

Concept 2

Reflect: The Concept of Cellular Regulation

Case Study, Part A

Andrew, an 8-year-old Native American male, is brought to the emergency department (ED) by his mother. On arrival, Andrew is pressing a bloody towel against his nose. As the triage nurse, you direct the boy and his mother to the assessment station. Andrew's mother explains that Andrew's nose began bleeding "about an hour ago" during a baseball tournament. Andrew denies any traumatic injury and his mother reports that her son's game had not yet begun when the bleeding began. Andrew appears to be in no acute distress. His respiratory rate is 28 breaths per minute, and his respirations are regular and not labored. Andrew's pulse rate is 136, which is elevated. As you apply a blood pressure cuff to Andrew's arm, you notice light, scattered bruising along his forearm. His blood pressure is 118/71, which is slightly elevated. Although Andrew denies any additional complaints, during further exploration of his health status, his mother reports that her son has seemed "really tired lately" and that he "seems like he's been bruising very easily."

Question 1

Considering your assessment of Andrew, which findings might suggest an alteration in cellular regulation?

Answer 1

Assessment findings that may suggest an alteration in cellular regulation include spontaneous epistaxis (nosebleed), bruising easily, and being "really tired lately."

Question 2

Why might Andrew's blood pressure and pulse rate be elevated?

Answer 2

Various conditions may cause an increase in blood pressure and pulse rate. For example, in Andrew's case, if blood loss related to his epistaxis is significant, his increase in blood pressure and heart rate may be a compensatory response to hypovolemia. Pain and infection also may stimulate the sympathetic nervous system and lead to increases in blood pressure and heart rate. Environmental circumstances and emotional responses may also affect blood pressure and pulse rate. For example, fear and anxiety may stimulate the sympathetic nervous system, triggering the release of hormones (such as adrenaline) that increase blood pressure and pulse rate.

Question 3

What is the relationship between bleeding and bruising?

Answer 3

Bruising is reflective of bleeding beneath the skin's surface.

Question 4

At this time, presuming Andrew has lost a significant amount of blood, what is the priority nursing diagnosis for this client?

Answer 4

Presuming Andrew has lost a significant amount of blood, his priority nursing diagnosis would be *Risk for Deficient Fluid Volume* (NANDA-I © 2012).

Question 5

Refer to the exemplar on Leukemia within this module. Which blood test do you expect to be ordered for further assessment of Andrew's condition?

Answer 5

Andrew's assessment will likely include a complete blood count (CBC) with differential and platelet count.

Case Study, Part B

Andrew is admitted to the ED. During the ED physician's assessment, Andrew tells the physician he feels "a little short of breath," especially when he runs. Andrew's mother reports he has been treated for strep throat three times and has had several ear infections within the past 6 months. The physician orders a CBC with differential for Andrew. After the phlebotomist draws Andrew's blood, she has to apply pressure to the puncture site for nearly 2 minutes before the site stops bleeding. You return to check on Andrew's status. The physician tells you he suspects Andrew may have developed leukemia.

Question 1

Which two components of the CBC will be most useful for evaluation of Andrew's shortness of breath with physical activity?

Answer 1

Because the red blood cell (RBC) contains hemoglobin (Hgb), which binds and carries oxygen, the two components of Andrew's CBC that will be most useful in evaluating his shortness of breath with physical activity include the RBC count and Hgb measurement.

Question 2

Based on Andrew's recurrent nosebleeds and his delayed clotting response after venipuncture, which particular blood component would you expect to be impaired?

Answer 2

Based on Andrew's recurrent nosebleeds and delayed clotting response, his platelet (PLT) count may be abnormal. Alternatively, his PLT function may be abnormal.

Question 3

Describe methods by which you could explain venipuncture to Andrew. How could you involve his mother when explaining the procedure?

Answer 3

Explanation of venipuncture to Andrew could include demonstration through pretending to perform the procedure on oneself or on another member of the healthcare team. The nurse could also perform a pretend demonstration of the procedure using Andrew's mother.

Question 4

Refer to the exemplar on Leukemia within this module. If Andrew has developed leukemia, what results would you expect the CBC to reveal?

Answer 4

If Andrew has developed leukemia, his CBC may reveal an increased white blood cell (WBC) count, with the differential showing an increase in the number of immature WBCs. His red blood cell (RBC) count, hemoglobin (HGB), hematocrit (HCT), and platelet (PLT) count may be decreased.

Question 5

Refer to the exemplar on Leukemia within this module. To further evaluate Andrew for leukemia, for which invasive diagnostic test might he be scheduled?

Answer 5

To further evaluate Andrew for leukemia, a bone marrow examination may be scheduled.

Question 6

Refer to the exemplar on Leukemia within this module. Explain the relationship between frequent/recurrent infections and leukemia.

Answer 6

For the client with leukemia, white blood cells (WBCs) may be immature and ineffective or, in some cases, deficient. Alterations in any of these factors related to WBCs can impair the client's immune response and increase vulnerability to infection.

Case Study, Part C

Andrew's laboratory results are available. His CBC results include the following:

WBC: 37.8 (normal = 4.5–13.5 K/ μ L)

RBC: 3.2 (normal = 3.9–5.2 M/ μ L)

PLT (platelets): 90 (normal = 150–450 K/ μ L)

Lymphocytes: 70 (normal = 37%–48%)

Per the ED physician's request, the pediatric oncologist arrives to examine Andrew and review his laboratory test results. Afterward, she suspects Andrew's signs and symptoms

may be caused by acute lymphoblastic leukemia (ALL). Andrew is admitted to the hospital for further evaluation and treatment.

Question 1

What diagnostic test will likely be included in Andrew's plan of care in order to confirm the suspected diagnosis of ALL?

Answer 1

Andrew will likely be scheduled for a bone marrow examination.

Question 2

Which component of Andrew's CBC suggests thrombocytopenia?

Answer 2

Andrew's abnormal platelet (PLT) count suggests thrombocytopenia.

Question 3

In reacting to the potential diagnosis of cancer, what response(s) might you anticipate from Andrew and his family members?

Answer 3

Andrew and his family members may react with any of a wide range of emotions, including fear, sadness, and anger. An initial sense of shock may also lead them to have no outward reaction to the potential diagnosis.

Question 4

Refer to the exemplar on Leukemia within this module. What does Andrew's lymphocyte measurement suggest about his body's ability to fight infection?

Answer 4

Andrew's increased lymphocyte count suggests his ability to fight infection may be impaired. Lymphocytes are immature white blood cells (WBCs) that are not fully able to fight infection.

Question 5

Refer to the exemplar on Leukemia within this module. As you prepare to transfer Andrew to the pediatric oncology unit, he asks you why he has to stay in the hospital. How should you respond?

Answer 5

If Andrew's mother is present, ask her if she would like to explain the reason for Andrew's hospital admission. If responding directly, be honest, but avoid evoking fear by limiting the details of the explanation; for example, "We'd like to find out what's causing your nosebleeds and why you're feeling more tired than usual."

Question 6

Formulate three nursing diagnoses that are appropriate for inclusion in the nursing plan of care for Andrew and his family.

Answer 6

For Andrew, appropriate nursing diagnoses include *Risk for Injury* related to bleeding tendencies secondary to decreased platelet count and *Risk for Infection* related to impaired white blood cell production. For Andrew and his family, many nursing diagnoses are appropriate, including *Risk for Interrupted Family Processes*. (NANDA-I © 2012)