

A 7-year-old boy is brought to the emergency department due to abdominal pain and fatigue. He developed abdominal pain, vomiting, and diarrhea a week ago. A few days later, he noticed significant blood in the diarrhea, which has since resolved. His mother believed the patient was improving until he developed diffuse abdominal pain today and "didn't want to get off the couch." Despite drinking a normal amount, he has not urinated in 24 hours. Multiple family members had similar initial gastrointestinal symptoms after attending a family cookout last week, but the mother says that everyone else has recovered. On physical examination, scleral icterus, diffuse abdominal tenderness, and 2+ pedal edema are present. Which of the following laboratory values is most likely to be seen in this patient?

- ☐ A. Decreased ferritin level
- ☐ B. Decreased platelet count
- ☐ C. Decreased reticulocyte count
- ☐ D. Increased prothrombin time
- ☐ E. Increased serum haptoglobin
- ☐ F. Positive direct Coombs test

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- ☐ A. Decreased ferritin level [6%]
- ☒ B. Decreased platelet count [58%]
- ☐ C. Decreased reticulocyte count [2%]
- ☐ D. Increased prothrombin time [9%]
- ☐ E. Increased serum haptoglobin [12%]
- ☐ F. Positive direct Coombs test [13%]

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Explanation:

User Id: XXXXXXXXXX

Hemolytic uremic syndrome	
Pathogenesis	<ul style="list-style-type: none"><li>Initial insult from Shiga toxin (most commonly <i>Escherichia coli</i> [O157:H7])</li><li>Vascular damage &amp; microthrombi formation</li></ul>
Clinical features	<ul style="list-style-type: none"><li>Antecedent diarrheal illness (often bloody)</li><li>Microangiopathic hemolytic anemia → fatigue, pallor, schistocytes</li><li>Thrombocytopenia → bruising, petechiae</li><li>Acute kidney injury → oliguria, edema</li></ul>

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This patient presents with abdominal pain, fatigue, and decreased urination after a bloody diarrheal illness, which is concerning for **hemolytic uremic syndrome (HUS)**. HUS most commonly occurs after infection with a **Shiga toxin** produced by a strain of *Escherichia coli* (O157:H7). This toxin initially invades and destroys the colonic epithelial lining, producing bloody diarrhea and abdominal pain. Approximately 15% of children then develop the classic triad of HUS: **microangiopathic hemolytic anemia**, **thrombocytopenia**, and **acute kidney injury** (poor urine output, edema, and elevated creatinine and blood urea nitrogen).

The pathophysiology of HUS begins with systemic vascular endothelial injury and subsequent platelet microthrombi formation, which leads to thrombocytopenia and **schistocytes** as they flow through small vessels (including glomeruli). The resulting hemolytic anemia leads to decreased haptoglobin (**Choice E**) and elevated bilirubin causing scleral icterus and jaundice. Treatment is supportive (eg, fluid/electrolyte management, blood transfusions, dialysis).

**(Choice A)** Decreased ferritin levels are seen in patients with iron deficiency anemia. Patients with HUS would be expected to have normal or increased ferritin levels, as ferritin is an acute phase reactant that rises in the setting of inflammation.

**(Choice C)** Decreased reticulocyte counts in the setting of anemia are typically indicative of defective bone marrow (eg, viral suppression, aplastic anemia, malignancy). Reticulocyte counts are increased in the setting of hemolytic anemias.

**(Choice D)** Coagulation studies in HUS, including prothrombin time, are typically normal. Thrombocytopenia and microangiopathic hemolytic anemia can be seen in both HUS and disseminated intravascular coagulation (DIC), and abnormal coagulation studies can support the diagnosis of DIC.

**(Choice F)** The direct Coombs test is positive in patients with autoimmune hemolytic anemia. Because red blood cells are mechanically destroyed in HUS, the direct Coombs test will be negative.

#### Educational objective:

Hemolytic uremic syndrome, most commonly caused by Shiga toxin produced by *Escherichia coli* strain O157:H7, is characterized by microangiopathic hemolytic anemia, thrombocytopenia, and acute kidney injury.

#### References:

1. [Hemolytic uremic syndrome.](#)
2. [Hemolytic uremic syndrome.](#)



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