Dermatology Practical & Conceptual

Clinical and Histopathological Characteristics of Prurigo Pigmentosa: A Case Series

Ferdi Öztürk[1], Hüseyin Bezir[1], Şaduman Balaban Adım[2], Hayriye Sarıcaoğlu[1]

1 Department of Dermatology, Bursa Uludag University Faculty of Medicine, Türkiye
2 Department of Pathology, Bursa Uludag University Faculty of Medicine, Türkiye

Key words: Prurigo pigmentosa, Doxycycline, Ketogenic diet, Reticular hyperpigmentation, Case series

Citation: Öztürk F, Bezir H, Balaban Adım Ş, Sarıcaoğlu H. Clinical and Histopathological Characteristics of Prurigo Pigmentosa: A Case Series. *Dermatol Pract Concept*. 2026;16(1):6961. DOI: https://doi.org/10.5826/dpc.1601a6961

Accepted: January 2, 2026; **Published:** January 2026

Funding: None.

Competing Interests: None.

Authorship: All authors have contributed significantly to this publication.

Corresponding Author: Ferdi Öztürk, Department of Dermatology, Bursa Uludag University Faculty of Medicine, 16240, Görükle, Bursa, Türkiye. ORCID ID: 0000-0001-7659-7120. E-mail: ferdiozturk@uludag.edu.tr

ABSTRACT

Introduction: Prurigo pigmentosa (PP) is a rare inflammatory skin disease, first described in 1971 in Japan. The condition is characterized by the abrupt appearance of pruritic, erythematous, maculopapular lesions that typically resolve within several days to weeks, resulting in reticulated hyperpigmentation.

Objective: This study aimed to retrospectively evaluate six cases of prurigo pigmentosa in light of clinical and histopathological features and treatment responses.

Methods: This retrospective study was performed at the Department of Dermatology, Bursa Uludag University Faculty of Medicine, Bursa, Türkiye, from 2022 to 2025. Six patients were included in the study, and their demographic characteristics, presenting complaints, clinical and histopathological findings, laboratory results, and treatment responses were assessed.

Results: Six patients with prurigo pigmentosa were evaluated. All presented with symmetrical, pruritic erythematous eruptions on the trunk and back. Three had a history of ketogenic diet or rapid weight loss. Five patients received oral doxycycline (100–200 mg/day) and demonstrated marked clinical improvement. One patient initially treated with corticosteroids showed worsening and was switched to doxycycline. Histopathology revealed spongiotic dermatitis (N=3), eosinophilic infiltration (N=2), and interface dermatitis (N=1). Elevated serum IgE levels were detected in two cases.

Conclusion: In conclusion, prurigo pigmentosa should be suspected in young patients with symmetric pruritic eruptions and a history of ketosis. Awareness of its variable histopathological findings and its strong association with dietary or metabolic triggers is essential to timely diagnosis. The rapid and consistent response to tetracycline-class antibiotics, particularly doxycycline, underscores their value as both a diagnostic aid and a preferred therapeutic option.

Introduction

Prurigo pigmentosa (PP) is an inflammatory skin disease first described in 1971 by Japanese dermatologist Masaharu Nagashima. Although the condition was initially reported predominantly in East Asian countries, its recognition has increased globally in recent years, with reports from various ethnicities and regions. PP typically presents with the sudden onset of pruritic, erythematous, maculopapular eruptions that often regress within a few days to weeks, leaving behind reticulated hyperpigmentation. Due to its dynamic presentation, timely recognition and differentiation from similar dermatoses are critical [1,2].

Clinically, PP most commonly manifests on the trunk, back, and neck with symmetric, itchy, and sometimes burning lesions. Initially appearing as erythematous papules, these lesions may coalesce into plaques and eventually resolve into pigmented macules. The course of the disease is often recurrent, presenting in relapsing episodes. This cyclical pattern indicates a potential for chronicity [3,4].

The pathogenesis of PP remains incompletely understood. However, various environmental and metabolic factors are believed to contribute. Commonly reported triggers include ketogenic diets, fasting, rapid weight loss, diabetes, pregnancy, infections, and certain medications [4,5]. Among these, the association between ketosis and PP has garnered particular attention. In states where the body shifts from glucose to ketone bodies for energy, such as during ketogenic dieting, the risk of developing PP appears to increase. This has been attributed to the pro-inflammatory effects of ketosis [4].

Histopathological features of PP vary depending on the stage of the disease. Early lesions may show spongiosis, perivascular neutrophilic infiltration, and papillary dermal edema, while later stages can demonstrate epidermal necrosis, pigment incontinence, lymphocytic infiltration, and melanophages. This variation underscores the importance of correlating histopathology with clinical findings, as diagnosis based on a single biopsy may be insufficient [6,7].

Diagnostically, PP poses a challenge due to its resemblance to other dermatological conditions such as contact dermatitis, drug eruptions, viral exanthems, atopic dermatitis, or confluent and reticulated papillomatosis. This may lead to misdiagnosis and unnecessary treatments. Therefore, clinicians should consider PP, particularly in young patients with symmetric trunk lesions and a history of ketogenic dieting [1,8].

Regarding treatment, tetracycline-class antibiotics (e.g., doxycycline, minocycline) are among the most effective agents. Their anti-inflammatory properties help control the inflammatory response seen in PP. Accurate diagnosis is essential, as the condition may be resistant to conventional therapies, and targeted treatment improves outcomes [2,7].

Objective

In this study, we retrospectively examined the demographic characteristics, clinical and histopathological findings, and the treatment responses of six patients diagnosed with PP in our clinic, and we discussed our findings in light of those in the existing literature.

Methods

This retrospective study was conducted at the Department of Dermatology, Bursa Uludag University Faculty of Medicine between the years 2022 and 2025. The medical records of patients who were followed with a preliminary diagnosis of prurigo pigmentosa (PP) were reviewed. A total of six patients were included, and their demographic characteristics, presenting complaints, clinical examination findings, laboratory results, histopathological diagnoses, and responses to treatment were evaluated.

Skin biopsies were obtained from all patients and reviewed by dermatopathologists. Histopathological evaluation focused on identifying findings compatible with PP such as spongiosis, eosinophilic infiltration, and pigment incontinence. Potential ketosis-related triggers such as dietary habits and weight loss were investigated and noted when present.

The treatment regimen included oral doxycycline (100–200 mg/day) in most cases. One patient initially received systemic corticosteroid therapy. Clinical responses were assessed based on regression of skin lesions, the time to improvement, and the development of post-inflammatory hyperpigmentation.

Results

Among the six patients included in this study, three were female and three were male. The mean age was 25 years, with a range of 15 to 37 years. All patients presented with pruritic erythematous maculopapular or plaque-type eruptions primarily located on the trunk and back. The distribution of lesions was generally symmetrical (Figure 1).

Three patients reported a history of following a ketogenic diet or experiencing rapid weight loss. Based on clinical suspicion, five patients were initiated on oral doxycycline therapy at a dosage of 100–200 mg/day. One patient initially received systemic corticosteroids; however, due to worsening of lesions during treatment, therapy was changed to doxycycline. The clinical and histopathological features of these cases are outlined in Table 1.

Histopathological evaluation revealed spongiotic dermatitis in three patients, eosinophilic infiltration in two patients, and interface changes with perivascular dermatitis in one patient. Elevated serum total IgE levels were noted

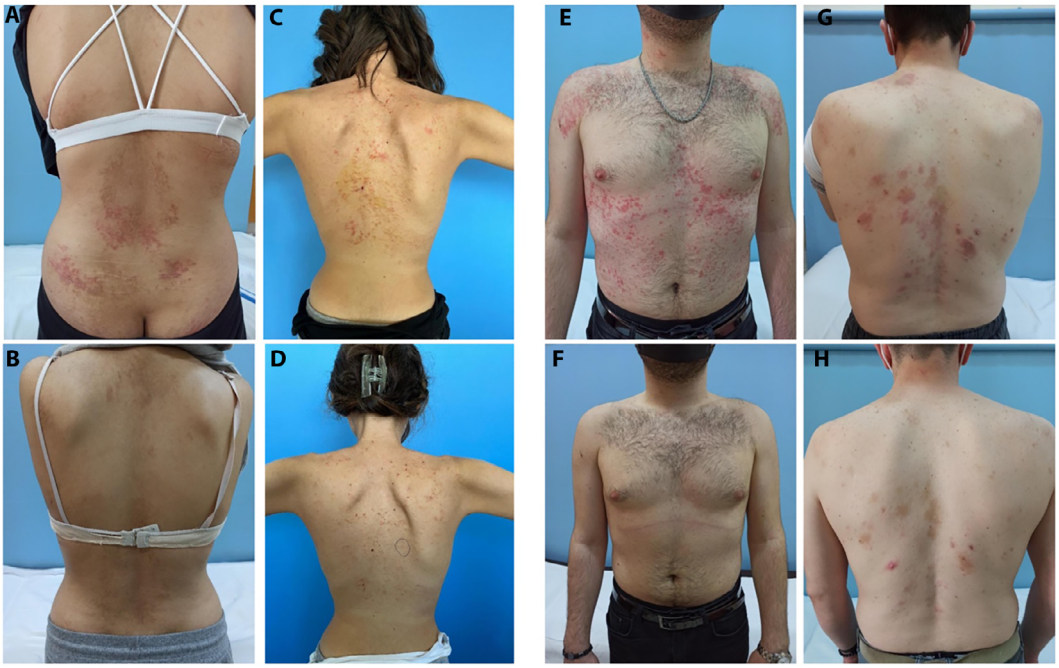

Figure 1. Before treatment, patients presented with pruritic erythematous maculopapular or plaque-type eruptions, predominantly on the trunk and back, with generally symmetrical distribution (Case 3: A, Case 1: C, Case 6: E, Case 5: G). Marked improvement with residual post-inflammatory hyperpigmentation was observed after treatment (Case 3: B, Case 1: D, Case 6: F, Case 5: H).

Table 1. Demographic, clinical, and histopathological features of the patients.

Case No	Age / Sex	Complaint	Clinical Findings	Histopathology	Potential Trigger	Treatment	Outcome
1	15 / F	Pruritic rash for 40 days	Erythematous, edematous papules and plaques on the face, chest, back, and neck; with pigmentation areas	Eosinophil-rich pustular dermatosis (suggestive of drug reaction)	Ketogenic diet (10 kg weight loss in 3 months)	Doxycycline 100 mg/day	Significant improvement with post-inflammatory pigmentation by Day 7
2	36 / F	Pruritic rash for 25 days	Maculopapular rash on upper trunk and forehead; onset during the first month of ketogenic diet	Interface dermatitis with perivascular infiltrate (suggestive of drug-induced maculopapular eruption)	Ketogenic diet (10 kg weight loss in 50 days)	Doxycycline 100 mg/day	Lost to follow-up
3	15 / F	Intermittent pruritic erythema and pigmentation for 1 year; last flare-up for 1 month	Papules, plaques, and hyperpigmented macules on the back, lumbar region, lateral chest, and hypogastric area	Chronic spongiotic dermatitis with prominent eosinophils	-	Doxycycline 200 mg/day	Marked improvement with pigmentation by Day 24
4	20 / M	Recent onset of pruritic lesions	Symmetrical maculopapular lesions on the trunk and back	Full thickness spongiotic changes with superficial perivascular infiltrate	-	Doxycycline 200 mg/day plus topical corticosteroid	Improvement with pigmentation by Day 20

Table 1 continues

Case No	Age / Sex	Complaint	Clinical Findings	Histopathology	Potential Trigger	Treatment	Outcome
5	37 / M	Chronic pruritic erythema, scaling, and pigmentation for 2 years	Erythematous, scaly papules and plaques on the neck, back, and chest	Chronic spongiotic dermatitis (consistent with atopic dermatitis)	-	Doxycycline 200 mg/day	Notable improvement and pigmentation by Day 10
6	24 / M	Mild pruritic erythema for 45 days	Erythematous papules and plaques beginning on the anterior trunk and spreading to the back	Vacuolar dermatitis with eosinophilic infiltrate	Weight loss (12 kg in 3 months)	Initial systemic corticosteroid and topical treatment; later switched to doxycycline 200 mg/day	Flare-up after corticosteroid; resolved with pigmentation within 2 weeks after doxycycline

in two patients (572 IU/mL and 130 IU/mL, respectively). Other laboratory parameters were within normal limits.

All five patients who received doxycycline demonstrated significant regression in pruritus and lesions within 7–24 days from treatment initiation. This clinical improvement was followed by the development of reticular-pattern hyperpigmentation at the sites of previous eruptions. As one patient did not attend follow-up visits, treatment response could not be evaluated.

Discussion

Prurigo pigmentosa (PP) is a rare inflammatory dermatosis that has been increasingly reported in association with metabolic conditions such as ketogenic diets, fasting, and rapid weight loss [4,5]. In our case series, three patients had a history of either following a ketogenic diet or experiencing significant weight loss, supporting the hypothesis that metabolic shifts, particularly ketosis, can trigger PP.

All patients presented with pruritic erythematous papules or plaques symmetrically located on the trunk and back. This clinical appearance is consistent with the classic description of PP in the literature [1,5]. Diagnosis is often delayed as PP can mimic various dermatoses such as contact dermatitis, drug eruptions, viral exanthems, atopic dermatitis, or confluent and reticulated papillomatosis [2]. Therefore, clinicians should consider prurigo pigmentosa in the differential diagnosis, especially in young patients with symmetrical trunk lesions and a history of ketosis.

Histopathological findings can differ depending on the disease stage. In our series, spongiosis, eosinophilic infiltration, and interface dermatitis were observed. These findings highlight the importance of clinicopathological correlation in making an accurate diagnosis, as PP's histological features change over time and may not be conclusive in a single biopsy [6,7].

Five patients were treated with doxycycline, and all showed significant improvement within 1–3 weeks. Tetracyclines have been widely reported to be effective in treating PP due to their anti-inflammatory properties [2,7]. One patient initially received systemic corticosteroids and experienced transient improvement, but the lesions flared up, necessitating a switch to doxycycline. This supports that tetracyclines may be more effective and preferable to corticosteroids in managing PP [1].

In our case series, elevated serum IgE levels were observed in two of the six patients. This finding may suggest a possible atopic predisposition or immune dysregulation associated with prurigo pigmentosa. A similar observation was reported by Kim et al., who noted increased serum IgE levels in five of six patients with PP, along with a history of allergic diseases such as atopic dermatitis and allergic rhinitis in some cases [3]. Although this may point toward an atopic component in the pathogenesis of PP, the clinical significance remains uncertain and requires further investigation in larger cohorts.

In summary, accurate clinical evaluation, appropriate biopsy, and response to characteristic treatment are key elements in the diagnosis of PP. Our case series highlights the importance of clinical awareness of PP, especially in patients with metabolic triggers, and demonstrates the positive therapeutic response to tetracycline antibiotics.

The main limitations of our study were its retrospective, single-center design and the relatively small sample size.

Conclusion

Prurigo pigmentosa is a rare but recognizable dermatosis with characteristic clinical and histopathological features. Due to its strong association with metabolic triggers such as ketogenic diets, fasting, and rapid weight loss, PP should be considered in young patients presenting with symmetric

pruritic erythematous eruptions on the trunk and back, particularly when a history of ketosis is present.

The histopathological findings vary depending on the disease stage and should be interpreted alongside clinical features to establish an accurate diagnosis. The rapid clinical response to tetracycline-class antibiotics not only helps confirm the diagnosis but also provides an effective treatment option. Among these drugs, doxycycline is notable for its anti-inflammatory properties and good safety profile, making it a preferred first-line treatment.

This case series demonstrates the clinical variability of PP, the strong correlation with metabolic stressors, and the consistent therapeutic response to tetracyclines. Increasing clinical awareness can help reduce diagnostic delays, prevent mismanagement, and improve patient outcomes by ensuring timely and appropriate treatment.

References

1. Mufti A, Mirali S, Abduelmula A, et al. Clinical manifestations and treatment outcomes in prurigo pigmentosa (Nagashima disease): a systematic review of the literature. *JAAD Int*. 2021;3: 79–87. DOI:10.1016/j.jdin.2021.03.003. PMID: 34409375.
2. Beutler BD, Cohen PR, Lee RA. Prurigo pigmentosa: literature review. *Am J Clin Dermatol*. 2015;16(6):533-543. DOI: 10.1007 /s40257-015-0154-4. PMID: 26334426.
3. Kim JK, Chung WK, Chang SE, et al. Prurigo pigmentosa: Clinicopathological study and analysis of 50 cases in Korea. *J Dermatol*. 2012;39(11):891-897. DOI: 10.1111/j.1346-8138. 2012.01640.x. PMID: 22901017.
4. Iliescu CA, Beiu C, Tebeică T, Popa LG. Prurigo pigmentosa associated with a ketogenic diet in a Romanian patient: a case report. *Healthcare*. 2025;13(3):300. DOI: 10.3390/healthcare 13030300. PMID: 39942489.
5. Oh YJ, Lee MH. Prurigo pigmentosa: a clinicopathologic study of 16 cases. *J Eur Acad Dermatol Venereol*. 2012;26(9):1149-1153. DOI: 10.1111/j.1468-3083.2011.04263.x. PMID: 21929552.
6. Böer A, Misago N, Wolter M, Kiryu H, Wang XD, Ackerman AB. Prurigo pigmentosa: a distinctive inflammatory disease of the skin. *Am J Dermatopathol*. 2003; 25(2):117-129. DOI: 10.1097/00000372-200304000-00005. PMID: 12652193.
7. Zeng X, Li L, Cui BN. Prurigo pigmentosa: a clinical and histopathological study of nine Chinese cases. *J Eur Acad Dermatol Venereol*. 2016;30(10):1794-1798. DOI: 10.1111/jdv.13659. PMID: 27440732.
8. Baykal C, Buyukbabani N, Akinturk S, Saglik E. Prurigo pigmentosa: not an uncommon disease in the Turkish population. *Int J Dermatol*. 2006;45(10):1164-1168. DOI: 10.1111/j .1365-4632.2006.02857.x. PMID: 17040430.