Successful treatment of pyoderma vegetans with doxycycline

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INTRODUCTION

Pyoderma vegetans (PDV) is a rare cutaneous disease characterized by well-defined vegetative papules and plaques with elevated borders and scattered pustules, most commonly on the scalp and intertriginous areas. Although most cases are associated with inflammatory bowel disease,[1,2] some may be associated with solid organ and hematologic malignancies, bacterial infections, HIV, diabetes mellitus, alcohol use disorder, and immunosuppression.[3-6] In this study, we describe a case of PDV in an elderly man without known inflammatory bowel disease who responded to doxycycline with exceptional results.

Abbreviation used:

PDV: pyoderma vegetans

CASE REPORT

A 93-year−old Caucasian man presented to a dermatology clinic with a rapidly enlarging rash involving both his armpits, face, and inguinal folds over the past 2 months. He exhibited mild associated pruritus. A review of systems was negative for gastrointestinal symptoms. Medical history was significant for hypertension, with no personal or family history of inflammatory bowel disease or hematologic malignancy. His last colonoscopy, 8 years prior to presentation, was unremarkable. Physical examination revealed pink verrucous papules and nodules coalescing into thick plaques with overlying yellow scale crust, pinpoint pustules, and yellow caseous drainage in his armpits (Fig 1, *A*), cheeks, ears, and right inguinal fold (Fig 2, *A*). No intact vesicles or bullae were noted. The initial differential diagnosis included pemphigus vegetans, PDV, vegetative Hailey-Hailey disease, and an atypical mycobacterial infection.

Routine workup, including complete blood counts with leukocyte differential, complete metabolic panel, and T-SPOT, was normal, with the exception of peripheral blood eosinophilia of 1069 cells/μL. Axillary wound cultures revealed *Staphylococcus aureus* susceptible to tetracycline. Histopathologic examination demonstrated eosinophilic spongiosis, pseudoepitheliomatous hyperplasia, and subcorneal pustules containing eosinophils and neutrophils, narrowing the differential diagnosis to PDV versus pemphigus vegetans (Figs 3 and 4, *A* and *B*). However, direct immunofluorescence for IgG, IgA, immunoglobulin M, C3, and fibrin was negative. Indirect immunofluorescence on monkey esophagus for anti-intercellular and antibasement membrane zone IgG and IgG4 was also negative, favoring the diagnosis of PDV. The patient was started on doxycycline 100 mg twice daily as well as desonide 0.05% ointment to the face and mupirocin 2% ointment to the axillae.

The scale, crust, and axillary drainage resolved within 2 weeks (Figs 1, *B* and 2, *A*). At this time, tissue cultures were obtained and found to be negative for aerobic, anaerobic, fungal, and acid-fast bacilli. The patient was offered a prednisone taper but declined because of the improvement on doxycycline and concern for side effects of prednisone.

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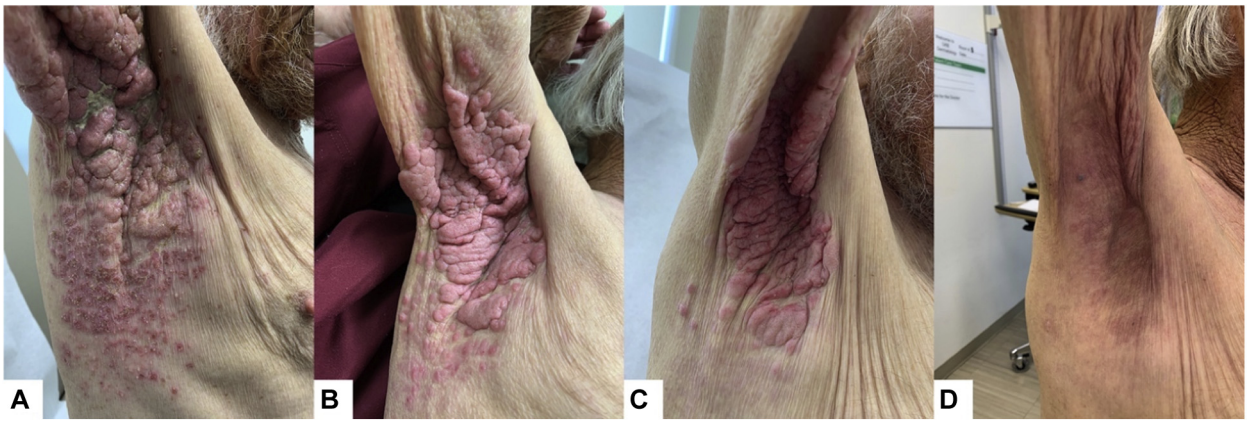

Fig 1. Clinical photographs of pyoderma vegetans on the right axilla before and after treatment with doxycycline. **A**, At presentation, physical examination revealed discrete erythematous papules, pustules, and nodules with overlying scale crust, coalescing into plaques with yellow caseous discharge over the right axilla before treatment. **B**, After 2 weeks of treatment. **C**, After 4 weeks of treatment. **D**, After 13 weeks of treatment.

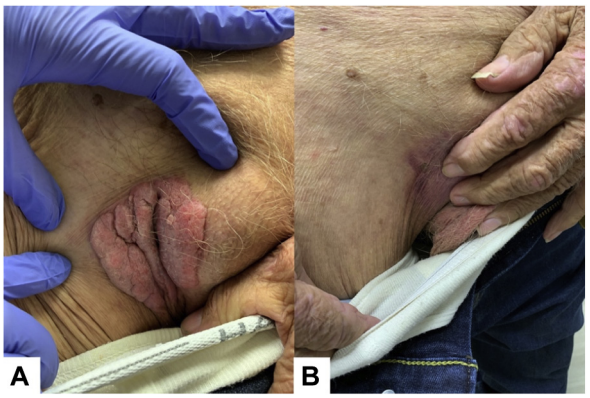

Fig 2. Clinical photographs of pyoderma vegetans on the right inguinal fold showing improvement with doxycycline. **A**, After 2 weeks of treatment. **B**, After 13 weeks of treatment.

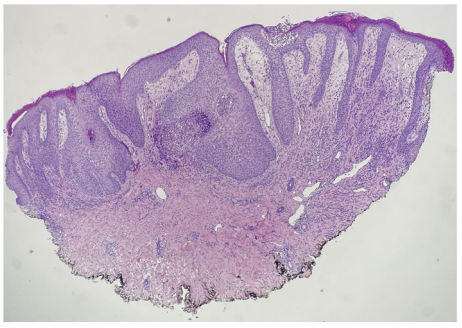

Fig 3. Low-power histopathology image of pyoderma vegetans showing eosinophilic spongiosis, pseudoepitheliomatous hyperplasia, and a subcorneal pustule.

The abrupt and unusual presentation of our patient's PDV prompted further workup to exclude an associated malignancy. An autoimmune workup, HIV serologies, and serum and urine electrophoresis with immunofixation were negative. Chest x-ray demonstrated no evidence of malignancy. Our patient declined colonoscopy because of his advanced age and the lack of gastrointestinal symptoms.

At the 4-week follow-up, physical examination showed smooth vegetative papules and plaques that were smaller, thinner, and less inflamed compared to those at the initial presentation. No drainage, crusting, or ulceration was observed (Fig 1, *C*). At the 7-week follow-up, desonide 0.05% ointment was replaced with triamcinolone 0.1% cream to the affected areas on the body, primarily due to insurance coverage. Thirteen weeks after the initial presentation, our patient continued to improve, as evidenced by the resolution of all the plaques with residual, well-defined pink patches (Figs 1, *D* and 2, *B*).

DISCUSSION

PDV is a rare type of neutrophilic dermatosis[3,6] characterized by pseudoepitheliomatous hyperplasia with a mixed dermal inflammatory infiltrate and subcorneal abscesses containing neutrophils and eosinophils on histology, most often in conjunction with negative direct immunofluorescence and indirect immunofluorescence studies.[1,2,6] Peripheral blood eosinophilia is often seen, as was in our patient.[2]

The etiology of PDV is unknown; nonetheless, some have postulated bacterial infection in immunocompromised patients as a contributing factor.[3-5] Our patient, a 93-year–old otherwise healthy gentleman, may have been predisposed to PDV because of the physiologic age-related waning of immune

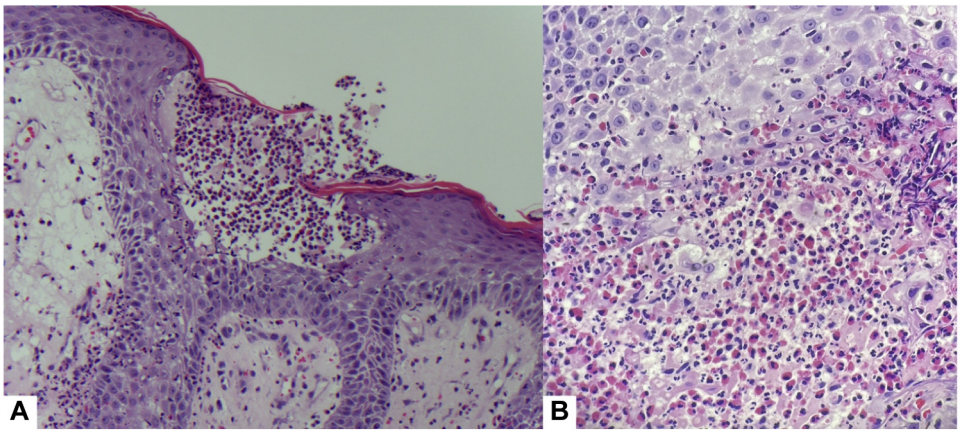

Fig 4. Higher-power histopathology images of pyoderma vegetans. **A**, Subcorneal pustule containing neutrophils and eosinophils. **B**, Eosinophilic spongiosis.

function, suggesting that a paraneoplastic or systemic inflammatory disease is not necessary in its pathogenesis. Although we cannot rule out *S aureus* infection as the sole cause of our patient's PDV, the discordance in prevalence between *S aureus*[7] and PDV[2] suggests that the presence of *S aureus* alone is not sufficient to cause PDV. It is likely that a combination of specific risk factors in a particular host is required for the disease to manifest. Additionally, Jetter et al[5] described a case of PDV in an HIV- and syphilis-positive patient, with tissue cultures positive for methicillin-resistant *S aureus*. The patient was concurrently started on a 2-week course of doxycycline for methicillin-resistant *S aureus* and benzathine penicillin G for syphilis. His PDV resolved 5 weeks later, which the authors attributed to the treatment of his syphilis.[5] Although many patients with PDV are immunocompromised and are found to have concomitant bacterial infections, PDV has been reported in healthy, immunocompetent patients,[4] suggesting a complex immunologic phenomenon characterized by multiple etiologic factors that are yet to be identified.

Currently, there are no treatment guidelines for PDV.[4,6] Systemic steroids are often used as first-line therapy, but recurrence upon discontinuation or tapering is common.[1] Other therapies reported in the literature include antimicrobials, such as penicillin, amoxicillin-clavulanic acid, ciprofloxacin, clindamycin, rifampin, dapsone, and itraconazole; tumor necrosis factor α inhibitors, such as infliximab, adalimumab, and etanercept; immunosuppressants, such as azathioprine, mycophenolate mofetil, methotrexate, and cyclosporine; and systemic retinoids, such as isotretinoin and acitretin.[1,3-6] To our knowledge, this is the first case in the literature to describe the successful treatment of PDV with conservative therapy consisting of doxycycline and low- to mid-potency topical corticosteroids. In addition to its broad-spectrum bacteriostatic activity, doxycycline exhibits antichemotactic effects on neutrophils, making it particularly useful in neutrophilic dermatoses, such as PDV.[8] Our case demonstrates the potential utility of doxycycline as a systemic steroid-sparing agent in the treatment of PDV. Furthermore, given its favorable side effect profile, it may prove to be a valuable alternative for those who have had failure with or would like to avoid more aggressive treatment modalities. Further research is necessary to identify specific mechanisms in the pathogenesis of PDV and establish treatment guidelines for this rare disease.

Conflicts of interest

Dr Graham has grant support from Pfizer and Argenx and is a consultant for Argenx and Clarivate. Author Reddy and Dr Wang have no conflicts of interest to declare.

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