Abstract
Palisaded neutrophilic and granulomatous dermatitis (PNGD) is thought to be an uncommon cutaneous manifestation associated with rheumatoid arthritis as well as connective-tissue, lymphoproliferative, and immune-complex diseases. We present a PNGD patient with the unusual clinical presentation of a unilateral, asymptomatic lesion. Although work-up of this patient was negative, PNGD may be the initial presenting symptom of corresponding disease, so diagnosis of PNGD should warrant work-up for underlying pathologies.

Introduction
Palisaded neutrophilic and granulomatous dermatitis (PNGD) is believed to be a rare cutaneous manifestation of connective-tissue, lymphoproliferative, and immune-complex diseases, rheumatoid arthritis (RA), and medication use.\textsuperscript{1,2} It most commonly presents as symmetric, skin-colored to erythematous papules and nodules located on the extremities, particularly on the extensor surfaces. The lesions may be asymptomatic, pruritic, or painful. On histopathology, early lesions of PNGD exhibit leukocytoclastic vasculitis with significant neutrophilic infiltrate and collagen degeneration, with mature lesions showing palisaded granulomas surrounding fibrin deposition, necrosis and nuclear debris. Management of PNGD includes high-potency topical or intraleisonal corticosteroids and/or discontinuation of the offending agent.

Case Presentation
A 69-year-old Pakistani male presented to a dermatology office with a chief complaint of a six-month history of a lesion on his right hip. The patient denied any pain or itch associated with the lesion, as well as any previous biopsies or treatment of the lesion. The only past medical history the patient reported was diabetes mellitus type II, for which he was taking metformin. The only other oral medication the patient took was a multivitamin. He denied any family history of skin disorders, any surgical history, and any known allergies. On physical exam, on the right lateral upper leg there was a 3.1 cm x 3.4 cm, clover-shaped, violaceous plaque with pink-to-waxy papules at the peripheral border (Fig. 1). No other skin lesions were noted on exam. On review of systems, the patient denied any joint disease or discomfort.

A 3 mm punch biopsy was performed at the initial visit, which revealed a superficial and deep, perivascular and interstitial infiltrate of lymphocytes, histiocytes, numerous eosinophils and neutrophils, with a foci of basophilic

![Figure 1](image1)

**Figure 1:** On right lateral upper leg, a 3.1 cm x 3.4 cm, clover-shaped, violaceous plaque with pink-to-waxy papules at the peripheral border.

![Figure 2a](image2a)

![Figure 2b](image2b)

![Figure 2c](image2c)

**Figures 2a-2c:** Superficial and deep, perivascular and interstitial infiltrate of lymphocytes, histiocytes, numerous eosinophils and neutrophils, with a foci of basophilic
collagen degeneration surrounded by numerous eosinophils (Fig. 2a-c). The diagnosis of palisaded neutrophilic and granulomatous dermatitis was made.

The patient was evaluated for any underlying conditions by numerous labs, which were all within normal range except for an elevated HgA1C. These labs included ANA, RPR, RF, anti-dsDNA, anti-Smith Abs, hepatitis profile, LHD, ESR, and C-reactive protein. The patient was placed on topical class I corticosteroid with mild improvement of the lesion.

The plan of treatment for this patient is possible intralesional steroid, oral corticosteroid, and possible re-biopsy if the lesion worsens. He will also be monitored for development of any underlying systemic disease.

**Discussion**

Dykman et al. first described palisaded neutrophilic and granulomatous dermatitis (PNGD) in 1965, in two patients with rheumatoid arthritis presenting with linear subcutaneous bands on the trunk. Since then, there have been more case reports of similar lesions, which have been given multiple names. PNGD has been described as an atypical, GA-like tissue reaction; rheumatoid papules, Churg-Strauss granulomas; superficial ulcerating rheumatoid necrobiosis; and interstitial granulomatous dermatitis with cutaneous cords and arthritis (Ackerman syndrome). In 1994, Chu et al. evaluated nine patients with PNGD and subsequently proposed that histopathologically, PNGD displays a spectrum of various characteristics depending on the duration of the lesion. They also coined the term “palisaded neutrophilic and granulomatous dermatitis,” encompassing previously reported similar cases under the umbrella term of PNGD.

Clinically, PNGD has various presenting characteristics. Early lesions of PNGD may appear as urticarial-like annular plaques or may even have a livedoid appearance. With time, the lesions may become more infiltrative and pleomorphic, presenting as violaceous, annular plaques, waxy papules, painful subcutaneous nodules or indurated linear bands. Some lesions may also be asymptomatic. The eruption of PNGD is symmetrically distributed on the trunk and extensor surfaces of the upper limbs. Patients with PNGD have also been reported to develop symmetric polyarthritis.

In the patient described herein, PNGD presented as a solitary, asymmetric, asymptomatic lesion on the lateral upper leg.

Many theories have been proposed regarding the pathogenesis of PNGD. Presence of IgM and C3 within the small vessels of PNGD lesions suggest possible precipitated immune complexes generated by underlying systemic disease. High titers of antineutrophilic antibody (ANA), anti-dsDNA and rheumatoid factor (RF) have been correlated with this cutaneous eruption and subsequent worsening of the systemic disease. The deposition of immune complexes within the dermal vessels triggers activation of the complement and neutrophils, which leads to ischemia and degenerated collagen, followed by a granulomatous reaction to the degenerated collagen.

A literature review revealed cases of PNGD associated with multiple drug therapies, especially TNF-alpha inhibitors used in patients with rheumatoid arthritis. More specifically, the agents most commonly responsible for the eruption are infliximab, etanercept, adalimumab, and lenalidomide. The exact mechanism of PNGD induction by anti-TNF-alpha medications is not well understood. However, it has been postulated that TNF-alpha inhibitors induce leukocytoclastic vasculitis via production of autoantibodies, which bind to rheumatoid factor (RF) IgM/C3 and cause a precipitation of these immune complexes within vessels, followed by a chain of events that leads to granulomatous inflammation. Patients with RA tend to develop lesions such as PNGD and rheumatoid nodules, which are both granulomatous reactions. It has also been noted that treatment of RA patients has resulted in accelerated formation of pulmonary granulomatous inflammation. Furthermore, TH1 predominance in RF leads to an increased TNF-alpha microenvironment and an increased influx of macrophages in response to the leukocytoclasia triggered by TNF-alpha inhibitors.

The onset of PNGD lesions associated with anti-TNF-alpha agents may vary from one month to two years. Cessation of the offending medication usually results in improvement and at times clearing of the lesions. Other oral medications cited in the literature as associated with PNGD eruption include methotrexate, leflunomide, azathioprine, calcium-channel blockers, beta-blockers, lipid-lowering agents, antihistamines, anticonvulsants and antidepressants.

Histopathologically, PNGD may exhibit pleomorphic changes. PNGD represents a continuum, with early lesions exhibiting diffuse interstitial inflammation composed of lymphocytes, histiocytes, eosinophils and few neutrophils, and late lesions maturing into a palisaded granula surrounded by dense histiocytic and neutrophilic infiltrates with central degenerated collagen and leukocytoclastic debris. According to Chu et al., the spectrum of PNGD is merely a progression of immune-complex-mediated changes from leukocytoclastic vasculitis (LCV) in early lesions to palisaded granulomas in fully developed lesions, followed by an end-stage of fibrosis. A common histological hallmark of all PNGD lesions is a palisaded arrangement of cells. The biopsy of the lesion described here revealed a superficial and deep, perivascular and interstitial infiltrate of lymphocytes, histiocytes, numerous eosinophils and neutrophils, with a foci of basophilic collagen degeneration surrounded by numerous eosinophils. These changes may represent an intermediate lesion, and the six-month history of the lesion noted by the patient supports these findings.

It is important to note that both clinically and histologically, PNGD may resemble granuloma annulare. However, PNGD exhibits a granulomatous inflammation in the lower half of the reticular dermis, described as “bottom-heavy,” while in granuloma annulare it is more concentrated in the papillary dermis, or “top-heavy.”

The clinical course of PNGD lesions is usually self-limited and may resolve spontaneously. It has been reported that patients with PNGD may develop symmetric polyarthritis. Management of PNGD consists of topical corticosteroids, tacrolimus, low-dose oral corticosteroids, dapsone, colchicine, cyclosporine, cyclophosphamide, mycophenolate mofetil and hydroxychloroquine. Lesions of PNGD tend to recur once therapy is discontinued.

**Conclusion**

Although the patient in this case was not diagnosed with an underlying immune-complex disorder, recognition of PNGD lesions is of importance as it may lead to an early diagnosis of an underlying systemic disease. PNGD presents with a spectrum of lesions, both clinically and histologically, and undergoes an evolutionary process. Thus, a high index of suspicion may result in early diagnosis and management of many systemic conditions. The patient in this case report should be periodically evaluated for development of an immune-complex disease.

**References**


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