

Acute Inpatient Presentation of Scurvy

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Scurvy is a well-known disease of vitamin C deficiency that still occurs in industrialized countries. The clinical manifestations of follicular hyperkeratosis, perifollicular petechiae, corkscrew hairs, and easy bruising are due to defective collagen synthesis and can be mistaken for small vessel vasculitis. Populations at risk for development of scurvy include elderly patients, alcohol and drug users, individuals who follow restrictive diets or have eating disorders, patients with malabsorption, and individuals with mental illness. We report an acute case of scurvy presenting in the inpatient/hospital setting with clinical findings initially thought to represent vasculitis. A high index of suspicion for scurvy must be kept in the appropriate clinical context, and a thorough medical history and physical examination are vital to make the diagnosis.

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Case Report

A 48-year-old man was admitted with acute-onset left knee pain, swelling, and bruising of 3 weeks' duration. Initially the patient was admitted to the vascular surgery department and was thought to have ischemic or thrombotic peripheral vascular disease; however, arteriography of the lower extremities was normal without evidence of stenosis or occlusion. The patient was then transferred to the medicine service for further workup. The rheumatology department was consulted first because of the left knee pain and edema; arthrocentesis was performed and revealed grossly bloody fluid with negative bacterial cultures. In addition to the large ecchymotic patch associated with the left knee swelling, diffuse petechial and purpuric macules and patches also were

noted on the lower extremities. At that time, the dermatology department was consulted to perform a skin biopsy to rule out vasculitis. Upon questioning, the patient noted the onset of the diffuse petechial rash on the lower legs at the same time as the left knee pain and ecchymosis. He denied trauma to the lower extremities. There was no pain, itching, or burning associated with the rash aside from the left knee pain. The patient admitted to a history of easy bruising but denied epistaxis. A medical history revealed hypertension, anxiety, and gastritis. The patient was taking esomeprazole magnesium and lorazepam prior to hospitalization. He reported occasional alcohol consumption and a history of smoking (25 packs per year). On further questioning, the patient reported a poor appetite, denied taking any vitamin supplements, and described little to no fruit and vegetable intake.

Physical examination revealed an afebrile thin man in no acute distress. Examination of the oral mucosa revealed many missing teeth and rotting of the remaining teeth. There was pitting edema of the left lower extremity up to the knee. The bilateral lower extremities had perifollicular petechial macules with a large purpuric patch extending from the left upper thigh down to the knee and upper posterior lower leg (Figures 1 and 2). Leg hair was sparse in areas with corkscrew configuration appreciated (Figure 3).

A 4-mm punch biopsy from the left lower leg revealed a focal superficial lymphohistiocytic infiltrate in a perifollicular distribution. Rare extravasated erythrocytes were noted (Figure 4). There was no evidence of vasculitis. Magnetic resonance imaging of the left femur was performed and exhibited extensive subcutaneous edema with diffusely increased T2 signal in the musculature suggestive of blood accumulation. Fascial fluid was noted but no subperiosteal hemorrhage was present.

Laboratory workup for coagulopathy and vasculitis were all negative, including normal erythrocyte sedimentation rate, antinuclear antibodies, cryoglobulins, antineutrophil cytoplasmic antibodies, anticardiolipin antibodies, lupus anticoagulant, prothrombin time, partial thromboplastin time, hepatitis panel, and complement. The patient's

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The authors report no conflict of interest.

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Figure 1. Diffuse purpuric macules on the bilateral lower extremities.



Figure 2. Large ecchymotic patch on the left thigh and knee with edema and hemarthrosis.



Figure 3. Perifollicular petechiae and corkscrew hairs.

white blood cell count was within reference range, but he had normocytic, normochromic anemia with a hemoglobin level of 8.9 g/dL (reference range, 14.0–17.5 g/dL). The patient also had hyperbilirubinemia (total bilirubin, 3.1 mg/dL [reference range, 0–1.0 mg/dL]; indirect bilirubin, 2.1 mg/dL [reference range, 0–0.9 mg/dL]) and a low prealbumin level of 6.8 mg/dL (reference range, 18–38 mg/dL). Serum folate, ferritin, and vitamin B₁₂ levels were all within reference range. Blood cultures were all negative for bacteria during his hospitalization. A serum vitamin C level was checked because of the high index of suspicion for scurvy and was lower than 0.12 mg/dL (reference range, 0.4–1.5 mg/dL). Although the magnetic resonance imaging and skin biopsy findings were not diagnostic of scurvy alone, the patient's medical history, physical examination, and low vitamin C level confirmed the diagnosis.

Comment

Scurvy is the well-known result of vitamin C, or ascorbic acid, deficiency historically associated with poor dietary intake in sailors. Although rare, scurvy still occurs in industrialized countries in the world

today due to poor dietary intake or absorption of vitamin C. Risk factors for scurvy in industrialized countries include poverty, alcohol and drug use, mental illness, and eating disorders.^{1,2} In our patient, there was no evidence of underlying psychiatric illness contributing to food restriction. His lack of vitamin C intake was most likely multifactorial, including alcohol consumption and rare fruit and vegetable intake.

The classic skin findings, as seen in our patient, include follicular hyperkeratosis, corkscrew hairs with perifollicular hemorrhage, and subcutaneous hemorrhage. Other findings include normocytic anemia, gingivitis with loss of teeth, anorexia, weight loss, fatigue, hemarthrosis, gastrointestinal tract bleeding, and edema.³ Bone findings, such as subperiosteal hemorrhage, are seen more commonly in children given their rapid bone growth and were not present in our patient.⁴ The anemia may be multifactorial, resulting from hemorrhage, impaired iron absorption, and concomitant folate deficiency, though folate levels were within reference range in our patient. Hemorrhage and hemolysis account for the indirect hyperbilirubinemia.

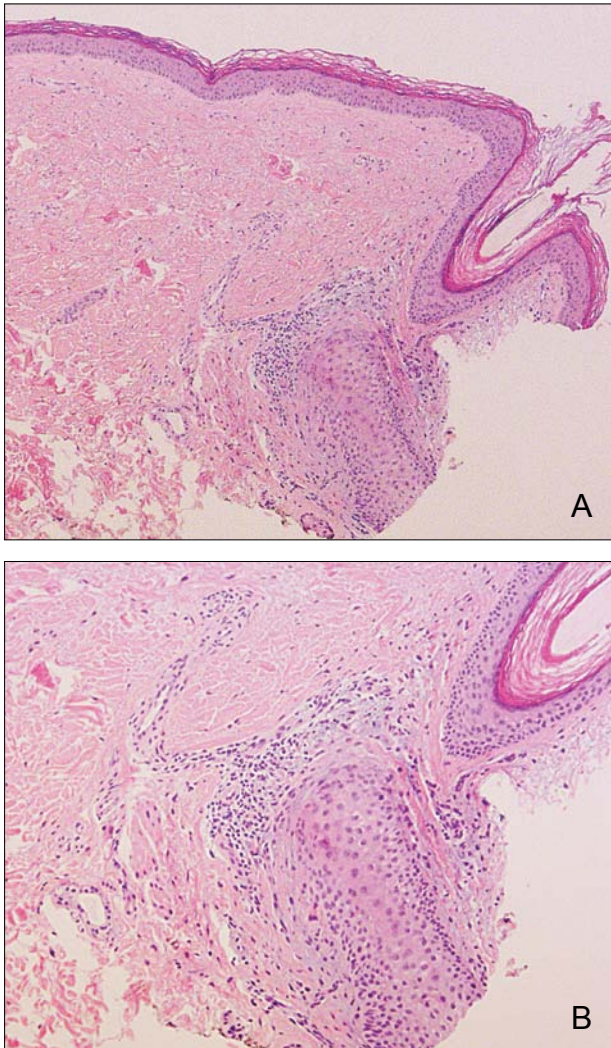


Figure 4. Low-power view of the left leg biopsy showed follicular hyperkeratosis and mild perifollicular fibrosis. No ulceration or vascular changes were present (A) (H&E, original magnification $\times 40$). Higher-power view of the follicle showed perifollicular fibrosis, a mild periadnexal lymphocytic infiltrate, and rare extravasated erythrocytes (B) (H&E, original magnification $\times 100$).

The skin findings are most often confused with small vessel vasculitis⁵; as a result, a thorough medical history and physical examination are important to diagnose scurvy.

Vitamin C has many biologic functions, including carnitine and norepinephrine synthesis, antioxidant properties, tyrosine metabolism, iron absorption, disulfide bonding of hair, and collagen synthesis. The role of vitamin C in collagen synthesis is responsible for its classic cutaneous findings. Vitamin C serves as a cofactor for hydroxylation of proline and lysine molecules required for stable triple helix formation in mature collagen; therefore, lack of this hydroxylation step results in decreased

triple helix formation and clinically in blood vessel fragility and poor wound healing.⁶

Scurvy responds promptly with repletion of vitamin C. The current recommendations for repletion include 100 mg 3 times daily,⁶ 500 mg twice daily,⁷ and 800 mg daily³ for one week, and then the normal adult recommended daily dosage of 75 to 100 mg can be resumed.⁸ Certain populations have higher vitamin C requirements, such as elderly patients, pregnant and lactating women, and smokers. Our patient had a smoking history of 25 packs per year. Because of higher turnover of vitamin C with increased oxidative stress in patients who smoke, it is necessary to increase vitamin C requirements by 2- to 3-fold in these patients.⁹ Symptoms of scurvy, such as fatigue and pain, begin to resolve within 24 hours; edema in 3 to 5 days; and most clinical signs, such as bruising, gingival erosions, and corkscrew hairs, usually resolve within 1 to 4 weeks after vitamin C repletion.⁶

Conclusion

We report a classic presentation of scurvy that was initially thought to be small vessel vasculitis. This case is a reminder that scurvy can still occur in the 21st century, albeit rare, especially in at-risk populations including elderly patients, alcohol and drug users, individuals who follow restrictive diets or have eating disorders, patients with malabsorption, and individuals with mental illness. Scurvy can mimic vasculitis; therefore, a detailed medical history and physical examination are essential in diagnosing this condition.

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