

# Palmoplantar and plaque psoriasis developed during pembrolizumab therapy in a patient with lung cancer

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Sir,

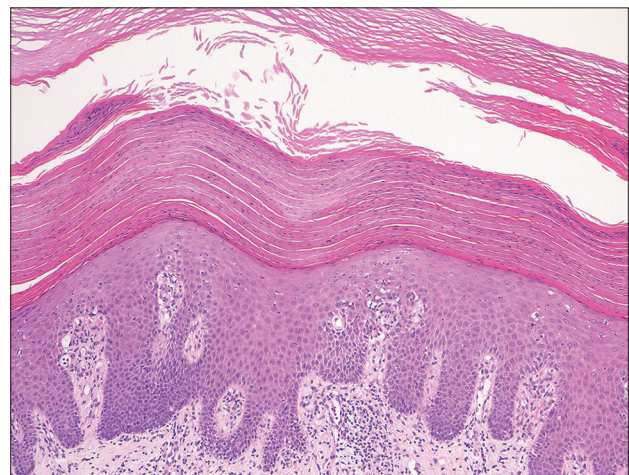
Various immunity-related adverse cutaneous events, including psoriasis, lichen planus, autoimmune bullous disease, and vitiligo, are induced in patients under immune checkpoint inhibitor (ICI) therapy for several types of cancers. Herein, we describe a case of the *de novo* development of psoriasis, in which the palms and soles were mainly affected, in a patient under treatment with pembrolizumab.

An 85-year-old male suffering from non-small cell lung cancer treated with pembrolizumab (200 mg) every three weeks for three months developed a skin eruption after the fifth infusion and was referred to our department. A physical examination revealed coalesced, keratotic erythemas and scaly, nail-plate-sized erythemas on the palms and soles (Figs. 1a and 1b). Similar lesions were scattered on the extensor aspect of the bilateral elbows and lower extremities. The psoriasis area and severity index (PASI) score was 2.4. A biopsy taken from the left palm and sole revealed similar histopathological features, such as hyperkeratosis with parakeratosis and acanthosis of the epidermis (Fig. 2). Eosinophil infiltration was absent. Immunohistochemistry revealed CD4- and CD8-positive T-cells infiltration within and below the epidermis (Figs. 3a and 3b). Soon after the initiation of treatment with topical calcipotriol/betamethasone dipropionate (Dovobet®) ointment, the patient developed interstitial pneumonia and oral prednisolone (40 mg/day) was administered along with the withdrawal of pembrolizumab. The skin lesions were cleared.

Psoriasis or psoriasiform scaly erythema is occasionally induced by ICIs, affecting the trunk and extremities [1].



**Figure 1:** Scaly erythemas and keratotic plaques on (a) the palm and (b) the sole.



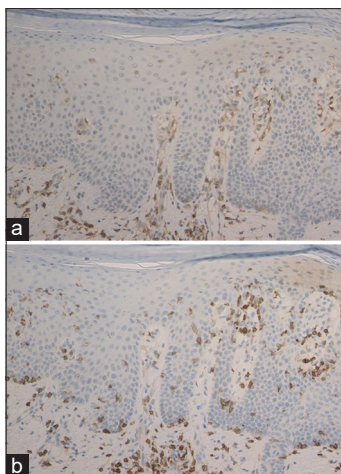
**Figure 2:** Histopathology showing elongation of the epidermis with parakeratosis of the overlying corneal layers, epidermal mononuclear cells, and perivascular infiltration of mononuclear cells in the upper dermis.

Previous reports showed that the majority of cases occurred as exacerbations of pre-existing psoriasis,

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**Figure 3:** Immunohistochemistry revealing both (a) CD4- and (b) CD8-positive T-cells within and below the epidermis.

whereas a new onset of psoriasis was relatively rare [2,3]. By contrast, according to the largest data, examining 115 patients with anti-programmed cell death 1 (PD-1)/programmed cell death ligand 1 (PDL1)-induced psoriasis, nearly 30% had a previous history of psoriasis, whereas 70% developed psoriasis *de novo* [4]. Plaque-type psoriasis was the most common (49/115; 42.6%), followed by palmoplantar psoriasis (12.2%), pustular psoriasis (7%), and guttate psoriasis (7%). Mixed-type, such as plaque and palmoplantar, psoriasis was observed in 9.6%. The mean duration between the initiation of ICIs and the onset or exacerbation of psoriasis/psoriasiform eruptions was several months [4]. Other studies revealed that the palms and soles were affected in some cases, and small-sized lesions presented as guttate-type psoriasis [5-7]. The present case did not have a previous history of psoriasis yet developed diffuse, keratotic erythemas and well-defined, scaly erythemas on the palms and soles, as well as on other sites such as the elbows, twelve weeks after the initiation of pembrolizumab. A biopsy was taken from palmar and plantar lesions, both of which showed similar histopathological features compatible with psoriasis.

Psoriasis is mediated by the Th17/IL-23 axis, and Th cells are downregulated by the PD-1 pathway. Thus,

PD-1 inhibition by ICIs induces the activation and overexpression of IL-17, leading to psoriasis. The reason why the palms and soles were predominantly involved is unknown. As our patient had been working as a courier for a considerable time, it may have imposed a physical burden on his hands/feet, and thus psoriasis may have been induced on the previously damaged sites. Our case suggests that ICIs may induce rare types of psoriasis, such as palmoplantar psoriasis.

## Consent

The examination of the patient was conducted according to the Declaration of Helsinki principles.

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