

New mycosis fungoides–like lymphomatoid reaction following COVID-19 vaccination: A case report

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Abstract

Numerous cutaneous side effects arising from COVID-19 vaccination have been reported. Mycosis fungoides (MF) is a rare indolent form of cutaneous t-cell lymphoma. While the pathogenesis of MF is not well understood, it is thought to involve immune dysregulation. There have been reports of COVID-19 vaccination induced flares and recurrences of cutaneous lymphomas and lymphomatoid reactions. We present the first reported case of COVID-19 vaccine induced MF-like lymphomatoid reaction.

Keywords

Mycosis Fungoides, COVID-19 vaccination, case report

In response to the COVID-19 pandemic, mass vaccination programmes have been implemented worldwide. Since then, numerous cutaneous side effects of COVID-19 vaccination have been reported, including new and exacerbated dermatoses such as pernio, leukocytoclastic vasculitis, erythromelalgia, herpes zoster, bullous pemphigoid and lymphomatoid reactions.^{1–3} Mycosis fungoides (MF) is a rare indolent form of cutaneous T-cell lymphoma (CTCL),⁴ and herein, we report a case of newly diagnosed MF-like lymphomatoid reaction following COVID-19 vaccination.

A 56-year-old woman presented with new erythematous pruritic patches on her buttocks and thighs (Figure 1) that developed within 48 hours after receiving her first dose of the Pfizer-BioNTech COVID-19 vaccine on May 19th 2021. The patient received her second dose of the Moderna COVID-19 vaccine on July 15th 2021, and within 48 hours, developed a similar appearing rash involving her back and lower legs (Figure 1). Her past medical history included mild psoriasis treated with topical therapies and involving the head and neck regions, with no history of body involvement. She was otherwise healthy with no history of lymphoma. Physical examination showed erythematous patches with fine scaling on the back, buttocks and legs involving less than 10% of body surface area and no palpable lymphadenopathy.

Pathology showed a band of superficial perivascular lymphocytic inflammation of the superficial dermis with atypia (Figure 2(a)). Junctional tagging, compact keratin, subtle spongiosis and scattered lymphocytes with irregular nuclear

contours (Figure 2(b)) were observed. The CD4: CD8 ratio of T-cell infiltrate was within normal limits with predominant CD8 staining (Figure 2(c) and (d)).

Based on the clinical and histopathological findings, the favoured diagnosis was MF with a CD8 positive phenotype; however, the differential diagnosis included pseudolymphoma. There are many similar clinicopathological features of MF and pseudolymphoma, and the distinction between these two diagnoses can often be difficult to delineate.⁵ Clinically, while pseudolymphoma, including lymphomatoid drug reactions (LDR), most commonly presents as a generalized maculopapular reaction in sun-exposed areas, MF typically presents with patches or plaques in sun-protected areas⁵ – as in this case. On histopathologic analysis, LDR typically shows a superficial band-like infiltrate with eosinophils while the presence of a more prominent infiltrate with nuclear atypia favours the diagnosis of MF.⁵ The patient was prescribed a course of topical steroids with complete resolution of her rash.

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Figure 1. (a) New onset ill-defined erythematous pruritic patches on the back following first dose of Pfizer COVID-19 vaccine. (b) New onset moderately ill-defined erythematous pruritic patches on the lower legs following second dose of Moderna COVID-19 vaccine.

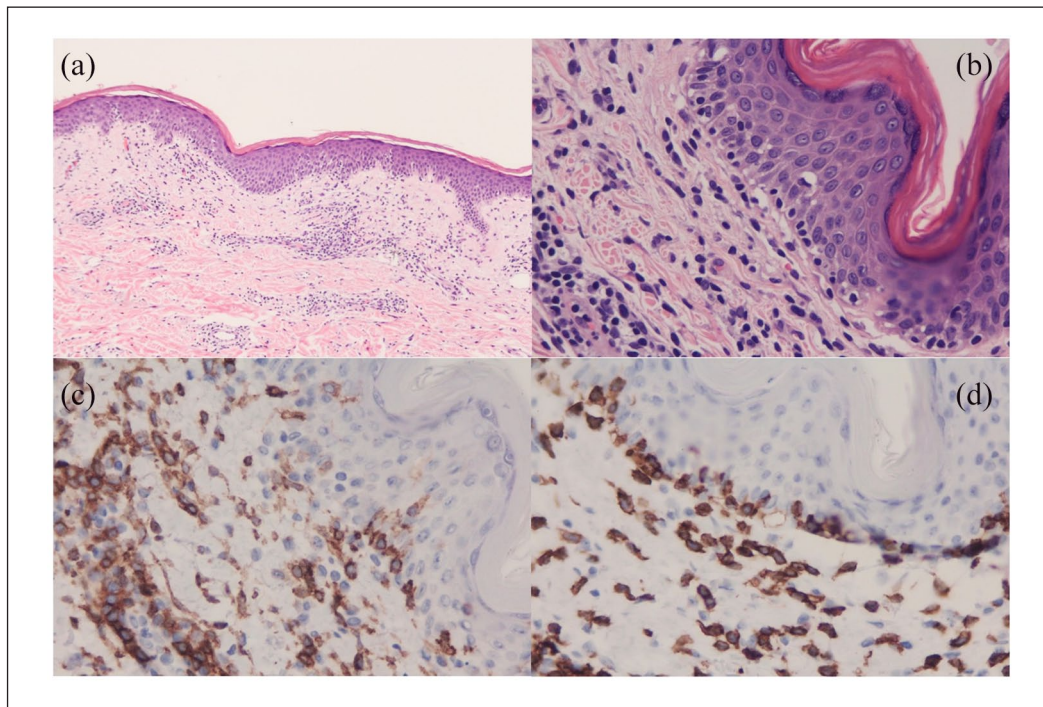


Figure 2. Shave biopsy of the right buttock. (a) Band of superficial perivascular lymphocytic inflammation of the superficial dermis with atypia with junctional tagging, compact keratin and subtle spongiosis. (b) Scattered lymphocytes with irregular nuclear contours. (c) CD4 staining. (d) CD8 staining.

CD4: CD8 ratio of T-cell infiltrate was within normal limits with predominant CD8 staining. Image credits to Dr Scott Bradshaw.

To our knowledge, this is the first reported case of MF-like lymphomatoid reaction following COVID vaccination. The pathogenesis of MF is not well understood but is thought to involve immune dysregulation. As disease progresses, there is a decline in the expression of T helper 1 (Th1) cytokines with a concomitant increase in the levels of T helper 2 (Th2) cytokines.⁶ The disruption of the balance between Th1 and Th2 cytokines is thought to impede cellular immunity.⁶ Messenger RNA (mRNA) COVID-19 vaccines activate the immune system to mount both innate and adaptive responses, generating antigen-specific T cells with CD4+ T-cell responses including Th1.⁷ It is plausible that mRNA COVID-19 vaccines may result in an immunomodulatory shift or modification of cytokine profiles implicated in the disease process of MF. This notion is supported by case reports on dupilumab, a human monoclonal antibody targeting the interleukin 4-receptor-alpha, potentially exacerbating or triggering MF⁸ through immunomodulation.

In this case study, although a coincidental co-occurrence of a MF-like lymphomatoid reaction and COVID-19 vaccination cannot be definitively excluded, the acute onset within 48 h after administration of two doses of COVID-19 vaccines is highly suspicious for a causal drug-induced phenomenon. Previous studies have reported exacerbations of CTCL in remission following COVID-19 vaccination. One case study reported flares of CTCL among two patients, who were previously in long-term remission, after receiving a viral vector COVID-19 vaccine.⁹ Another study reported recurrence of a primary cutaneous CD30-positive lymphoproliferative disorder following mRNA COVID-19 vaccine.¹⁰ In addition, two cases of lymphomatoid reactions, pityriasis lichenoides et varioliformis acuta and T-cell predominant cutaneous lymphoid hyperplasia, have been reported following COVID-19 vaccination.³

To date, this is the first report of new onset MF-like lymphomatoid reaction following COVID-19 vaccination. Dermatologists should be aware of the potential for this adverse reaction, and a detailed clinical and vaccination history should be considered for patients with a new diagnosis of MF. Further research may provide more insights into the potential relationship between MF and COVID-19 vaccination.

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Informed consent

The patient in this manuscript has given written informed consent to publication of their case details and associated images.

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