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OBSERVATION

Prurigo Pigmentosa After Bariatric Surgery

Prurigo pigmentosa (PP) is a rare idiopathic inflammatory dermatosis that typically presents as pruritic erythematous papulovesicles in a reticular pattern predominantly on the trunk of young women.¹⁻³ The lesions then resolve with residual hyperpigmentation. The pathogenesis of PP is not completely clear. However, it has mainly been associated with ketotic states such as those seen in dieting, fasting, diabetes mellitus, and soft-drink ketosis.¹⁻³ Herein we report the first case to our knowledge of PP occurring after bariatric surgery, which provides further evidence of a possible role of ketosis in PP pathogenesis.

Report of a Case | A woman in her 40s presented with a 1-week history of an itchy skin eruption on her trunk. The patient reported having had bariatric surgery (laparoscopic sleeve gastrectomy) 1 week earlier, with significant decrease in food intake since the day of surgery. The patient was otherwise healthy. Skin examination revealed erythematous papulovesicles and hyperpigmented macules (Figure 1) arranged in a reticular pattern and symmetrically distributed on the chest and back. Punch biopsy specimens obtained from a representative lesion on the chest revealed focal parakeratosis, mild epidermal hyperplasia, mild focal spongiosis, and a mild to moderately dense superficial and mid-dermal perivascular and interstitial focally band-like lymphoneutrophilic infiltrate with scattered eosinophils (Figure 2). Taken together, the clinical and histopathologic features were consistent with PP diagnosis.

Laboratory studies including complete blood cell count, liver function tests, comprehensive metabolic panel, and autoim-

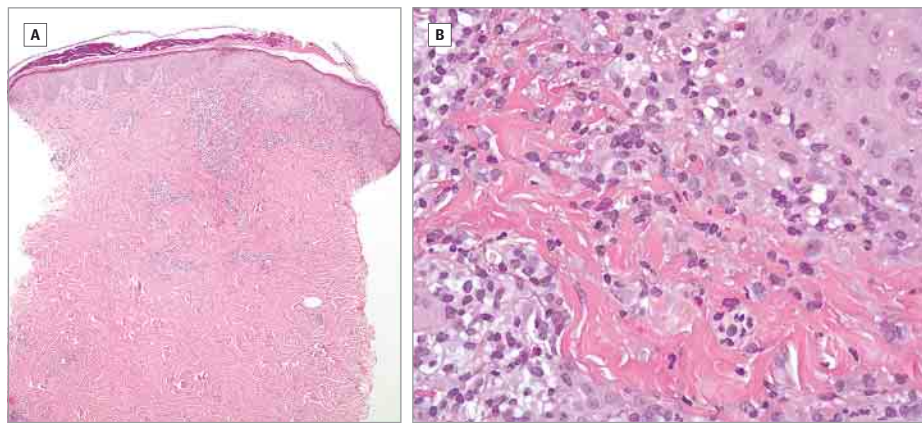
mune evaluation showed no abnormalities. Direct immunofluorescence testing was not performed because autoimmune bullous disease was not considered. Patch testing was not performed for logistical reasons. The patient improved significantly after beginning treatment with doxycycline (100 mg, twice daily) and after resuming a balanced diet after surgery. The eruption had not recurred at last follow-up 6 months following surgery.

Discussion | Since its first description by Nagashima et al in 1971,¹ more than 300 PP cases have been reported.²⁻⁶ Though largely

Figure 1. Clinical Prurigo Pigmentosa With Erythematous Papulovesicles and Hyperpigmented Macules in a Reticular Pattern and Symmetrically Distributed on the Chest and Back



Figure 2. Prurigo Pigmentosa Punch Biopsy Specimens Obtained From a Representative Lesion on the Chest



Both panels show mild epidermal hyperplasia and superficial and mid-dermal perivascular and interstitial lymphoneutrophilic infiltrate (hematoxylin-eosin, original magnifications, $\times 4$ [A] and $\times 20$ [B]).

described in the Japanese population, several PP cases have also been reported in Western countries and, recently, in the Middle East.^{2,3}

The pathogenesis of PP is not completely clear. In addition to being associated with several factors including exogenous (physical trauma, friction) and hormonal (pregnancy, menstruation), PP has classically been reported in association with metabolic derangements, especially ketotic states (dieting, fasting, diabetes mellitus).^{2,3} Actually, several studies have detected elevated urine and/or blood ketone levels in patients with PP.^{2,3} In such circumstances, it is believed that ketone bodies may distribute around blood vessels leading to perivascular inflammation or enter into cells modifying their intracytoplasmic processes. The inflammation is believed to be mainly mediated by neutrophils: PP usually responds well to medications with antineutrophil effect, such as dapsone and tetracyclines, which would support this neutrophil-mediated theory. A role for decreased insulin levels, which is reported to occur after bariatric surgery,⁴ has also been hypothesized as cause of PP.²

In addition to its effect in changing the course of many skin diseases such as psoriasis, bariatric surgery has been associated with several dermatoses including bowel-associated dermatosis-arthritis syndrome, nutritional deficiency dermatoses, and alopecia.⁵ However, PP has never been reported after bariatric surgery. Given that such surgery may easily replicate the metabolic disturbance associated with other ketotic states such as dieting or fasting,^{5,6} we believe that the association between PP and bariatric surgery may be underdiagnosed or underreported.

In conclusion, to our knowledge, this report is the first to describe PP developing after bariatric surgery, adding PP to the cutaneous complications of such procedures. Increased awareness of this rare entity and this association is important because bariatric surgery is a common procedure nowadays, and the metabolic abnormalities accompanying it mimic those that occur with other ketotic states.

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Conflict of Interest Disclosures: None reported.

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Occurrence of Psoriasiform Eruption During Nivolumab Therapy for Primary Oral Mucosal Melanoma

The immunoinhibitory receptor programmed death 1 (PD-1) is expressed on antigen-stimulated T cells. The interaction between PD-1 and its ligands, which are expressed on dendritic cells, macrophages, and cancer cells, inhibits antitumor activity of cytotoxic T cells.¹ A fully human anti-PD-1 antibody, nivolumab, has been approved in Japan for unresectable melanoma. We report a case of melanoma that responded well to nivolumab treatment, but the patient developed skin eruptions resembling psoriasis.

Report of a Case | An 80-year-old man had been receiving nivolumab therapy at 2 mg/kg every 3 weeks at another hospital to treat unresectable primary mucosal melanoma presenting on the upper lip, palate, and cheeks (**Figure 1A**). Prior to the therapy, he had no metastatic disease. He was previously healthy without personal or family history of psoriasis. The tumor on the lip enlarged over the course of the first 2 doses of nivolumab and then began to shrink after the third dose. Immediately following the fourth dose, the patient developed malaise, skin eruption, dysesthesia, and severe pain of the extremities. He was therefore referred to our hospital for evaluation of his systemic condition.

On admission, he had a low-grade fever, and the nodule on his lip was markedly reduced in size (**Figure 1B**). He had no gastrointestinal symptoms, and computed tomographic scans showed no metastatic lesions or interstitial pneumonia. Findings from neurological examination were unremarkable. Skin examination revealed asymptomatic, sharply bordered, scaly, erythematous plaques on the trunk and extremities, but eruptions having unclear borders or crusts were also seen (**Figure 1C**).

Routine laboratory test results were normal except for highly elevated C-reactive protein (CRP) (11.2 mg/dL; normal range <0.3 mg/dL). A skin biopsy performed on the day of admission revealed mild parakeratotic hyperkeratosis, irregular acanthosis, and moderate infiltration of mononuclear cells in the dermis (**Figure 2**). Some of the infiltrates tested positive for interleukin (IL)-17 or IL-23 by immunohistochemical analysis. The granular layer was absent in most areas.

On the third day after hospitalization, the patient developed a high fever, over 39.5°C. He was prescribed oral prednisolone (0.7 mg/kg), and the systemic symptoms and skin eruptions improved immediately. After termination of prednisolone treatment, the eruptions recurred along with increased CRP levels and a fever up to 37.8°C. Readministration of prednisolone (0.4 mg/kg) immediately resolved these symptoms, and at last follow-up he was taking 0.1 mg/kg of prednisolone. During the 3 months after the last dose of nivolumab, the lesions on the palate decreased in size. No melanoma cells were found in the biopsy from the upper lip.

Discussion | Previous clinical trials of anti-PD-1 antibody have demonstrated a potent antitumor activity for metastatic