

Anti-melanoma differentiation-associated gene 5 dermatomyositis complicated by myopericarditis



Nima Milani-Nejad, MD, PhD, Benjamin Kaffenberger, MD, and John Trinidad, MD, MPH
Columbus, Ohio

Key words: dermatomyositis; anti-melanoma differentiation-associated gene 5; myocarditis; pericarditis; ulceration.

INTRODUCTION

Dermatomyositis is an autoimmune condition with a spectrum of presentation and involvement of various organs. Depending on the dermatomyositis subtype, the myocardium can sometimes be involved.¹ Anti-melanoma differentiation-associated gene 5 (anti-MDA5) is a protein that recognizes viral particles and plays a vital role in innate immunity,² including protection against myocarditis.³ MDA5 antibody-positive dermatomyositis has a unique presentation of cutaneous and mucosal ulcerations with progressive interstitial lung disease.^{4,5} Here, we describe a patient with MDA5 dermatomyositis complicated by myocarditis. We also discuss the potential underlying pathophysiology that may increase the risk of myopericarditis in patients with MDA5 dermatomyositis.

CASE PRESENTATION

A woman in her 30s was admitted to the hospital for worsening dyspnea concerning for interstitial lung disease. She reported a 5-month history of progressive shortness of breath, arthralgias, and rash that subsequently ulcerated on the neck and bilateral hands, feet, arms, and thighs. No muscle weakness or pain was noted. Imaging studies found pulmonary patchy airspace disease with air bronchograms and pulmonary effusion. Pulmonary function testing was consistent with restrictive lung disease. Cardiac magnetic resonance imaging study showed pericardial effusion and inflammation and edema in the

Abbreviation used:

MDA5: melanoma differentiation-associated gene 5

myocardium consistent with diagnosis of myocarditis and pericarditis.

Her dermatology examination was notable for keratotic ulcerating papules on the bilateral dorsal and palmar hands (Figs 1 and 2) and feet, waxy digital pulps (Fig 2), and keratotic plaques on the elbows, arms, and thighs. A biopsy of the skin lesions found nonspecific hyperkeratosis, fibrosis, and pigment incontinence. Because of concern for dermatomyositis, a myositis panel was obtained confirming MDA5 antibodies consistent with diagnosis of anti-MDA5 dermatomyositis. Additional serologic tests found negative antinuclear, Smith, positive SS-A, negative SS-B, Mi-2, PL-7, PL-12, EJ, OJ, KU, U1-RNP, U2-RNP, U3-RNP, Mi-2, Jo-1, Ku, NXP-2, P155/140, and PM/Scl antibodies. She was started on systemic steroids and azathioprine with improvement of her symptoms including the cardiac and pulmonary systems.

DISCUSSION

Anti-MDA5 dermatomyositis has unique and distinct dermatologic manifestations of hyperkeratotic ulcerating papules and plaques commonly on the dorsal aspect of hand joints, digital pulps, palms, elbows, and knees. Other manifestations include

From the Division of Dermatology, Department of Internal Medicine, The Ohio State University Wexner Medical Center.

Funding sources: None.

Conflicts of interest: Dr Kaffenberger is an investigator for Biogen, Veloce Biopharmaceuticals, Sun Pharmaceuticals, Xbiotech, and Celgene. Drs Milani-Nejad and Trinidad have no conflicts to disclose.

Correspondence to: Nima Milani-Nejad, MD, PhD, 540 Offcenter Place, Suite 240, Gahanna, OH 43230. E-mail: nima.milaninejad@osumc.edu.

JAAD Case Reports 2019;5:358-9.

2352-5126

© 2019 by the American Academy of Dermatology, Inc. Published by Elsevier, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jidcr.2019.02.005>



Fig 1. Hyperkeratotic ulcerating papules on the dorsal metacarpophalangeal joints. Ulcerating papules on lateral aspects of digits.



Fig 2. Ulcerating papules on the bilateral palmar fingers. Waxy taught appearance of the digital pulp.

alopecia, oral ulcerations, panniculitis, and digital hyperkeratosis.⁴ On skin biopsy, the presence of interface dermatitis and mucin is absent to minimal.⁶ There is often pauci-inflammatory or mononuclear-predominant vasculopathy and thrombosis⁶ corresponding to the clinical findings.

Patients with anti-MDA5 dermatomyositis often have an amyopathic course⁴ but present with other systemic manifestations. The prevalence of interstitial lung disease, often rapidly progressive, can reach 100%,^{5,6} highlighting the importance of early recognition and treatment. Other systemic features include pneumomediastinum, arthritis, fevers, and hand swelling.⁴

To our knowledge, myocarditis and pericarditis, which we observed in our patient, has not been

reported. MDA5 has an essential role in recognition of viral ribonucleic acids.^{2,3} A transgenic mouse model with overexpression of MDA5 is protected against viral myocarditis as demonstrated by increased survival and lower viral load, cardiomyocyte apoptosis, and myocardial dysfunction³ indicating the vital role that MDA5 plays in protection against viral myocarditis. It is plausible that the antibody formation against MDA5 in dermatomyositis renders this protein nonfunctional thereby increasing the susceptibility to myocarditis.

Because the progression of lung and cardiac disease can be rapid and fatal, it is essential to recognize the unique cutaneous features of anti-MDA5 dermatomyositis to initiate immunosuppressive therapy early to prevent morbidity and mortality. It is essential to have a multimodality approach to therapy with pulmonologists, cardiologists, rheumatologists, dermatologists, and internal medicine physicians given the systemic manifestations. Treatment options include systemic steroids, mycophenolate mofetil, rituximab, cyclophosphamide, and various other immunosuppressive regimens.⁴

We present a case of anti-MDA5 dermatomyositis associated with myopericarditis. This association warrants recognition and further studies in order to be understand its significance and impact.

REFERENCES

1. Zhang L, Wang GC, Ma L, Zu N. Cardiac involvement in adult polymyositis or dermatomyositis: a systematic review. *Clin Cardiol*. 2012;35:686-691.
2. Buskiewicz IA, Huber SA. MDA5: the almighty for myocardium. *Circ Heart Fail*. 2013;6:153-155.
3. Philip J, Xu Z, Bowles NE, Vallejo JG. Cardiac-specific overexpression of melanoma differentiation-associated gene-5 protects mice from lethal viral myocarditis. *Circ Heart Fail*. 2013;6:326-334.
4. Kurtzman DJB, Vleugels RA. Anti-melanoma differentiation-associated gene 5 (MDA5) dermatomyositis: A concise review with an emphasis on distinctive clinical features. *J Am Acad Dermatol*. 2018;78:776-785.
5. Cao H, Pan M, Kang Y, et al. Clinical manifestations of dermatomyositis and clinically amyopathic dermatomyositis patients with positive expression of anti-melanoma differentiation-associated gene 5 antibody. *Arthritis Care Res (Hoboken)*. 2012;64:1602-1610.
6. Fiorentino D, Chung L, Zwerner J, Rosen A, Casciola-Rosen L. The mucocutaneous and systemic phenotype of dermatomyositis patients with antibodies to MDA5 (CADM-140): a retrospective study. *J Am Acad Dermatol*. 2011;65:25-34.