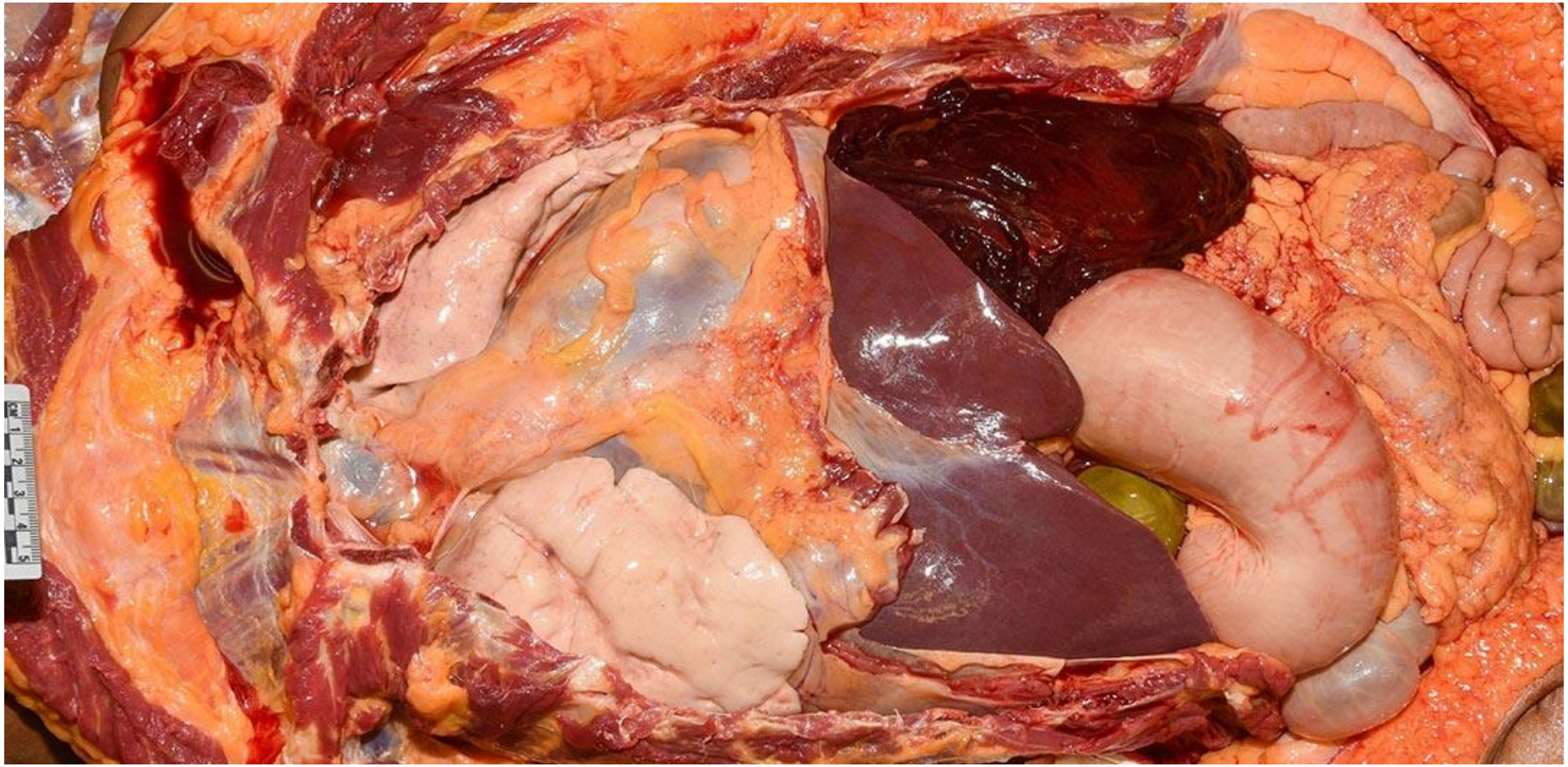
Case #15

NAME Educational Activities Committee



Case courtesy of Ellen Connor, MD PhD and
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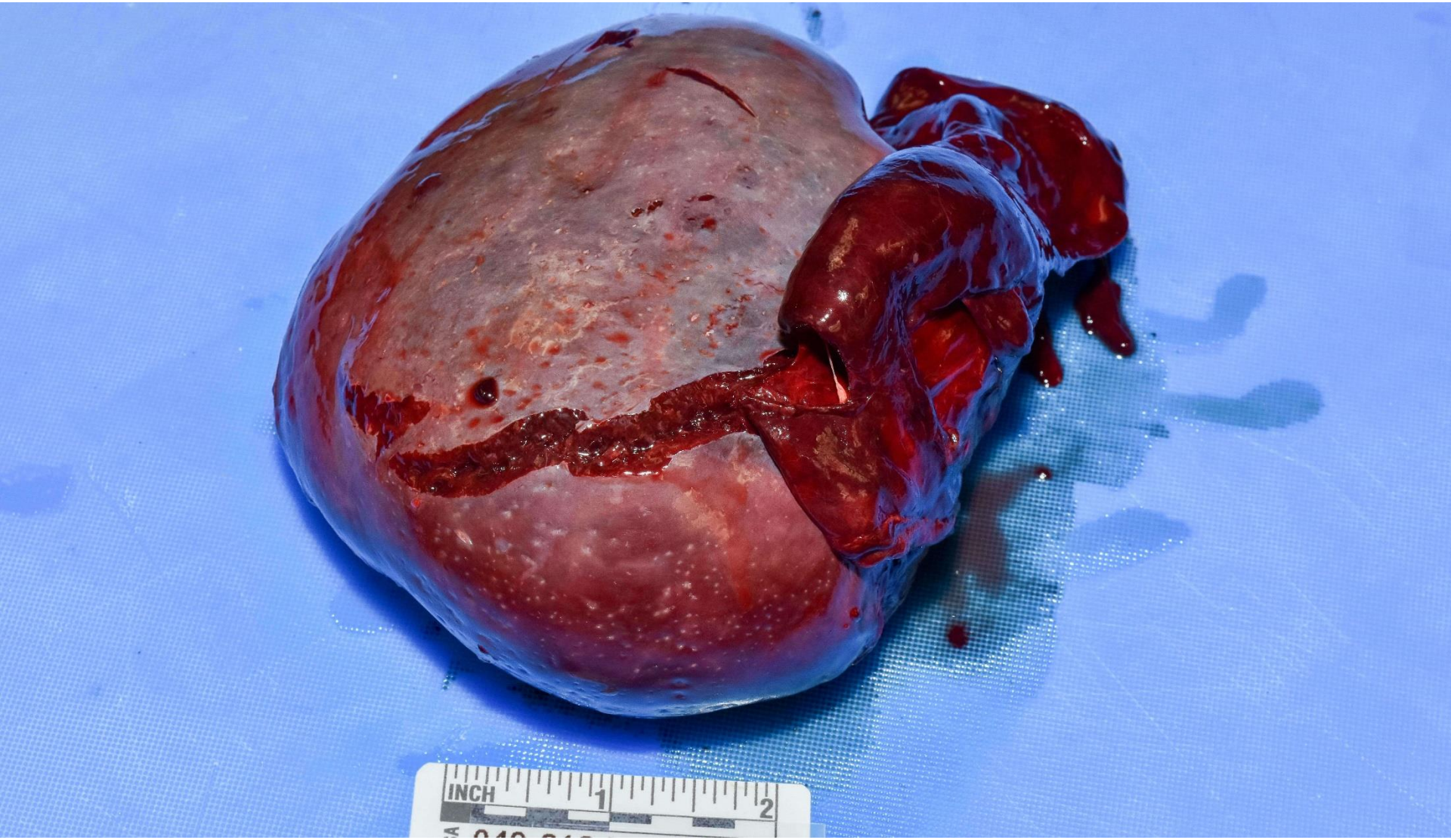

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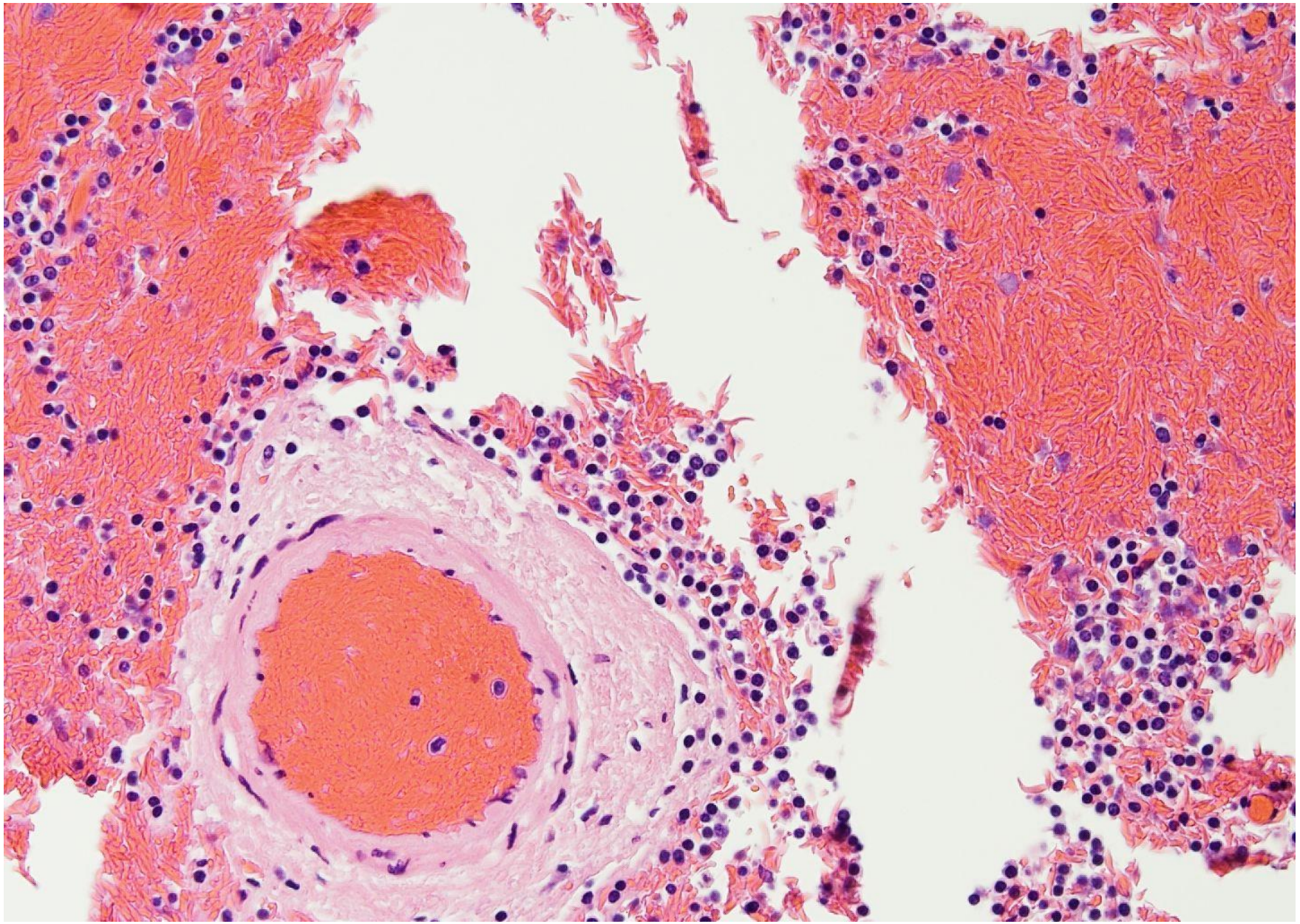


Case courtesy of Ellen Connor, MD PhD and
Daniel Kirsch

1. A 48-year-old Black woman was found unresponsive at home and was declared dead at the scene. Past medical history includes recurrent UTI's, hypertension, and remote COVID-19 infection. Autopsy findings are pictured above. What underlying condition or process is most likely involved?

- ◯ COVID-19 infection
- ◯ Hurler syndrome
- ◯ Hepatic schistosomiasis
- ◯ Sickle cell disease
- ◯ Chronic myelogenous leukemia

A. COVID-19 infection (7.33% responses)

COVID-19 infection, especially in someone with SCD, has been reported to acutely cause RBC sickling and splenic sequestration, resulting in patients presenting with severe anemia[1] [2]. Pulmonary complications, including ARDS, are exacerbated in COVID-19 patients with SCD[3]. A case series of SCD patients with COVID-19 infection reported multiple manifestations of vaso-occlusive crises, but did not report splenomegaly or rupture[4]. In a subset of patients, COVID-19 infection may trigger secondary hemophagocytic lymphohistiocytosis (HLH), which may present with splenomegaly[5]. However, this is an acute complication that occurs in the context of multi-organ failure and not from a remote and resolved infection.

B. Hurler syndrome (HS) (3.04% responses)

HS is an inborn error of metabolism caused by a deficiency of the alpha-L-iduronidase (IDUA) enzyme resulting in accumulation of glycosaminoglycans in liposomes. Splenomegaly is a common feature of HS, along with multi-organ morbidity[6]. However, without treatment HS is fatal, with a median survival age of 8.7 years[7]. This makes it highly unlikely in this adult patient.

C. Hepatic schistosomiasis (13.55% responses)

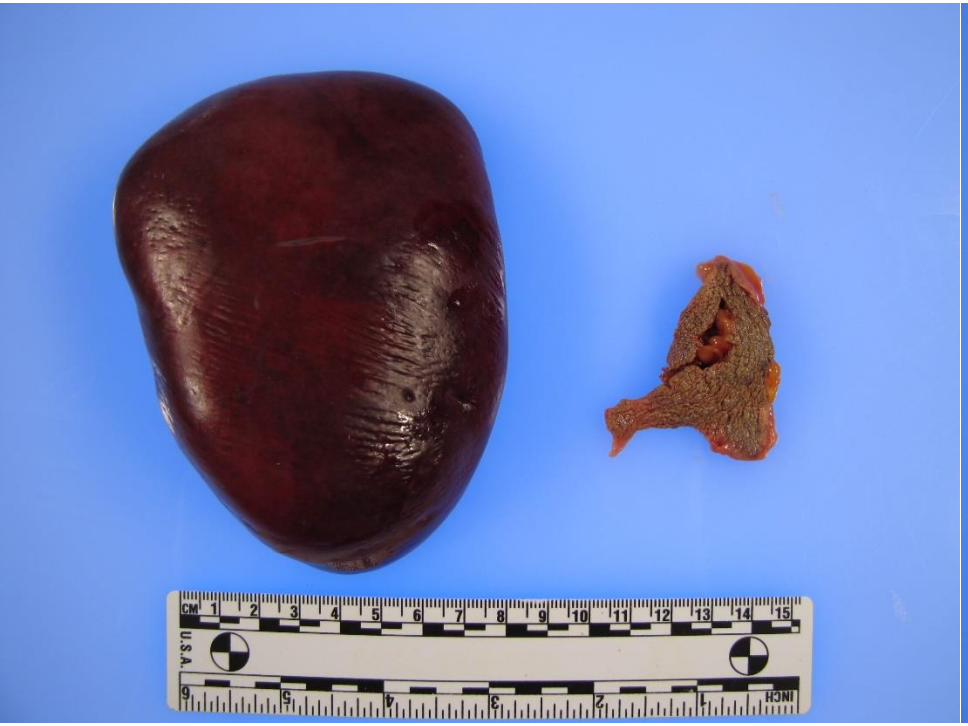
Schistosomiasis is a tropical disease that is endemic to Africa, Asia, and South America, caused by skin contact with Schistosoma larvae in fresh water[8]. Splenomegaly in the context of Schistosoma infection is explained by schistosoma eggs causing chronic liver inflammation leading to hepatic fibrosis and splenomegaly[9] [10]. This has been reported in about 5-7% of patients[10]. In our case, there were no pathologic findings in the liver, and sickled cells are identified in the spleen histology.

D. Sickle cell disease (SCD) (Correct answer, 65.28% responses)

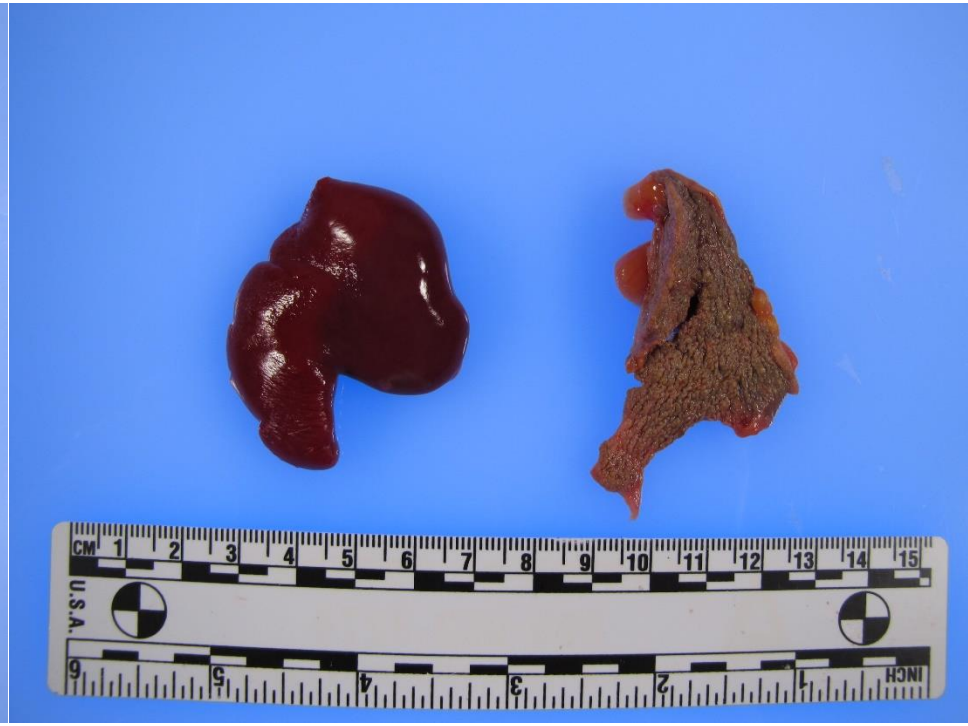
SCD is caused by a mutation of the beta-globin gene for hemoglobin (HbG). SCD prevalence is higher in Black patients in the United States when compared to other racial groups[11] [12]. Deoxygenation allows for the irreversible polymerization of HbG, leading to sickle-shaped erythrocytes that are stiff, non-compliant, and cause vaso-occlusive crises[13]. There are a spectrum of splenic findings in SCD patients, including functional hyposplenism and splenic atrophy[14]. In these cases, autosplenectomy is due to repetitive vaso-occlusive events from sickled erythrocytes[15] [16] [17]. The attached additional photos show an autoinfarcted spleen from a 40-year-old SCD patient compared to a normal adult spleen (A) and a 4 month old infant spleen (B) (photos courtesy of Reade Quinton MD). However, erythrocytic sickling can also lead to splenic sequestration, splenomegaly, and subsequent splenic crisis and anemia, which is most often seen in pediatric patients but can occur at any age[18]. Spontaneous splenic rupture can occur due to massive erythrocyte sequestration during a sickle crisis and should be treated surgically by splenectomy[19]. In this case, massive amounts of sickled erythrocytes are clearly seen histologically in the spleen, making SCD the most likely underlying condition for atraumatic splenic rupture.

E. Chronic myelogenous leukemia (CML) (10.79% responses)

Splenomegaly is commonly seen in myeloproliferative disorders such as CML and has rarely been reported to cause splenic rupture[20] [21]. This is due to infiltration of the spleen by malignant cells and can occur in other hematological malignancies[22]. In splenomegaly due to CML, a pronounced granulocytic infiltrate is seen histologically in the spleen, which is the not present in the decedent. Of note, if leukemia is included in the differential diagnosis, one should consider submitting a section of bone marrow for histologic evaluation.



A. Normal adult spleen compared to adult auto infarcted spleen.



B. Normal 4-month-old spleen compared to adult auto infarcted spleen.

Images courtesy of Reade Quinton, MD

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