

Case Studies

A 92-Year-Old Male with Eosinophilic Asthma Presenting with Recurrent Palpable Purpuric Plaques

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Abstract

Churg-Strauss syndrome or eosinophilic granulomatosis with polyangiitis is a systemic vasculitis affecting the small and medium-sized vasculature. It is commonly associated with asthma and eosinophilia. Most patients are diagnosed at around the age of 40. We report a case of biopsy-confirmed Churg-Strauss syndrome in a 92-year-old male with a history of eosinophilic asthma and peripheral eosinophilia who was later diagnosed with Churg-Strauss syndrome.

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Case Report

A 92-year-old male with a history of eosinophilic asthma and peripheral eosinophilia of unclear etiology presented with a nonpruritic, nontender rash that first appeared in the groin then spread to the torso and upper extremities over the course of 1 week. Prior to presentation, he also noted arthralgias, myalgias, severe dyspnea, fatigue, anorexia, and low-grade fevers for several weeks. He then began having nonbloody, watery diarrhea with associated abdominal pain and was thus admitted to the hospital.

His prior clinical history included a similar palpable purpuric plaque eruption that occurred in 2014. He reported that the prior rash had resolved with ketoconazole use. On

examination, there were multiple scattered petechiae coalescing into large palpable purpuric plaques across the trunk, with significant involvement on the flanks and groin. There were a few plaques on the bilateral lower extremities. Initial laboratory workup at presentation was notable for hemoglobin 10.3 g/dL (reference range 13–17 g/dL), BUN 48 mg/dL (reference range 7–22 mg/dL), and creatinine 1.84 mg/dL (reference range 0.8–1.4 mg/dL).

Diagnosis and Clinical Course

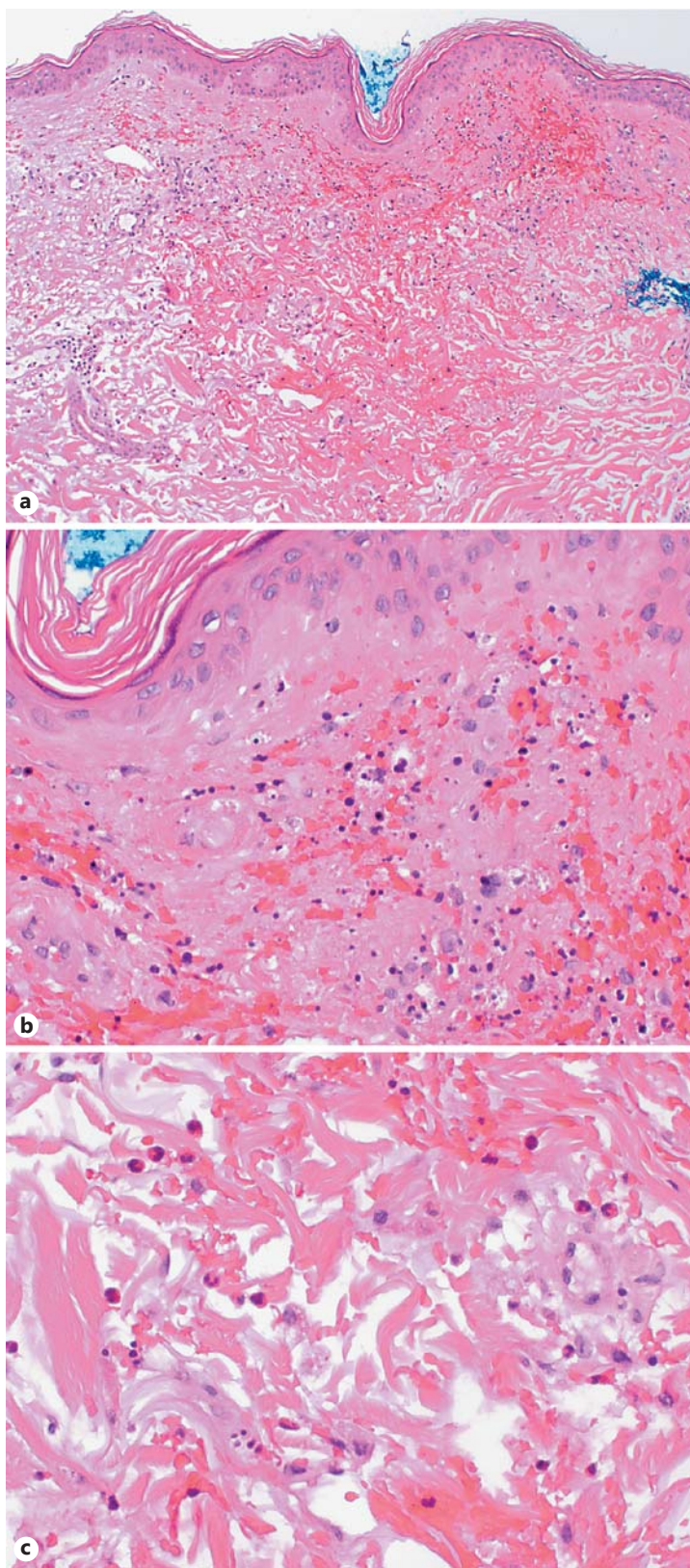
Histopathologic examination revealed a leukocytoclastic vasculitis with eosinophils and a negative IgA by direct immunofluorescence (Fig. 1c). Laboratory findings revealed ANCA-MPO-positive IgG 1,514 mg/dL (reference range 614–1,295 mg/dL), lambda free light chain 136.8 mg/L (reference range 5.7–26.3 mg/L), cryoglobulin negative, complement total <13 mg/dL, C4 <6 mg/dL, and C3 54 mg/dL.

These findings, in the setting of the patient's eosinophilic asthma and clinical history, were consistent with the Churg-Strauss syndrome. He was started on a course of intravenous methylprednisone 1 g daily for 3 days then transitioned to daily prednisone 60 mg for 30 days which was then decreased by 10 mg every week until 20 mg where he would then be managed as an outpatient. He was also given rituximab 1,000 mg once then set up to be possibly managed with rituximab as an outpatient. During admission he had shortness of breath. Pleural effusions were discovered on chest X-ray and CT. Although he initially required supplemental oxygen, his condition improved with diuresis. His eosinophilia was followed up with a peripheral blood flow cytometry. Stool ova and parasite test was negative and a *Strongyloides* antibody was ordered. He was treated empirically with ivermectin. The acute kidney injury likely from vasculitis improved with intravenous fluids along with the peripheral edema present on admission.

Discussion

The term eosinophilic granulomatosis with polyangiitis or Churg-Strauss syndrome describes a multisystem vasculitis consisting of significant eosinophilia, asthma, and rhinosinusitis [1, 2]. It affects both the small and medium-sized arteries, predominantly affecting the lung and skin. Churg-Strauss syndrome is the most rarely diagnosed of the three ANCA-associated vasculitides, including Wegener's and microscopic polyangiitis [3]. Most patients are diagnosed at a mean age of 40 years and with very few occurrences being reported in patients older than age 65 years [4]. The exact pathogenesis of Churg-Strauss syndrome is unknown but studies have suggested there is an element of abnormal immune function [5]. T regulatory cells CD4+CD25+ that make IL-10 were decreased in patients with Churg-Strauss syndrome compared with asthma and chronic eosinophilic pneumonia but were increased during remission of the disease in patients with Churg-Strauss syndrome, therefore indicating that T regulatory cells might have an influence so that patients with asthma or eosinophilic pneumonia will eventually develop Churg-Strauss syndrome. The eosinophils in patients with Churg-Strauss syndrome might also be functioning abnormally from a combination of reduced eosinophil apoptosis and increased eosinophil recruitment by Th2 cytokines such as IL-4, IL-13, and IL-5 [6].

Genetics may also play a role in the pathogenesis of Churg-Strauss syndrome. Vaglio et al. [7] performed genotyping of HLA-A, HLA-B, and HLA-DR loci in 48 Churg-Strauss patients and 350 healthy controls. The frequency of HLA-DRB1*07 allele was significantly higher in the Churg-Strauss patients (27.1%) than in controls (13.3%). Further analysis of Churg-



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Fig. 1. Punch biopsy of the left flank. **a** Medium-power view of H&E. A medium-power image shows extravasated erythrocytes and an inflammatory infiltrate within the superficial and middle dermis. **b** Higher-power view of H&E. A high-power view of the superficial dermis shows a leukocytoclastic vasculitis with leukocytoclasia, fibrin deposition within superficial dermal vessels, frank vessel destruction, and extravasated erythrocytes. **c** Higher-power view of H&E. In other areas of the dermis, eosinophils are prominent. No granulomata are seen.

Strauss patients with HLA-DRB4 showed that the frequency of the HLA-DRB4 allele significantly correlated with the number of vasculitis symptoms (such as rapidly progressive glomerulonephritis, purpura, and alveolar hemorrhage).

Churg-Strauss syndrome typically occurs in three stages: prodromal, eosinophilic, and vasculitic stages [8–10]. The prodromal stage occurs earlier in life when the patient may only have allergic rhinitis or asthma. The eosinophilic stage is when eosinophilia can be detected in the peripheral blood and there is also multiorgan infiltration, especially in the pulmonary and gastrointestinal tract. Lastly, the vasculitic stage is characterized by a small and medium vessel systemic vasculitis that may be associated with extravascular granulomatosis. Patients often report constitutional symptoms of anorexia, fatigue, and fever. Our patient in this case had been experiencing these symptoms before his admission to the hospital.

Diagnosis is usually based on clinical findings such as asthma, allergic rhinitis, and eosinophilia $>1,500/\mu\text{L}$ [10, 11]. Forty to sixty percent of patients with Churg-Strauss syndrome are found to have ANCA, with most of the patients who are ANCA-positive having antibodies directed against myeloperoxidase with perinuclear staining (MPO-ANCA) [11]. In our patient, a history of eosinophilic syndrome, systemic symptoms, and histopathologic findings revealing leukocytoclastic vasculitis with eosinophils were all diagnostic of Churg-Strauss syndrome.

One of the reasons for delayed diagnosis of Churg-Strauss syndrome in our patient may be explained by his previous treatment with steroids for eosinophilic asthma. Since Churg-Strauss syndrome is a disease that usually has a good response to treatment with steroids, some patients may have Churg-Strauss syndrome, but the disease is somewhat quiescent from steroid therapy for the underlying asthma [11]. The more advanced symptoms of Churg-Strauss syndrome may begin to become clinically apparent when steroid dosage is discontinued or decreased. In 1955, Churg et al. [12] described a case series of 4 patients who had Churg-Strauss syndrome that was not recognized clinically until it was revealed from changes in the patients' steroid therapy. Initial therapy for Churg-Strauss syndrome continues to be high-dose steroids. Those who fail to respond to steroids or cardiac involvement may have cyclophosphamide added [9, 10]. For prognosis, long-term survival in patients with Churg-Strauss syndrome can be improved with early systemic corticosteroids and immunosuppressants, close follow-up in the outpatient setting, and effective treatment if relapse occurs [13].

Statement of Ethics

The manuscript was prepared in compliance with all ethical and confidentiality guidelines and principles.

Disclosure Statement

The authors have no conflicts of interest to disclose.

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