

Correspondence

A case of prurigo pigmentosa occurring in a patient with psoriasis vulgaris following a ketogenic diet during the COVID-19 pandemic

Dear Editor,

Prurigo pigmentosa (PP) is a rare inflammatory skin disease that mainly occurs in Asian women. Although the etiology is yet unclear, ketogenic diets are suggested triggers of PP. On the contrary, there are some reports showing that PP occurs in systemic diseases including adult-onset Still's disease, atopic dermatitis, and Sjögren syndrome.¹ Here, we demonstrate a case of PP occurring in a patient with psoriasis vulgaris following a ketogenic diet during the COVID-19 pandemic.

A 56-year-old Japanese woman with a 14-year history of psoriasis vulgaris (Fig. 1a) presented with exacerbation of pruritic erythematous skin lesions of her whole body that had been treated with topical corticosteroid plus systemic oral cyclosporine or apremilast. She reported that she followed the stay-at-home policy during the COVID-19 pandemic and started vigorous home workouts and a ketogenic diet. Physical examination revealed red and brown papulovesicles coalescing into

reticulated plaques with reticulated hyperpigmentation on the back, shoulder, and limbs (Fig. 1b,c). We could not observe obvious psoriatic erythema. A punch biopsy from the skin lesion demonstrated a lymphocytic perivascular infiltrate within the superficial dermis (Fig. 1d). Pigmentary incontinence and subtle interface changes were observed. Increased levels of ketone body concentration in plasma were confirmed (171 $\mu\text{mol/l}$), and a diagnosis of PP was made. She was started on oral minocycline (100 mg/day) and resumed a nonketogenic diet. The levels of ketone body concentration were then decreased to 23 $\mu\text{mol/l}$, and the skin lesions were markedly improved in 2 months.

To the best of our knowledge, this is the first case of PP occurring in a patient with psoriasis vulgaris. Psoriasis is an inflammatory skin disease characterized by elevated cytokines including interleukin-17, interleukin-23, and tumor necrosis factor- α . Obesity is a well-known major risk factor of psoriasis, and weight loss interventions, including exercise and ketogenic diets, potentially improve the symptoms of psoriasis. Since ketogenic diets have been reported to reduce inflammation

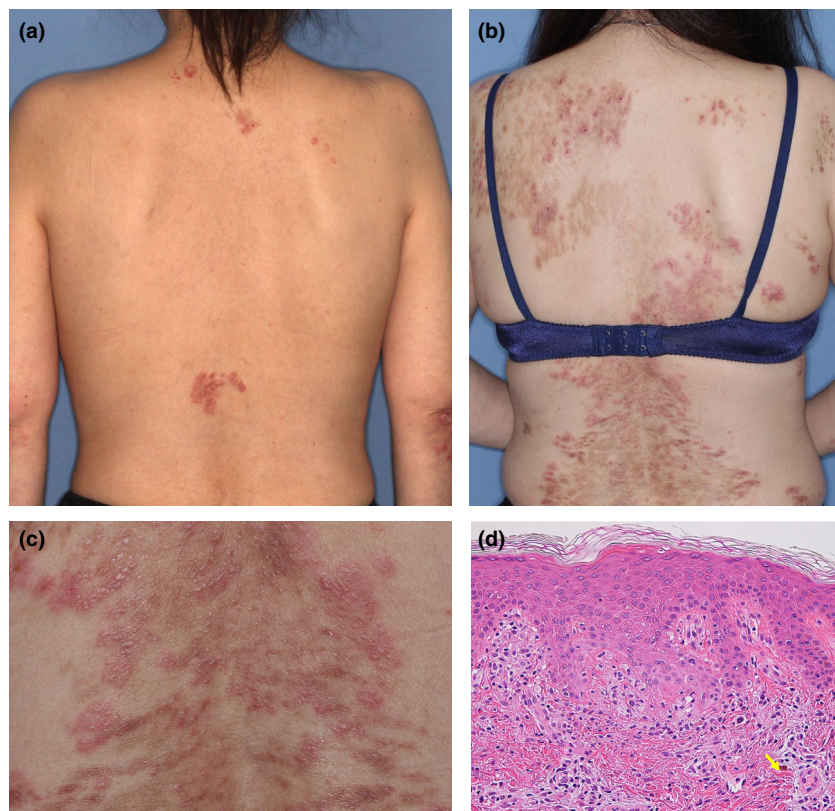



Figure 1 (a) Clinical manifestations of psoriasis. (b) Distant and (c) close (c) views of clinical manifestations of prurigo pigmentosa. Red and brown reticulated papules coalescing into plaques with scale and areas of hyperpigmentation. (d) Histological features of a biopsy specimen showed a lymphocytic perivascular infiltrate within the superficial dermis, pigmentary incontinence (arrow), and subtle interface changes (hematoxylin and eosin staining $\times 40$)

induced by cytokines, interferon- γ , interleukin-17, and tumor necrosis factor- α in various diseases, it has been suggested that ketogenic diets can be a therapeutic option for psoriasis.² Conversely, PP was provoked by ketogenic diet in our psoriasis patient. The pathogenesis of PP is still unclear. The increased levels of interleukin-6 were reported in the skin lesion of PP.³ As doxycycline and dapsone are effective treatments for PP, it is hypothesized that neutrophils may be activated by ketosis in the skin lesions of PP.⁴ The increased levels of interleukin-6 and neutrophil activation were also reported in the skin of psoriasis patients.⁵ Thus, even though PP and psoriasis have some pathological aspects, the effects of ketogenic diets were paradoxically reported in the pathogenesis of PP. However, minocycline and a nonketogenic diet did improve the skin manifestations of PP, suggesting that a ketogenic diet was a possible trigger of PP in our patient. Therefore, it is suggested that ketogenic diets could provoke PP even in patients with psoriasis.

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