CASE REPORT

Dermatomyositis following COVID-19 Vaccination: A Case Report and Review of Vaccine-associated Autoimmune Phenomena

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ABSTRACT

The COVID-19 pandemic has underscored the vital role of vaccination in mitigating widespread morbidity and mortality. Nevertheless, the global vaccination campaign has also brought to light rare but notable immune-mediated adverse events. Vaccination is inherently immune stimulatory, designed to provoke a robust immune response, and in rare instances, this heightened immune activity may unmask or trigger autoimmunity in genetically predisposed individuals. Proposed mechanisms include molecular mimicry, epitope spreading, and bystander activation, all of which can disrupt immune tolerance and initiate autoreactive responses. This case report explores a potential link between COVID-19 vaccination and the onset of dermatomyositis, adding to the growing body of literature examining the rare but important phenomenon of vaccine-associated autoimmunity.

Keywords: dermatomyositis, COVID-19 vaccine, Sinovac, vaccine-associated autoimmune phenomena, case report

INTRODUCTION

The COVID-19 pandemic has profoundly affected global health, with far-reaching consequences for individuals, communities, and healthcare systems. In response, vaccination has emerged as one of the most pivotal strategies in reducing both morbidity and mortality, offering a promising pathway toward controlling the spread of the virus. Over the past few years, worldwide vaccination campaigns have reached unprecedented scales, with billions of doses administered to individuals across the globe. As of 2025, the Philippines has successfully administered over 90 million doses, achieving full vaccination for a substantial proportion of its population.[1] This milestone represents a major achievement in the country's efforts to control the pandemic and protect public health.

However, as vaccination efforts have accelerated, the global health community has encountered a new challenge, detecting and understanding rare, vaccine-associated adverse events, including autoimmune phenomena. Although the benefits of COVID-19 vaccination in preventing severe illness, hospitalization, and death are clear, the rapid deployment of vaccines has also provided an opportunity to identify less common side effects. Among these, autoimmune disorders have raised important concerns and have been the subject of numerous studies.

The potential for vaccines to act as triggers for autoimmune diseases remains an area of ongoing investigation and debate. Several vaccines have been associated with the development of autoimmune conditions, although these events are rare. For instance, Guillain-Barré syndrome has been documented

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following influenza vaccination, while systemic lupus erythematosus has been linked to the human papillomavirus vaccine.[2] Additionally, immune-mediated demyelination has been observed after hepatitis B vaccination.[2,3] These reports have prompted further research into the mechanisms by which vaccines may trigger autoimmunity, including theories of molecular mimicry, immune system dysregulation, and genetic predisposition.

Dermatomyositis is a rare and complex autoimmune disease characterized by both skin and muscle involvement. It belongs to the group of idiopathic inflammatory myopathies and is typically marked by proximal muscle weakness and distinctive cutaneous manifestations such as the heliotrope rash and the V sign.[4] While the precise etiology of dermatomyositis remains unclear, it is thought to involve humoral-mediated immune responses that target the muscle capillaries and arteriolar endothelium, resulting in muscle fiber damage and inflammation. The disease can be triggered or exacerbated by a variety of factors, including infections, malignancy, and, potentially, vaccinations.[4]

In this case report, we present a compelling case of dermatomyositis following the administration of the COVID-19 vaccine, specifically the Sinovac (CoronaVac) vaccine. This case raises important considerations regarding the potential for vaccines to induce autoimmune responses.

CASE PRESENTATION

We present the case of a 51-year-old male, with well-controlled hypertension, maintained on losartan 50 mg daily, who developed an erythematous maculopapular rash on his upper anterior chest and back approximately two months after receiving his second dose of the Sinovac (CoronaVac) COVID-19 vaccine. Within days, he experienced progressive proximal muscle weakness involving the shoulders, upper arms, hips, and thighs, leading to difficulty in rising from a seated position and lifting his arms overhead. Approximately one month after symptom onset, he developed periorbital edema, which gradually progressed to involve both upper and lower extremities. He also reported dysphagia and an unintentional weight loss of two kilograms. Concerned by the worsening muscle weakness and its impact on daily activities, he sought medical consultation, his first for these symptoms. He had no prior interventions or evaluations for similar complaints and no known history of autoimmune disease, either personally or within his family. He has a 15-pack-year smoking history and he works in a fish pond, a job that requires moderate physical effort. He reported no recent travel, no new medications, or significant psychosocial stressors prior to symptom onset.

On physical examination, hallmark dermatological signs of dermatomyositis were noted (Figure 1). These included macular erythema over the lower anterior neck (V sign) and upper back (shawl sign), ill-defined erythematous patches bilaterally on the periorbital region, nasolabial folds, and malar areas, consistent with a heliotrope rash, and hyperkeratotic, pink, ill-defined papules with scaling were observed on the bilateral lateral second digits indicative of mechanic's hands. Symmetric proximal muscle weakness was observed in both upper and lower extremities with Medical Research Council (MRC) grading of 2/5. Onychoscopy revealed erythema of the proximal nail folds without telangiectasias.

A referral to dermatology was made for further evaluation of the skin lesions, however, biopsy was not pursued as the lesions had already become non-viable. Laboratory tests revealed significantly elevated muscle enzymes: creatine kinase

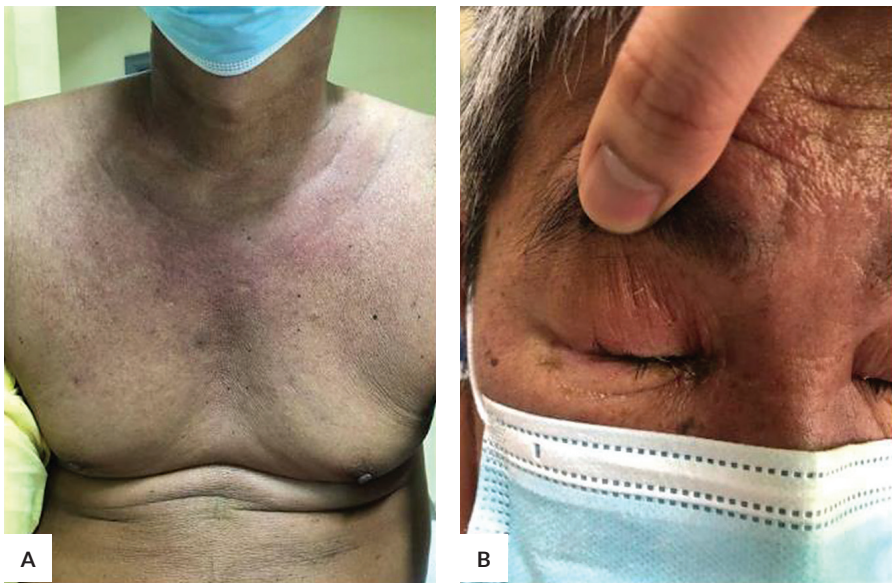

Figure 1. Dermatological signs of dermatomyositis. **(A)** V sign. **(B)** Heliotrope rash.

(CK) 3899 U/L (normal range 55-170 U/L), CK-MB mass 15.4 ng/mL (normal value <5 ng/mL), lactate dehydrogenase (LDH) 683 U/L (normal range 140-280 U/L), aspartate aminotransferase (AST) 232 U/L (normal range 5-40 U/L), and alanine aminotransferase (ALT) 66 IU/L (normal range 4-36 U/L), all consistent with active muscle inflammation. Inflammatory markers showed an elevated erythrocyte sedimentation rate (ESR) of 36 mm/hr (normal range for age 0-25 mm/hr), while C-reactive protein (CRP) remained normal. Autoantibody screening, including anti-Jo-1 and anti-U1 RNP, was negative. Work up for bacterial, viral, and fungal infection were negative and thyroid function tests were normal. Based on the clinical presentation and laboratory findings, a diagnosis of dermatomyositis was established.

Given that dermatomyositis is often associated with malignancy, a thorough malignancy workup was conducted, including tumor markers (alpha-fetoprotein, carcino-embryonic antigen, CA 19-9, and prostate-specific antigen) as well as chest and abdominal CT scans, all of which showed no evidence of neoplasia. Upper gastrointestinal endoscopy revealed *H. pylori* gastritis, while colonoscopy identified a colonic polyp, which was subsequently diagnosed as tubular adenoma on biopsy. Hepatitis serology indicated past hepatitis B infection, with a positive anti-HBc result and negative findings for other markers.

The patient was initially started with intravenous hydrocortisone at a dose of 1 mg/kg/day, which was subsequently transitioned to oral prednisone at 80 mg/day (1 mg/kg/day). Corticosteroids are the cornerstone of initial therapy for dermatomyositis, as they effectively control inflammation and reduce muscle weakness. The use of corticosteroids is well-supported by British Society of Rheumatology (BSR) guidelines, which recommend high-dose corticosteroids for initial disease management, followed by tapering as the patient improves.[5] Azathioprine, an immunosuppressive agent, was introduced on the third hospital day at a dose of 50 mg/day orally. Azathioprine is commonly used as a steroid-sparing agent in dermatomyositis, particularly when corticosteroid therapy needs to be reduced to avoid long-term side effects. By the second week of treatment, there was significant improvement in muscle strength, with MRC grading increasing from 2/5 to 4/5 in the proximal muscle groups. Additionally, muscle enzymes gradually decreased, reflecting improvement of myositis. Cutaneous manifestations, including the heliotrope rash and mechanic's hands, showed marked regression. Edema completely resolved. From the patient's perspective, there was substantial improvement in functional status, including regained independence in walking. No new symptoms or medication-related side effects were noted. At six months, both clinician and patient assessments indicated stable remission. Corticosteroids were tapered gradually, and the patient adhered to his medication regimen, remaining on azathioprine maintenance without recurrence of muscle weakness or rash.

DISCUSSION

Autoimmune disorders, though infrequent, have been documented following vaccination with various vaccines. A review by Chen et al. identified a range of autoimmune conditions associated with COVID-19 vaccination, including immune thrombocytopenic purpura, autoimmune liver diseases, Guillain-Barré syndrome, IgA nephropathy, rheumatoid arthritis, and systemic lupus erythematosus.[6] A report by Gouda et al. reported a case of a 43-year-old Asian female who was diagnosed with dermatomyositis with interstitial lung disease, ten days after receiving the second dosage of BNT162b2 mRNA (Pfizer) COVID-19 vaccine.[7] Another report by Yang et al. reported a patient who developed anti MDA5 positive dermatomyositis after receiving inactivated (Sinopharm) COVID-19 vaccine.[8]

Studies have shown that vaccines, through the stimulation of the immune system, can induce the production of autoantibodies or activate autoreactive T cells, leading to autoimmune responses.[9] Autoimmune conditions, such as autoimmune myositis and dermatomyositis, have been reported after SARS-CoV-2 infection.[10] The mechanism behind the development of autoimmune diseases after vaccination is thought to be similar to the process observed after natural infections.[11] This mechanism may involve several factors, including molecular mimicry, epitope spreading, bystander activation, the release of hidden immune targets, reactivation of memory T cells, activation of superantigens, or direct damage that triggers the release of autoantigens.[11] Interestingly, researchers have identified three immunogenic epitopes in patients with dermatomyositis that closely resemble SARS-CoV-2 proteins, suggesting that the immune response may be triggered by a shared mechanism between the virus and the body's own tissues.[12] The Sinovac (CoronaVac) vaccine, which uses an inactivated virus, may trigger an immune response that inadvertently activates autoreactive immune cells, especially in individuals with a genetic predisposition to autoimmune diseases.[13] Additionally, the adjuvants used in vaccines can enhance immune responses, but in some cases, they may promote excessive inflammation, leading to autoimmune manifestations.[11] While these mechanisms remain speculative in this case, the temporal relationship between vaccination and symptom onset, along with the absence of other identifiable triggers, suggests that vaccination could have played a role in precipitating dermatomyositis in this patient.

Locally, adverse effects following COVID-19 vaccination, such as cutaneous reactions, have been documented.[14] However, to our knowledge, this is one of the first reported cases of dermatomyositis temporally associated with the Sinovac (CoronaVac) vaccine in the local setting. This case highlights a detailed clinical course, comprehensive diagnostic evaluation, and successful management of dermatomyositis in a previously healthy individual following COVID-19 vaccination. The temporal proximity between vaccination and

symptom onset raises the possibility of a potential association. Moreover, an extensive malignancy workup yielded negative results, further supporting the consideration that the vaccine may have played a role in triggering the condition. Nonetheless, as a single case report, this finding does not establish causality. The temporal association alone is insufficient to confirm that the vaccine was the definitive cause, and the contribution of other unidentified environmental or genetic factors cannot be ruled out.

CONCLUSION

This case highlights a potential association between COVID-19 vaccination and the development of dermatomyositis, a rare autoimmune condition. While dermatomyositis is commonly linked to underlying malignancy or infections, this patient had no clear triggers other than the recent COVID-19 vaccination, raising the possibility that the vaccine may have acted as a trigger for autoimmune activation. Given the rarity of such occurrences, clinicians should maintain a high index of suspicion for autoimmune complications following vaccination, particularly in patients presenting with unexplained muscle weakness and skin changes. Early recognition and appropriate management, including corticosteroids and immunosuppressive agents are crucial for improving patient outcomes. As vaccination campaigns expand globally, it becomes increasingly important to monitor for rare adverse effects and identify populations at higher risk. Understanding the risk factors for these rare autoimmune responses could inform vaccination strategies and help ensure more personalized care for individuals predisposed to such conditions.

Ethical Consideration

Informed consent was secured and patient confidentiality was observed.

Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

Both authors declared no conflicts of interest.

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