

Scurvy in Hospitalized Patients

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PRACTICE POINTS

- Clinicians should maintain a high index of suspicion for vitamin C deficiency/scurvy in hospitalized patients with purpura who have multiple medical comorbidities and risk factors.
- A low platelet count may mask underlying vitamin C deficiency, and patients may have concurrent deficiencies in other nutrients such as zinc.

Vitamin C deficiency can occur in industrialized nations in at-risk populations, such as those with a history of smoking, alcohol use, restrictive diet, poor oral intake, psychiatric disorders, dementia, bone marrow transplantation, gastroesophageal reflux disease, or end-stage renal disease. In this case series, we present 4 hospitalized patients with thrombocytopenia and a range of risk factors for micronutrient deficiency who were diagnosed with scurvy.

Scurvy, caused by vitamin C or ascorbic acid deficiency, historically has been associated primarily with developing nations and famine; however, specific populations in industrialized nations remain at an increased risk, particularly individuals with a history of smoking, alcohol use, restrictive diet, poor oral intake, psychiatric disorders, dementia, bone marrow transplantation, gastroesophageal reflux disease, end-stage renal disease, and hospitalization.¹ Micronutrient deficiency-associated dermatoses have been linked to poor clinical outcomes in hospitalized patients.² In this case series, we report 4 hospitalized patients with scurvy, each presenting with unique comorbidities and risk factors for vitamin C deficiency (eTable).

Case Reports

Patient 1—A 50-year-old man with a 6-month history of eczema and restrictive dietary intake was admitted to the hospital for septic shock attributed to a left foot infection of 5-days' duration. The patient had experienced unintentional weight loss with severe protein-calorie malnutrition. His dietary history was notable for selective eating

behaviors, intermittent meal skipping, and vegetarianism. Mucocutaneous examination by the dermatology consult team showed exfoliative dermatitis with angular cheilitis, corkscrew hairs on the legs (eFigure 1), and scattered purpura throughout the body. The differential diagnosis included eczema exacerbation, cutaneous T-cell lymphoma/Sézary syndrome, and malnutrition-related dermatosis. Punch biopsies of the left medial knee and right lateral arm revealed impetiginized, spongiotic, psoriasiform dermatitis with papillary dermal edema. The histologic changes were consistent with malnutrition-related dermatosis. Laboratory results included low vitamin C levels (0.1 mg/dL [reference range, 0.2-2.1 mg/dL]), undetectable zinc levels (<10 µg/dL [reference range, 60-130 µg/dL]), a low platelet count (21 k/µL [reference range, 150-400 k/µL]), low albumin levels (0.9 mg/dL [13.0 g/dL [reference range, 14.0-17.4 g/dL])). The final diagnosis was exfoliative dermatitis due to eczema and multiple nutrient deficiencies (vitamin C and zinc). The patient was treated with vitamin C 500 mg/d and was started on mirtazapine to improve his appetite. Following a 3-month hospitalization, the patient was lost to follow-up after discharge.

Patient 2—A 55-year-old woman with a history of multiple psychiatric disorders presented to the dermatology consult service with an asymptomatic purpuric eruption on the right antecubital fossa of 2 days' duration that spread to the proximal thighs. Five days prior to presentation, she had received an allogeneic bone marrow transplant complicated by mucositis. She also reported a 4-month history of decreased appetite. At the current presentation, numerous acral, follicular-based, purpuric macules and papules without associated corkscrew hairs were observed (eFigure 2). The differential diagnosis included a purpuric drug reaction, viral exanthem, acute graft-vs-host disease, neutrophilic dermatoses, and vitamin C deficiency-related dermatosis. Laboratory results revealed undetectable vitamin C levels (<0.1 mg/dL [reference range, 0.3-2.7 mg/dL]), a low platelet count (8 k/µL [reference range, 150-400 k/µL]), normal albumin levels (3.7 g/dL [reference range, 3.5-5.0 g/dL]), and low

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The eTable and eFigures are available in the Appendix online at <https://www.mdedge.com/cutis>.

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hemoglobin (7.8 g/dL [reference range, 14.0-17.4 g/dL]). Based on the histopathologic finding of subtle interface dermatitis with purpura from a punch biopsy of the right forearm, the eruption was attributed to scurvy. Although dermatology recommended supplementation with vitamin C 1000 mg/d, the decision was deferred by the primary team and the purpura improved without it—suggesting the purpura was only partly attributable to low vitamin C.

Patient 3—A 77-year-old woman with a history of low oral intake, a low body mass index (18.15 kg/m² [reference range, 18.5-24.9]), vegetarianism, multiple psychiatric disorders, dementia, recent *Clostridioides difficile* colitis treated with meropenem, and recurrent idiopathic pancytopenia presented to the hospital with recurrent oral erosions and purpura of the legs for an unknown period. Physical examination by the dermatology consult team revealed superficial lip desquamation; erosions of the buccal mucosa with no involvement of the inner lip or gingiva; mild gingival hyperplasia (eFigure 3); and scaly, purpuric, follicular macules and papules on the legs. The arms and legs were devoid of hair. Laboratory results were notable for low vitamin C levels (0.1 mg/dL [reference range, 0.3-2.7 mg/dL]), a low platelet count (28 k/μL [reference range, 150-500 k/μL]), low albumin levels (2.9 g/dL [reference range, 3.5-5.0 g/dL]), and low hemoglobin (8.8 g/dL [reference range, 12.0-16.0 g/dL]). A punch biopsy from the left thigh revealed pauc-inflammatory interface dermatitis with purpura. Based on the clinical and histologic findings, a final diagnosis of purpuric drug eruption (from the meropenem) and scurvy was made. Nutritional support included supplementation with vitamin C 1000 mg/d. The patient's oral erosions and purpura gradually resolved with treatment throughout her 1.5-month hospitalization.

Patient 4—A 67-year-old woman with a history of extensive cardiovascular disease, gastroesophageal reflux disease without esophagitis, end-stage renal disease not requiring hemodialysis, and loss of appetite presented with a painful pruritic eruption on the legs with groin involvement of 2 months' duration. The patient was admitted to the hospital for worsening mental status and weakness accompanied by dark stools, hematuria, and a productive cough with red-tinged sputum. Physical examination by the dermatology consult team showed a scaly, follicular, purpuric eruption affecting the acral and intertriginous sites (eFigure 4). The patient had sparse leg hair, making it difficult to assess for hair tortuosity. A punch biopsy of the left posterior knee revealed purpuric psoriasiform dermatitis, which was consistent with nutritional deficiency-associated dermatosis. Laboratory results included low vitamin C (<0.1 mg/dL [reference range, 0.3-2.7 mg/dL]), zinc (58 μg/dL [reference range, 60-130 μg/dL]), and albumin levels (3.3 g/dL [reference range, 3.5-5.0 g/dL]) and a low platelet count (67 k/μL [reference range, 150-500 k/μL]). The patient was started on supplementation with vitamin C 1000 mg/d with improvement of the purpura.

Comment

Micronutrient deficiencies may be common in hospitalized patients due to an increased prevalence of predisposing risk factors including infection, malnutrition, malabsorptive conditions, psychiatric diseases, and chronic illnesses.³ Acute-phase response in hospitalized patients also has been strongly associated with decreased plasma vitamin C levels.⁴ This phenomenon is postulated to be due to the increase in ascorbic acid uptake by circulating granulocytes in acute disease⁵; however, because low vitamin C levels during the acute-phase response may not always accurately reflect total body stores, other clinical features should be assessed. Previously reported social history risk factors include smoking, alcohol consumption, marijuana use, restrictive diets, vegetarianism, and living alone.^{6,7}

The unifying clinical clues for scurvy in our 4 patients were a history of poor oral intake and purpura. While purpura is nonspecific and can appear after traumatic injury to the skin in elderly patients with photodamage and coagulation disorders, it also is associated with vitamin C deficiency, even with a normal platelet count, circulating von Willebrand factor levels, and prothrombin time/partial thromboplastin time.⁸ This is because vitamin C is vital in forming the collagen and extracellular matrix. Specifically, it is a cofactor for lysine and proline hydroxylase enzymes needed for the α-helix crosslinks in collagen, which are essential for its structural integrity.⁹ Collagen is a structural protein that maintains the blood vessel walls, skin, and the basement membrane. A deficiency in vitamin C leads to impairment in collagen synthesis, and insufficient collagen results in compromised connective tissue, blood vessels, and hair strength, which may lead to purpura. All of our patients had thrombocytopenia, and similarly, consideration for scurvy in hospitalized patients with risk factors for micronutrient deficiency is a must. Additional findings such as a follicular-based pattern of the purpura, hair tortuosity, restrictive dietary history, histopathology reports consistent with nutritional dermatoses, serum vitamin C levels, and improvement with vitamin C supplementation are more specific for scurvy. All of these factors can assist the clinician in detecting and confirming these micronutrient deficiencies.

Although there are no established therapeutic guidelines for scurvy, the mainstay of treatment is vitamin C repletion, either orally or parenterally. In hospitalized patients, one suggested regimen is 1000 mg of intravenous ascorbic acid daily for 3 days, followed by further supplementation with a dose of 250 to 500 mg twice daily for 1 month as needed after discharge.¹⁰ Symptom improvement occurs about 72 hours after vitamin replacement.⁸ We recommended 500 to 1000 mg of daily vitamin C supplementation for our patients.

Final Thoughts

This case series highlights the importance of maintaining a high index of suspicion for scurvy in hospitalized patients presenting with purpura, especially in a follicular-based pattern, who have multiple medical

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comorbidities and risk factors for vitamin C deficiency. The manifestations of scurvy are heterogeneous, necessitating a comprehensive mucocutaneous examination. The diagnosis of scurvy requires correlation of the findings from the patient history, clinical examination, laboratory results, and histopathology.

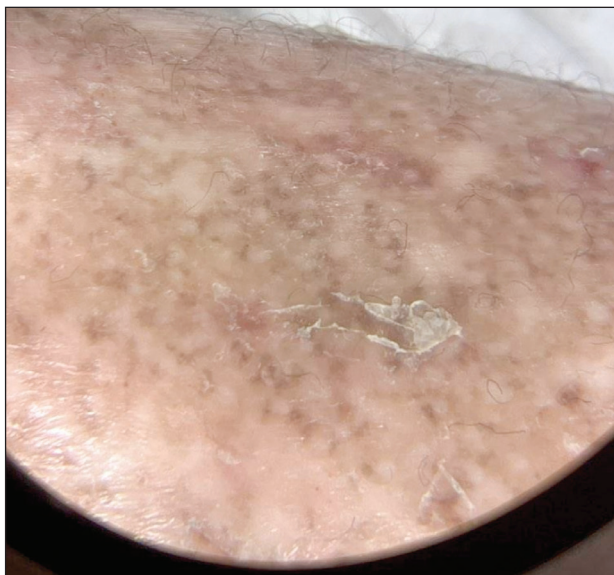
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eTABLE. Summary of the Case Patients

	Patient 1	Patient 2	Patient 3	Patient 4
Sex/Age, y	M/50	F/55	F/77	F/67
Medical history	Eczema, restrictive dietary intake, 6-mo history of unintentional weight loss and severe protein-calorie malnutrition	Multiple psychiatric disorders, bone marrow transplantation 5 d prior to current presentation complicated by mucositis	Low oral intake, low BMI, vegetarianism, multiple psychiatric disorders, dementia, recent <i>Clostridioides difficile</i> colitis treated with meropenem, and recurrent idiopathic pancytopenia	History of extensive cardiovascular disease, GERD, and ESRD
Scurvy risk factors	Restrictive diet, weight loss	Loss of appetite, multiple psychiatric disorders, recent bone marrow transplantation	Low oral intake, multiple psychiatric disorders, dementia, use of meropenem	Loss of appetite, GERD, ESRD
Clinical presentation	Exfoliative dermatitis on the legs	Asymptomatic purpuric eruption on the right antecubital fossa that spread to the legs	Recurrent oral erosions and purpura of the legs	Painful and pruritic eruption with groin involvement
Morphology	Exfoliative dermatitis with angular cheilitis, scattered purpura, corkscrew hairs on the legs	Numerous asymptomatic, follicular-based purpura affecting the acral sites; no corkscrew hairs	Superficial lip desquamation, erosions of the buccal mucosa, mild gingival hyperplasia, purpura of the legs	Intertriginous and acral scaly, follicular-based purpura with petechiae
Laboratory results	Low: vitamin C, zinc (undetectable), platelet count, albumin, hemoglobin	Low: vitamin C (undetectable), platelet count, hemoglobin; Normal: albumin	Low: vitamin C, platelet count, albumin, hemoglobin	Low: platelets, vitamin C, zinc, albumin; Normal: hemoglobin
Histopathology	Eroded and impetiginized spongiotic psoriasiform dermatitis with papillary dermal edema	Subtle interface dermatitis with purpura	Pauci-inflammatory interface dermatitis with purpura	Purpuric psoriasiform dermatitis
Final clinical diagnosis	Exfoliative dermatitis due to eczema with zinc and vitamin C deficiencies	Follicular-based purpuric eruption partially attributable to vitamin C deficiency	Purpuric drug eruption from meropenem use and scurvy	Follicular-based purpuric eruption from vitamin C and zinc deficiencies
Treatment	Vitamin C 500 mg/d	None	Vitamin C 1000 mg/d	Vitamin C 1000 mg/d
Rash outcome	Unknown (patient lost to follow-up)	Improved but not resolved without vitamin C supplementation	Resolved with vitamin C supplementation	Improved but not resolved with vitamin C supplementation

Abbreviations: BMI, body mass index; ESRD, end-stage renal disease; GERD, gastroesophageal reflux disease.



eFIGURE 1. Corkscrew hairs on the bilateral legs in patient 1.



eFIGURE 3. Mild gingival hyperplasia in patient 3.



eFIGURE 2. Follicular-based purpuric macules and papules without associated corkscrew hairs in patient 2.



eFIGURE 4. Scaly, follicular, purpuric eruption affecting acral and intertriginous sites in patient 4.