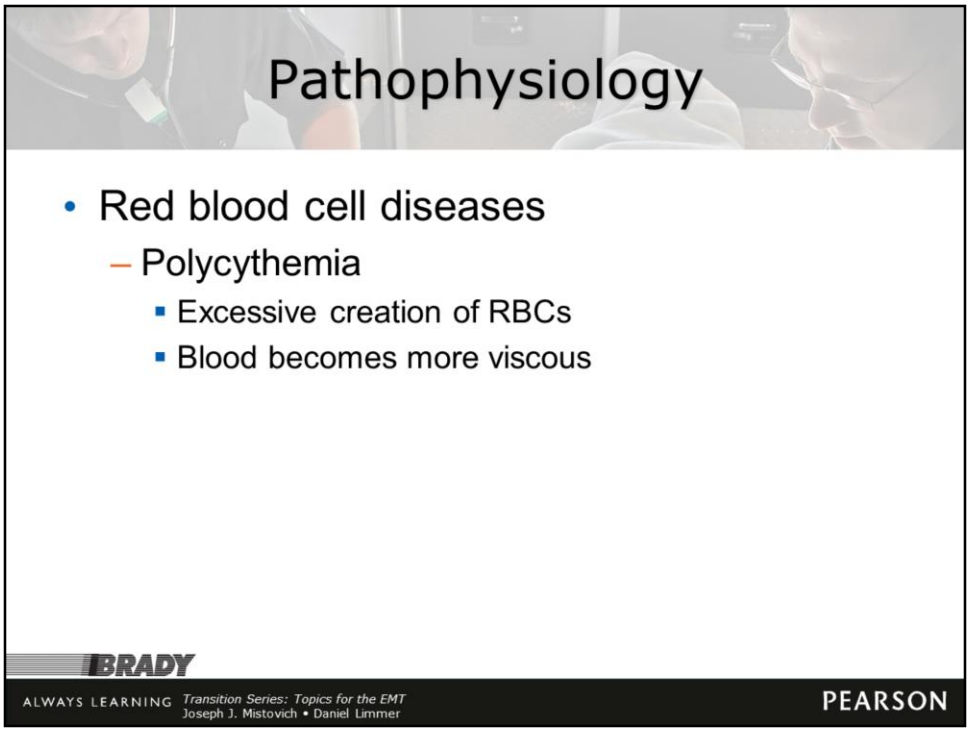
Eventually though, damage to the heart, brain, and other organs can occur leading to emergencies precipitated by that.

Table 31-1 Types of Anemia *Source:* Bledsoe, Porter, and Cherry, Paramedic Care Vol. 3, p. 533.

Cause	Type	Pathophysiology
Inadequate production of red blood cells	Aplastic	Failure to produce red blood cells.
	Iron deficiency	Iron is the primary component of hemoglobin.
	Pernicious	Vitamin B_{12} is necessary for correct blood cell division during its development.
	Sickle cell	A genetic alteration, in low oxygen states, causes production of a hemoglobin that changes the shape of red blood cells to a C, or sickle.
Increased red blood cell destruction	Hemolytic	Body destroys red blood cells at a rate greater than production; red blood cell parts interfere with blood flow.
Blood cell loss or dilution	Chronic disease	Hemorrhage leads to cell loss; excessive fluid leads to a dilution of red blood cell concentration.



Discuss pathophysiology behind sickle cell and the effects on the body.

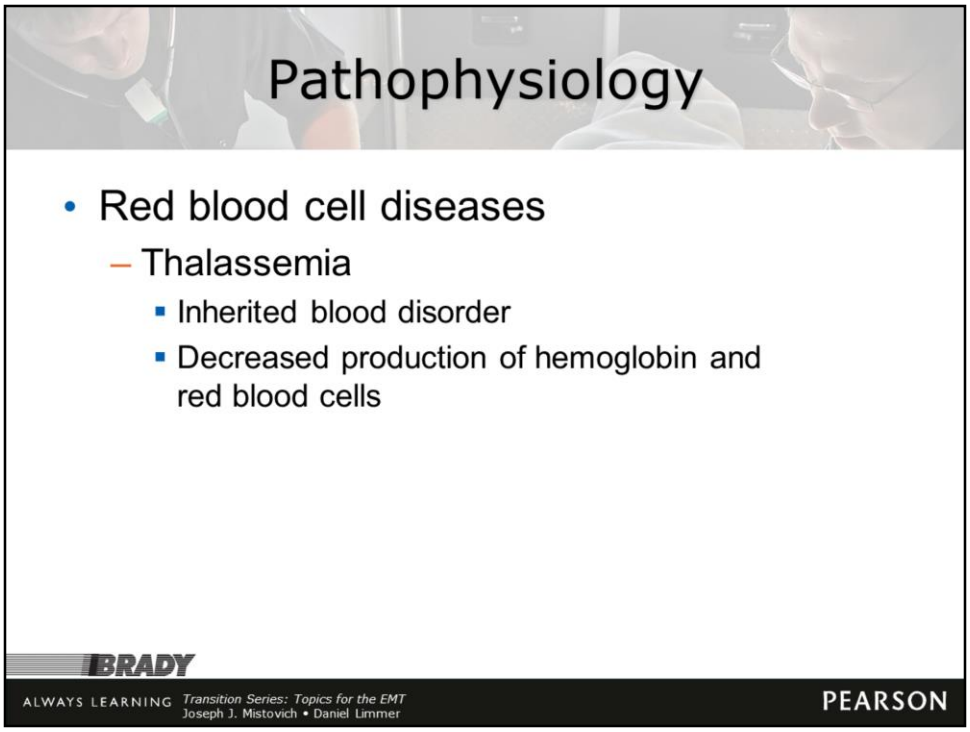


Polycythemia , or erythrocytosis , is a condition resulting from an abnormally high level of red blood cells in the blood.

The increase is usually due to an excess production of red blood cells.

Pseudoerythrocytosis may appear secondary to dehydration.

The higher the red blood cell levels, the greater is the risk of thrombosis in the individual.

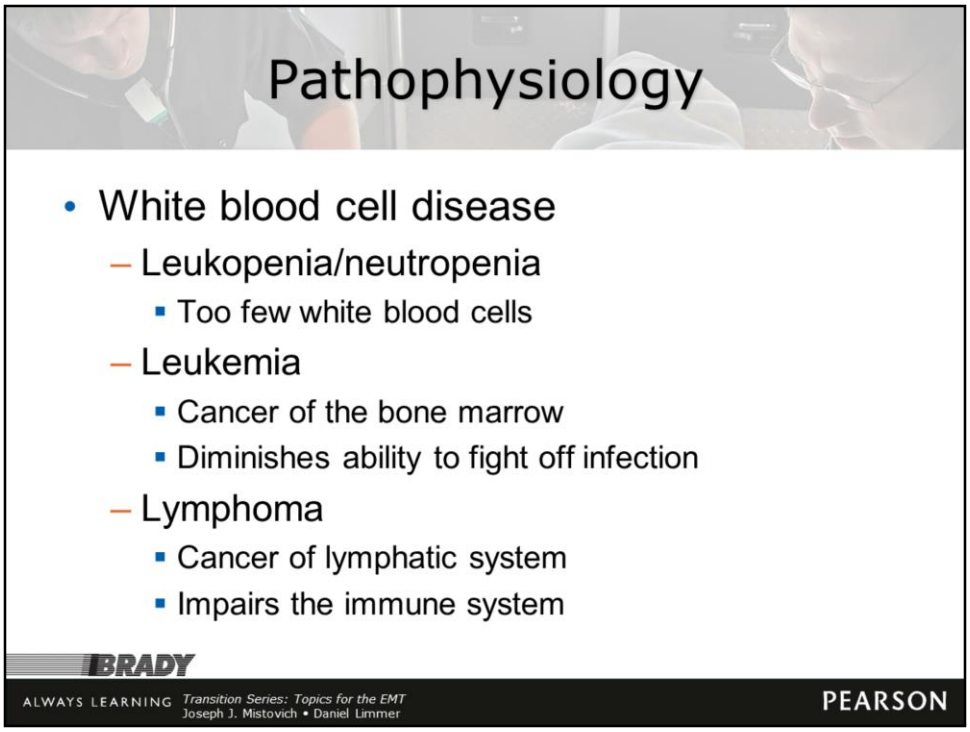


Thalassemia is an inherited blood disorder that results in the decreased production of:
•Hemoglobin
•Red blood cells

It usually affects people of:
•Mediterranean ancestry
•Asian ancestry

Severe thalassemia is normally identified by the age of two years.

Signs and symptoms include:
•Pallor
•Anorexia
•Listlessness
•Jaundice

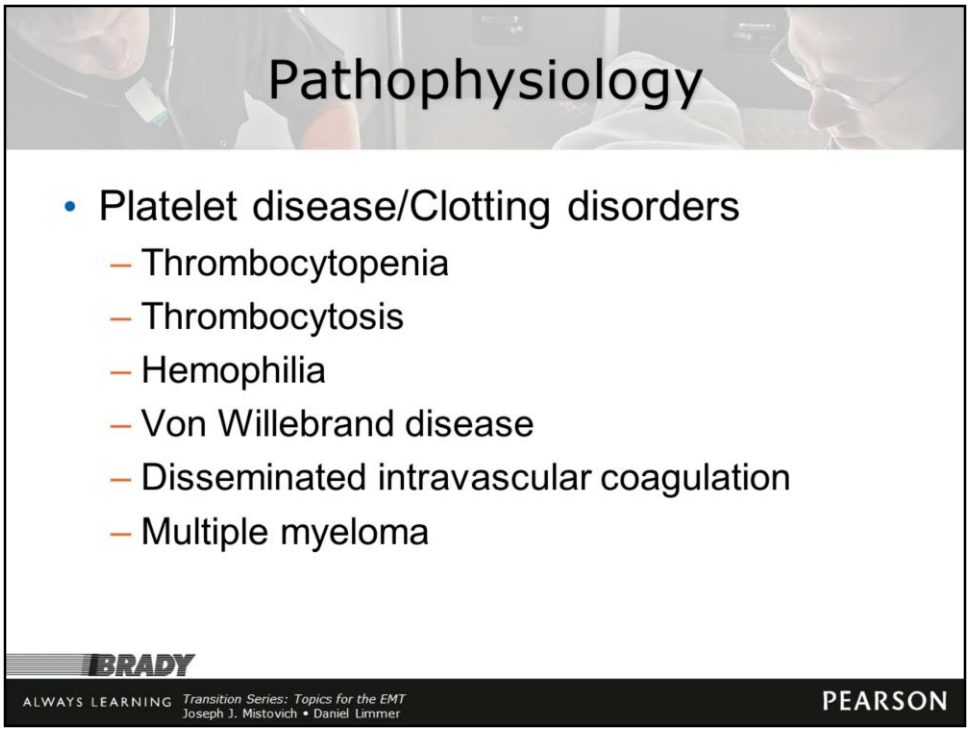


Discuss pathophysiology behind the listed white blood cell diseases.

Leukocytes respond to infection by increasing in number.

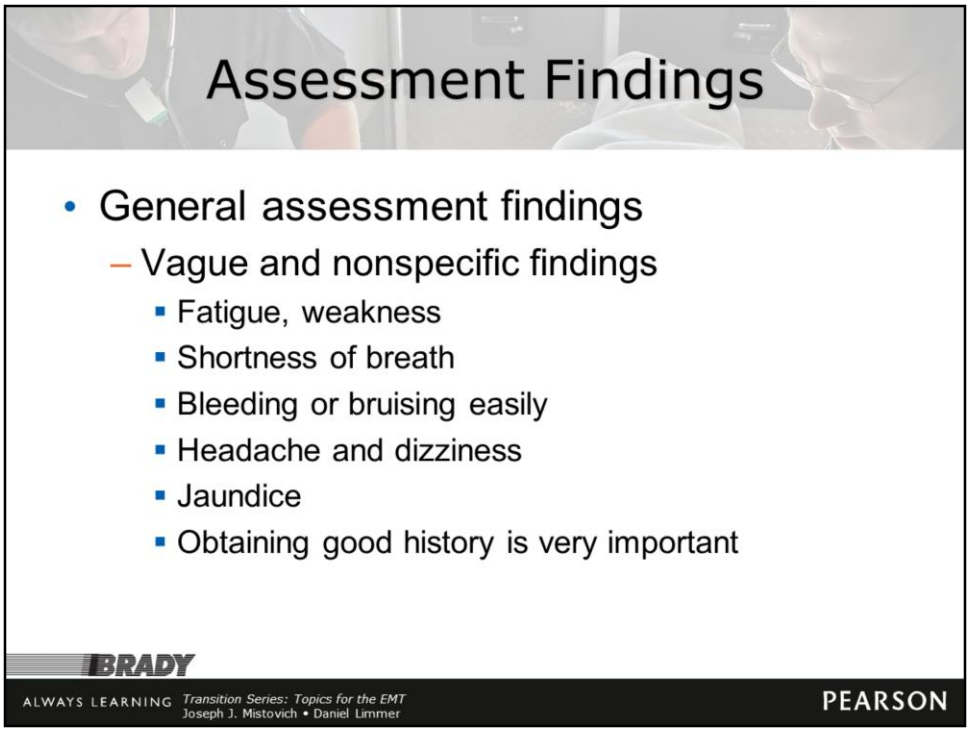
Disseminated intravascular coagulation results when excessive clotting is followed by excessive hemorrhage.

thrombocytes are the primarily function of blood component?

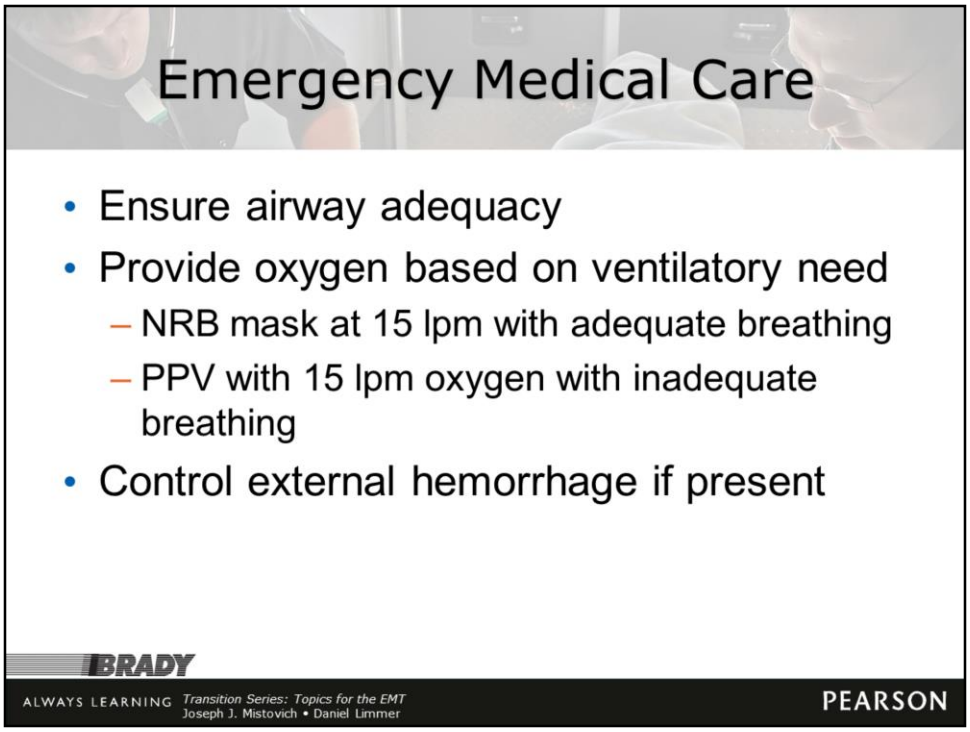


Discuss pathophysiology behind the listed platelet and clotting disorders.

Generally speaking, due to the overproduction, underproduction, or disturbed production of platelets and clotting elements—there is ongoing disturbances to the clotting mechanisms which can result in either excessive bleeding or the clumping of cells together in the formation of vascular emboli.

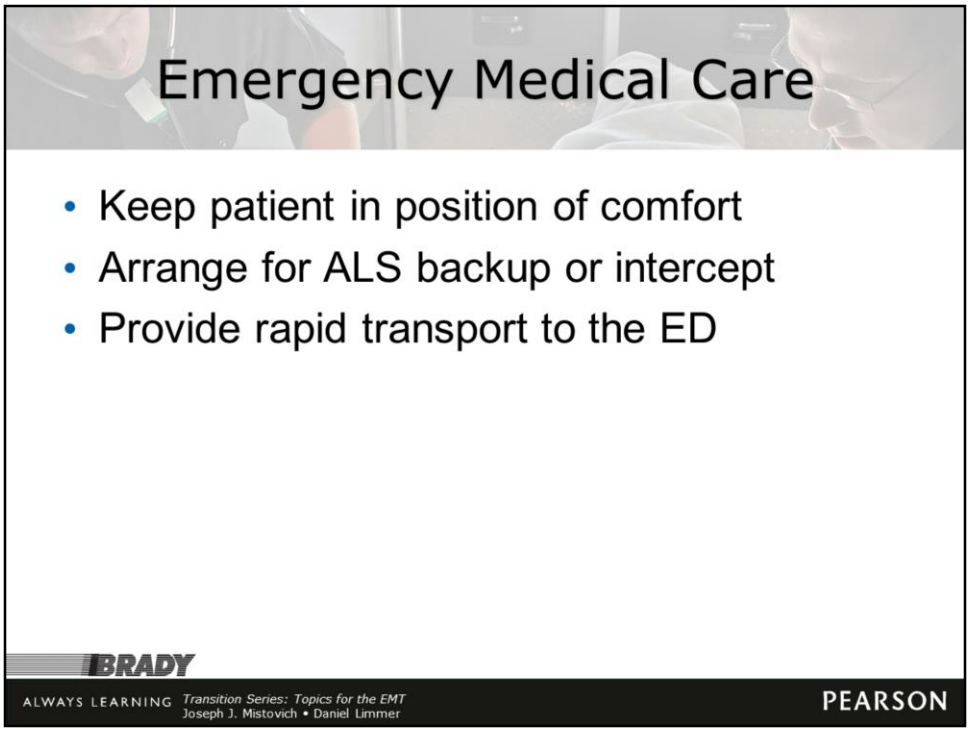


Unfortunately the symptoms are very vague and nondescript. It is difficult to develop a differential diagnosis in the prehospital environment.

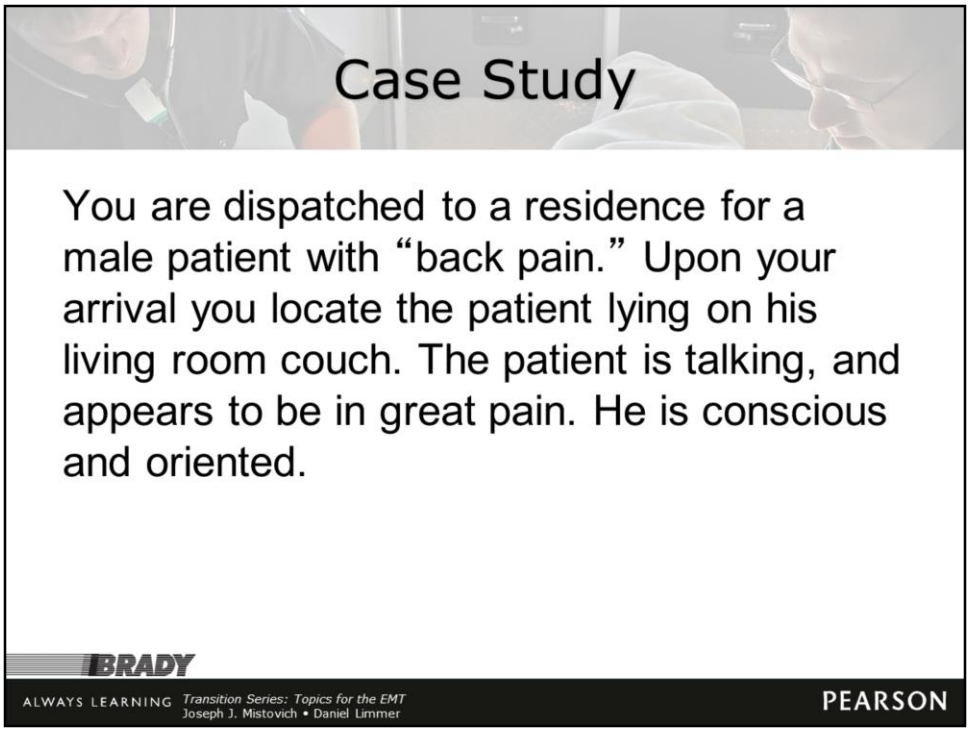


Emergency medical care for patients with hematological emergencies is primarily supportive.

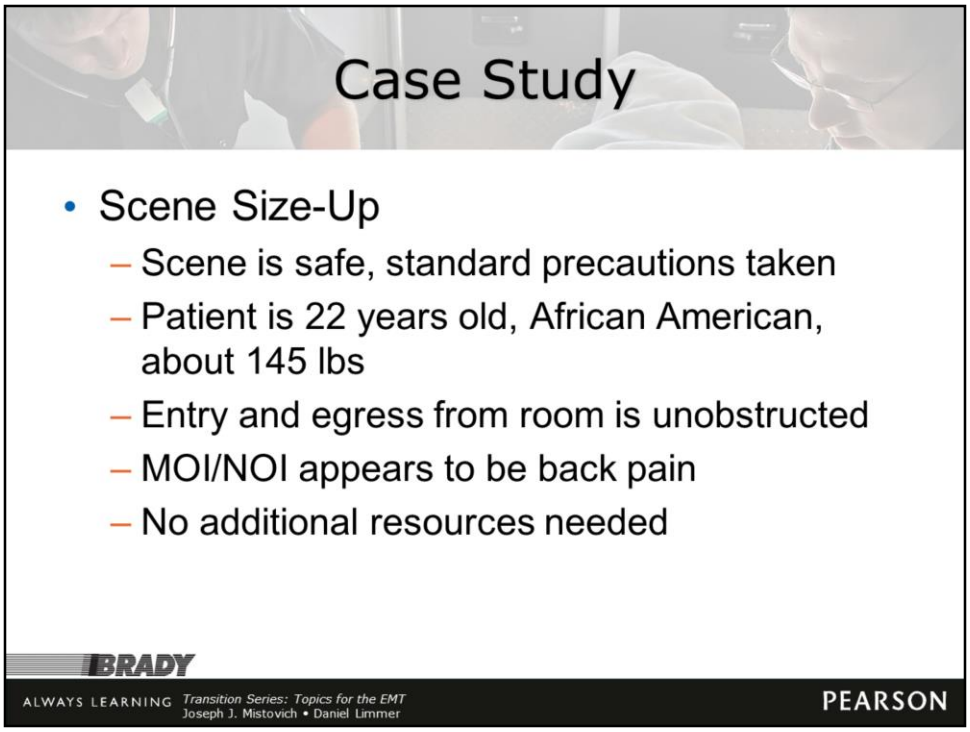
Patients may present with a wide variety of signs and symptoms, based on their underlying condition, that require emergency medical care.



Review treatment strategies.



Present case study.



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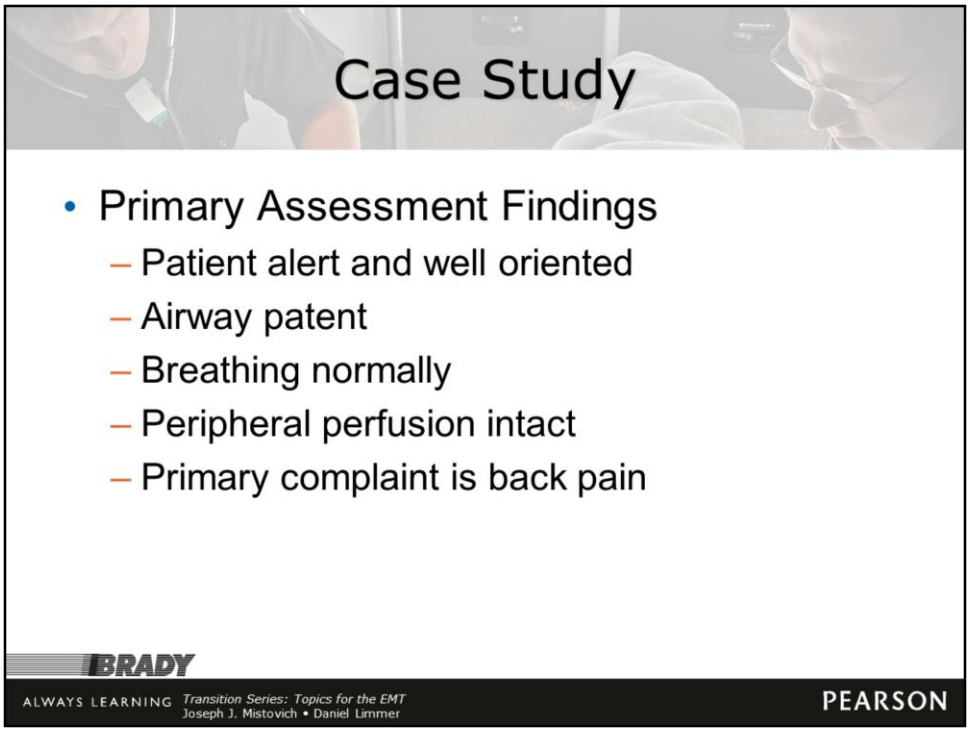

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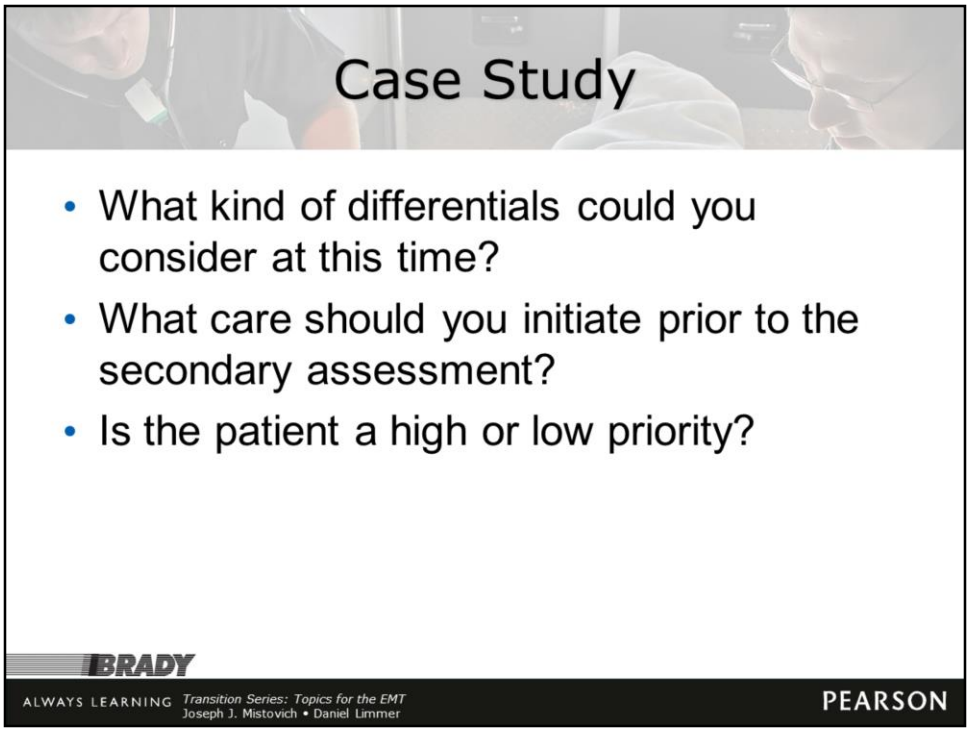
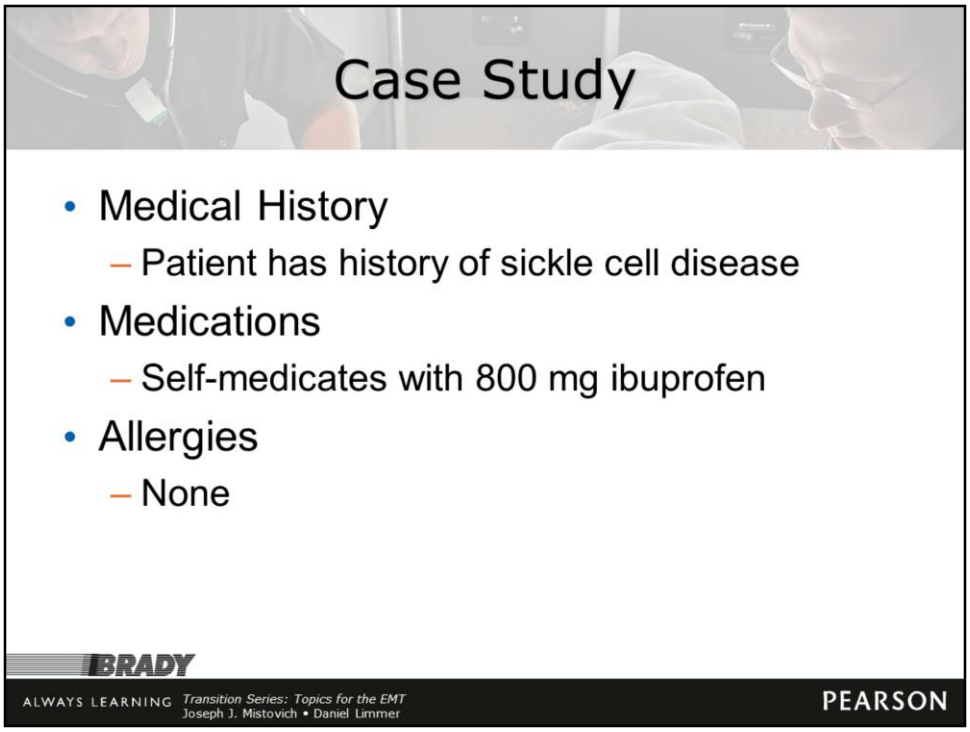


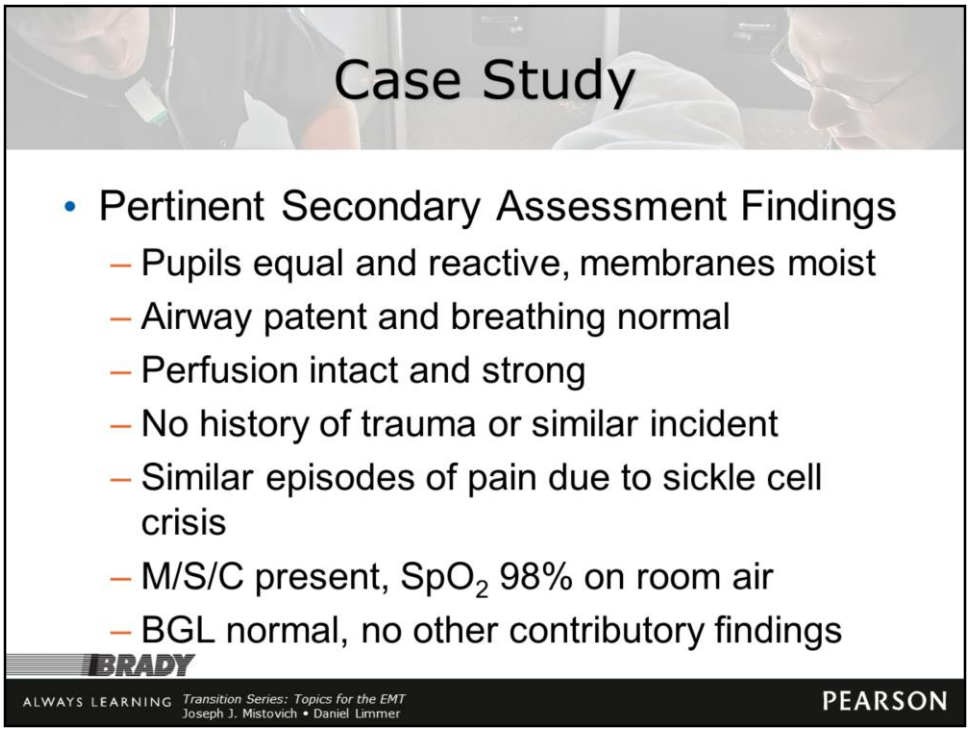
In a young male with back pain, one may initially suspect a traumatic etiology.

Others would include vertebral disk injuries, renal pathologies, or maybe GI that radiates into the back (Kehr sign).

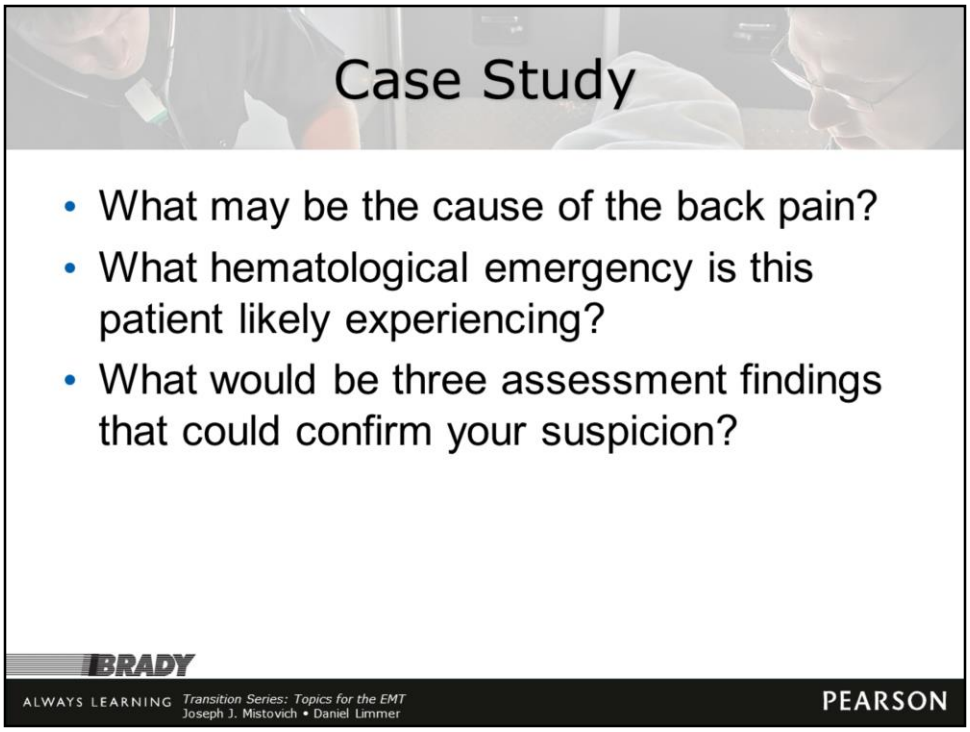
Initial treatment at this time would be oxygen. Finally, the patient would be categorized as a low priority.



Discuss case study.

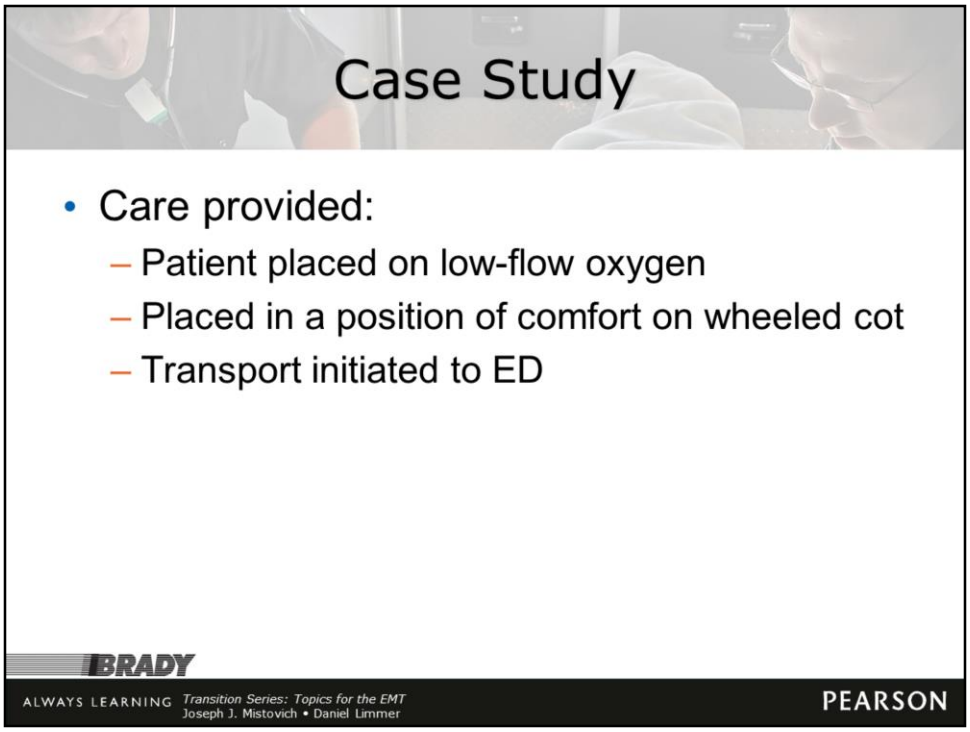


Discuss case study.

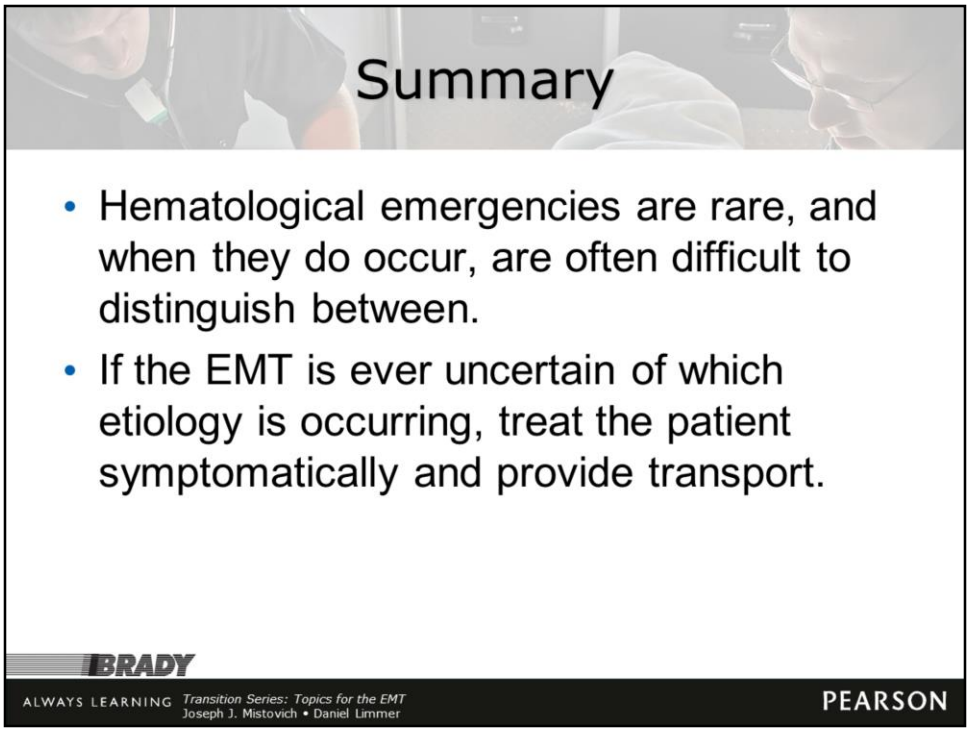


The pain is probably secondary to ischemic or poorly perfused tissues secondary to the sickle cell disease.

Sickle cell crisis is the obvious choice:
•History of sickle cell
•Atruamtic back pain in a young patient
•Similar episodes of sickle cell crisis



Review patient management.



Review as appropriate.