LETTER TO THE EDITOR

Onset of amyopathic dermatomyositis following mRNA-based SARS-CoV-2 vaccination

Editor

SARS-CoV-2 vaccination has been reported as a potential trigger of autoimmune-mediated skin conditions, including leucocytoclastic vasculitis or cutaneous lupus erythematosus (LE).[1] Moreover, postvaccination flares of disease requiring treatment have been reported in up to 11% of patients with rheumatic diseases, especially in systemic LE.[2] We herein report a case of clinically amyopathic dermatomyositis (CADM) that occurred after mRNA-based SARS-CoV-2 vaccination with BNT162b2.

A 68-year-old woman presented with a new onset of a strongly pruritic rash affecting the face, trunk, arms and buttocks (Fig. 1a, b). Moreover, livid erythematous papules and plaques were present on the dorsal parts of the fingers and back of the hands, suspicious for dermatomyositis (Fig. 1c). Skin lesions occurred approximately 8 days after the second injection of the Pfizer-BioNTech *BNT162b2* mRNA *vaccine*. The patient felt otherwise healthy, with no complaints about muscle weakness or pain, recent weight-loss or fewer. She had a previous history of ductal mamma carcinoma treated with b*reast*-conserving surgery combined with radiotherapy in 2008, and was tumour-free since then. There was no drug intake, and her further medical history was unremarkable.

Laboratory investigations found a normal blood cell count and serum chemistry (including normal creatine kinase at three different testing timepoints), but increased titres for antinuclear antibodies (1:320; normal <1:160), low C3 and C4 complement levels, elevated rheumatoid factor, as well as strong positivity for anti-Ro/SSA. Moreover, anti-TIF1g and anti-signal recognition particle (SRP) antibodies were found in myositis-blot (including negative antibodies for Mi-2, MDA5, NXP2, SAE1, Ku, PM-Scl100, PM-Scl75, Jo-1, PL-7, PL-12, EJ, and OJ). All other extractable nuclear antigens were unremarkable, and review of organ systems (total body computed tomography, lymph node sonography, abdominal ultrasonography, gastroscopy and colonoscopy) was normal. Moreover, clinical criteria for systemic LE were absent. A punch biopsy taken from the left upper arm revealed discrete vacuolar interface dermatitis, dermal lymphocytic infiltrates, and mucin deposition. Based on these findings, a diagnosis of CADM was made. We started treatment with tapered intravenous glucocorticosteroids beginning with 150 mg daily, resulting in a significant improvement of skin lesions within 2 weeks.

CADM is a rare subtype of dermatomyositis with hallmark cutaneous findings but lack of myopathy. Importantly, a substantial risk for interstitial lung disease or malignancy exist in CADM, and solid tumours and hematologic malignancies have been reported in 89% and 11% of CADM patients, respectively.[3] Although the most common type of tumour reported in CADM is breast cancer, screening for malignancy in our patient was unremarkable. Interestingly, our patient had positive SRP antibodies, a myositis-specific antibody found in

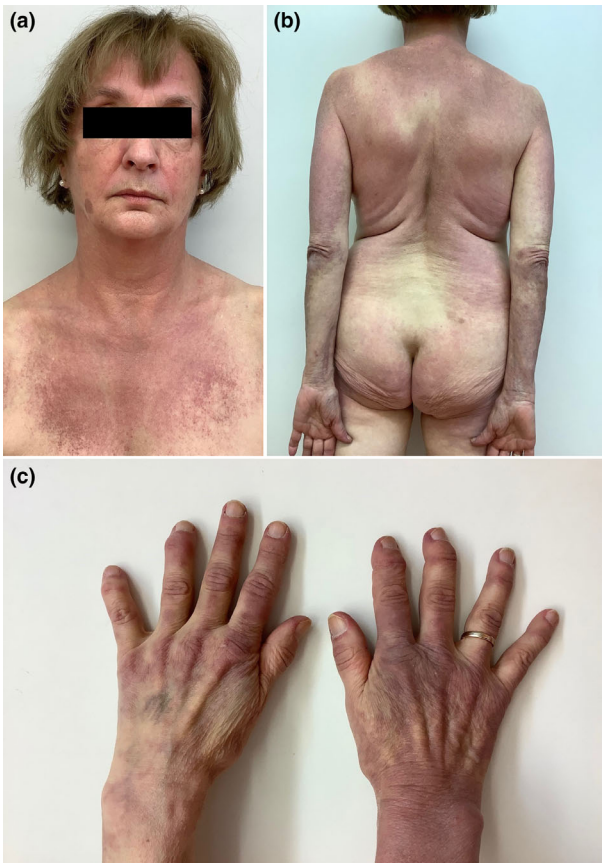

Figure 1 (a) Clinical findings at first presentation in our department. Violaceous rash of the face and upper chest, characteristic for dermatomyositis. (b) Affection of the entire trunk, arms and buttocks. (c) Violaceous papules and plaques affecting the dorsal parts of the fingers and back of the hands, characteristic for Gottron papules. Moreover, osteoarthritis of several fingers is present.

Table 1 Onset of dermatomyositis following COVID-19 vaccination

Patient No.	Reference	Sex/age (years)	Type of COVID vaccine	Onset of skin lesions after vaccination	Antibody profile	Other abnormal blood findings	Signs for cancer association	Treatment of dermatomyositis	Outcome
1	Gouda *et al.*[6]	F/43	mRNA (BNT162b2)	10 days after second injection	ANA 1:80, anti-RNP	CK 3358 U/L, AST 88 U/L, ALT 90 U/L, CRP 48 mg/dL	No	Tapered prednisolone 60 mg/day, MMF 1500 mg/day, and HQC 200 mg/day	Significant improvement in muscular strength, complete crearance of skin lesions
2	Wu *et al.*[7]	F/77	mRNA (BNT162b2)	5 days after first injection	Anti-TIF1g	CK 4476 U/L, AST 256 U/L, ALT 154 U/L	No	40 mg intravenous methylprednisolone for 3 days and 2 g/kg of IVIG for 5 days, than tapered prednisone 60 mg for 4 weeks along with 1 g of MMF twice daily	Marked improvement in muscle strength
3	Joshida *et al.*[8]	F/81	mRNA (BNT162b2)	14 days after first injection	Anti-TIF1g	CK 3119 U/L, myoglobin 583 ng/mL	Suspicion of advanced sigmoid colon cancer	Tapered prednisolone 50 mg/day and IVIG	Rapid improvement of muscle and skin lesions
4	Joshida *et al.*[8]	F/87	mRNA (BNT162b2)	7 days after first injection	Anti-TIF1g	myoglobin 401 ng/mL, high level of carbohydrate antigen 19–9	Suspicion of colon cancer	Tapered prednisolone 30 mg/day	Improvement of muscle and skin lesions
5	Lee *et al.*[9]	M/53	mRNA (BNT162b2)	14 days after second injection	Anti-NXP2	CK 14659 U/L, AST 457 U/L, ALT 206 U/L	No	Pulse intravenous methylprednisolone, followed by 1 mg/kg prednisolone and initiation of MMF	Improvement in muscle strength
6	Present case	F/68	mRNA (BNT162b2)	8 days after second injection	ANA 1:320, anti-Ro, anti-TIF1g, anti-SRP	Low C3 and C4 complement levels, elevated RF	No	150 mg intravenous methylprednisolone, than tapered prednisone initially, then 2 g/kg of IVIG and rituximab 1 g	Significant improvement of skin lesions

ALT, alanine aminotransferase; ANA, antinuclear antibodies; AST, aspartate aminotransferase; CK, creatine kinase; CRP, c-reactive protein; F, female; HQC, hydroxychloroquine; IVIG, intravenous immunoglobulins; M, male; MMF, mycophenolate mofetil.

polymyositis and immune-mediated necrotizing myopathy that usually lack an association with cancer.[4] Besides tumours, a variety of other triggers have been reported for dermatomyositis, including infections, drugs, radiation, and vaccines. Several reports of cutaneous LE following SARS-CoV-2 vaccination have been recently published, and all of these cases were anti-Ro/SSA antibody positive cases of subacute cutaneous LE.[5] Enhanced production of type 1 interferons might be a key mechanism of vaccine-induced cutaneous LE, and especially anti-Ro/SSA antibody-positive individuals reveal an elevated IFN signature and increased lupus-risk.[5] Although we cannot fully exclude a cancer association of CADM in our case, the temporal correlation, rapid clinical onset and unusual autoantibody-profile (anti-Ro/SSA, anti-TIF1g, anti-SRP, lack of other malignancy-associated antibodies) could be suggestive for a causal relationship with SARS-CoV-2 vaccination. Nevertheless, simultaneous occurrence does not prove a causal connection. However, during the review process of this article, several other cases of new-onset dermatomyositis following SARS-CoV-2 vaccination were reported in the literature (Table 1). In the ongoing worldwide vaccination campaign against COVID-19, dermatologists play a key role in the interpretation of vaccine-induced cutaneous reaction patterns, and should consider SARS-CoV-2-vaccination as a potential trigger of autoimmune-mediated diseases, especially in unusual cases with unexplained trigger.

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Conflict of interest

We declare no competing interests.

Data availability statement

Data available on request from the authors

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