Bugs and Blood Cells
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PRESENTATION
When lymphoma is suspected in a patient already diagnosed with several other chronic, life-threatening diseases, the ultimate diagnosis brings good news in the form of a potentially very treatable condition.

A 63-year-old Hispanic man was admitted to the hospital for altered mental status when he presented to the nephrology clinic for a follow-up visit for chronic renal insufficiency. He had been presumptively diagnosed with allergic interstitial nephritis based upon ongoing renal insufficiency with concurrent eosinophilia and eosinophiluria, but he had not had a renal biopsy because steroid bursts resulted in clinical improvement. He also suffered from type II diabetes and systolic congestive heart failure, and he had a 2.5-year history of severe diffuse pruritus without definitive diagnosis. It was initially thought that the patient’s altered mental status was secondary to a number of contributing causes including uremic encephalopathy and hyponatremia.

The patient was a retired carpenter who lived alone without pets. He did not engage in any high-risk sexual behaviors, smoke, or abuse alcohol or drugs. He denied allergies of any kind. His medication regimen consisted of amlodipine, aspirin, Bumex, carvedilol, glipizide, hydralazine, and sevelamer.

At admission to the hospital, the patient reported an unintentional weight loss of 20 pounds over the course of the previous month. He denied fever, chills, night sweats, myalgias, or other symptoms indicative of an acute or chronic infectious or neoplastic illness. However, his ongoing diffuse pruritus was quite severe and was refractory to treatment with Cetaphil topical cream and hydroxyzine. Originally, the patient had presented to the dermatology clinic in August 2005 with generalized pruritus that was not relieved by oral antihistamines or medicated creams. At that time, he had denied any allergic or infectious contacts, and had been found to be in generally good health. Lacking convincing historical factors or physical exam findings to explain the pruritus, he had been diagnosed with medication (hydrochlorothiazide)-induced pruritic eruption. Initially, he had been treated with Atarax (25 mg daily at bedtime) and instructed to discontinue hydrochlorothiazide, but these measures failed to resolve the pruritus, which persisted at his 1-month follow-up visit. The physical exam performed at that follow-up visit revealed minimal erythema with persistent scaling and excoriations bilaterally at the antecubital fossa, trunk, and back.

In January 2008, the patient was admitted to the hospital twice for acute exacerbations of decompensated congestive heart failure and incidentally was diagnosed with eosinophilia. His white blood cell counts during the 2 January admissions were $8.9 \times 10^3/\text{mm}^3$ and $8.3 \times 10^3/\text{mm}^3$ with 19% and 23% eosinophils, respectively. A consultation with the hematology and oncology service during the second January admission led to the suggestion that the cause of the eosinophilia was acute allergic interstitial nephritis secondary to Lasix therapy. The Lasix was therefore discontinued, and the patient was placed on Bumex. A 2-week course of high-dose prednisone was also initiated. These measures resulted in an initial drop in the eosinophil count. However, the eosinophil count rose progressively as the prednisone was tapered.

ASSESSMENT
Examination upon the patient’s most recent admission to the hospital for altered mental status revealed him to be afebrile, with a blood pressure of 172/92 mm Hg and a heart rate of 92 beats per minute. He appeared well nourished, awake, and alert, and he was oriented to person and place but not time. Hyperkeratotic, minimally erythematous plaques with islands of lichenification and excoriated papules were noted over the anterior aspects of his lower legs (Figure 1). These lesions
extended proximally to include a circumferential band-like
distribution across his lower abdomen and back. No apprecia-
table lymphadenopathy or hepatosplenomegaly was evident.

A complete blood count and peripheral blood smear dem-
strated marked eosinophilia with 37% eosinophils and an
absolute eosinophil count of $3.6 \times 10^3$mm$^{-3}$ (normal range up
to $0.3 \times 10^3$mm$^{-3}$). Mild anemia and lymphopenia also were
noted. No other abnormalities were demonstrated. Serum elec-
trolytes were within normal limits with the exceptions of hy-
ponatremia and elevated creatinine, blood urea nitrogen, and
phosphorous, which were increased secondary to chronic renal
insufficiency. Because of the unexplained complete blood
count findings and concern for myeloma, serum protein elec-
trophoresis was performed. This test revealed a polyclonal
increase in the gamma globulin fraction ($3.32$ g/dL; normal
range $0.7-1.6$ g/dL). Anti-nuclear antibody and anti-neutrophil cyto-
plasmic antibody tests were negative; serum complement 3 and
4 levels were normal; and anti-proteinase-3 antibody and anti-
myeloperoxidase antibody levels were within normal limits.
There was no evidence of hepatitis B or C infection, and
serology for human immunodeficiency virus was negative.

Because a malignancy, specifically a lymphoma, was
suspected, a computed tomography (CT) scan of the abdo-
men and pelvis was performed. The CT scan demonstrated
multiple borderline-enlarged bilateral pelvic and inguinal
lymph nodes, with the largest (which was in the left inguinal
region) measuring $2.3 \times 1.4$ cm. No other pathology was
noted. Based upon the dermatologic findings, the history of
chronic pruritus and weight loss, eosinophilia, and pelvic
adenopathy, a cutaneous T-cell lymphoma (specifically,
mycosis fungoides) was suspected, and a 4-mm skin punch
biopsy was taken from the patient’s left lower abdomen.

**DIAGNOSIS**

Pathologic analysis of the patient’s skin biopsy did not
confirm the suspected lymphoma. Instead, it revealed
vesiculating epidermal spongiotic dermatitis with super-
ficial perivascular lymphoeosinophilic infiltrate (Figure
2). Hematoxylin and eosin staining demonstrated arthro-
pod fragments within the inflammatory crust of serum
and eosinophils (200×). Eosinophils were focally prominent within
the spongiotic epidermis.

![Figure 1](image1.png)
**Figure 1** Lichenification and excoriation on lateral lower extremity.

![Figure 2](image2.png)
**Figure 2** Hematoxylin and eosin-stained section from a punch biopsy showing epidermal spongiosis and a superficial perivascular infiltrate consisting primarily of lymphocytes and eosinophils (200x). Eosinophils were focally prominent within the spongiotic epidermis.

![Figure 3](image3.png)
**Figure 3** (100x magnification) Hematoxylin and eosin stained section from a punch biopsy (100x). Arrowhead indicates a superficial eosinophilic crust. Arrow indicates an arthropod fragment.

Eosinophilia is an infrequently characterized manifesta-
tion of both classic and crusted (Norwegian) scabies. Several cases of eosinophilia in association with *S. scabiei*
infestation have been reported in patients younger than 20
years of age; 2 of the patients had predisposing disorders of keratinization.\textsuperscript{3,4} None of the reports published thus far have addressed the degree of eosinophilia demonstrated in \textit{S. scabiei} infection, however.\textsuperscript{5} The pathologic mechanism of scabies-associated eosinophilia involves local eosinophilic invasion of the infected dermis. Systemic urticarial reaction is occasionally noted.\textsuperscript{6} Typical dermatological manifestations can include pruritic papules, burrows, and nodules (frequently in axilla and genital areas) and nonspecific lesions such as excoriations, eczematization, and impetiginization. Some scabies infections present similarly to bullous pemphigoid disease.\textsuperscript{7}

Our patient demonstrated a mixed pattern of atypical \textit{S. scabiei} infection manifesting in crusted scabies with some impetigious features. The crusted form of scabies occurs in immunocompromised patients and is characterized by very large burden of mites. This form of scabies may go undiagnosed or may be misdiagnosed as psoriasis, eczema, contact dermatitis, or an adverse drug reaction, as was originally the case with our patient.\textsuperscript{8}

**MANAGEMENT**

The patient was treated with 2 doses of oral ivermectin (0.2 mg/kg) administered 2 weeks apart. This treatment was augmented with permethrin and clobetasol cream. He reported an immediate decrease in pruritus, and his eosinophil count fell simultaneously and abruptly to within normal limits. At the time of discharge, his differential blood count revealed 2% eosinophils with $0.3 \times 10^3$ eosinophils/mm$^3$ (Figure 4).

In crusted scabies, the hyperkeratotic crusts might harbor millions of mites, making this condition highly contagious. Crusts may flake off and contaminate clothing, bed linens, curtains, floors, and walls, and they remain infective for up to 2 days.\textsuperscript{9} The United States Centers for Disease Control and Prevention (CDC) recommends appropriate patient isolation, as well as the use of gloves, gowns, and shoe covers to prevent skin-to-skin contact.\textsuperscript{10} For hospitals with one or more cases of crusted scabies, the CDC also advocates measures involving infection control personnel and dermatologists. However, scabies transmission can occur despite appropriate patient isolation and barrier use.\textsuperscript{11} Therefore all hospital staff, volunteers, and visitors who might have been exposed to a patient with crusted scabies should be treated prophylactically with a course of 5% permethrin. The patient’s room should be cleansed thoroughly, and all linens and clothing with which patient had contact should be machine-laundered with hot water. Vacuuming has proved effective for mite removal from room curtains and the surrounding environment.

**References**


