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CASE STUDY

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Post-COVID-19 vaccination IgA vasculitis in an adult

Marc E. Grossman MD, FACP[1] | Gerald Appel MD[2] | Alicia J. Little MD, PhD[1] | Christine J. Ko MD[1,3]

[1]Department of Dermatology, Yale University School of Medicine, New Haven, Connecticut, USA

[2]Department of Internal Medicine, Columbia University Medical Center, New York, New York, USA

[3]Department of Pathology, Yale University School of Medicine, New Haven, Connecticut, USA

Correspondence
Christine J. Ko, 15 York St, LMP 5031, New Haven, CT 06519.
Email: christine.ko@yale.edu

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University of Utah.

Abstract

Leukocytoclastic vasculitis has been reported in the setting of COVID-19 infection and post-COVID-19 vaccination. We report a case of IgA vasculitis (IgAV) post-COVID-19 vaccination, with immunoglobulin A (IgA) immune deposits in the skin and renal involvement. SARS-CoV spike protein immunohistochemical staining was negative. IgAV with skin and renal involvement is a potential reaction to COVID-19 vaccination.

KEYWORDS
COVID vaccine, Henoch–Schönlein purpura, IgA vasculitis, leukocytoclastic vasculitis, palpable purpura

1 | INTRODUCTION

Cutaneous leukocytoclastic vasculitic reactions have been temporally associated with COVID-19 vaccines from various manufacturers, including Astra-Zeneca, Bharat, Jansen, Moderna, and Pfizer.[1-6] The exact pathogenesis of these reactions is unclear, and perivascular immunoglobulin A (IgA) immune deposits have not been described previously, to our knowledge. Any direct relationship of small-vessel vasculitis with spike protein deposition is also unknown.

2 | CASE REPORT

A clinically healthy 94-year-old man with no history of vasculitis, COVID-19 infection, or change of medications presented 10 days after his second COVID-19 mRNA-1273 vaccination with palpable purpura from the waist down (Figure 1). He had no associated complaints. His platelet count was 227 000 (140 000–450 000/μL); serum creatinine had been normal (1.0 mg/dL) 6 months earlier. At presentation, his creatinine was 1.2 mg/dL (0.7–1.3 mg/dL) and urinalysis showed trace proteinuria and hematuria. Close follow-up showed a worsening trend; urinalysis showed an increase to 2+ protein and 3+ blood, with creatinine rising to a maximum of 2.4 mg/dL (0.7–1.3 mg/dL). Other laboratory test results included an erythrocyte sedimentation rate of 75 mm/h (0–15 mm/h), positive anti-nuclear antibodies (ANA) at 1:320 (speckled; normal <1:80), and unchanged hemoglobin at 9.9 g/dL (13–18 g/dL). Repeat ANA test was negative two subsequent times, as were those for rheumatoid factor and anti-neutrophil cytoplasmic antibody (ANCA). Serum immunoglobulin levels and SPEP/UPEP (serum/urine protein electrophoresis) were normal.

His stable medical problems included chronic atrial fibrillation, bioprosthetic aortic valve replacement, complete prostatectomy,

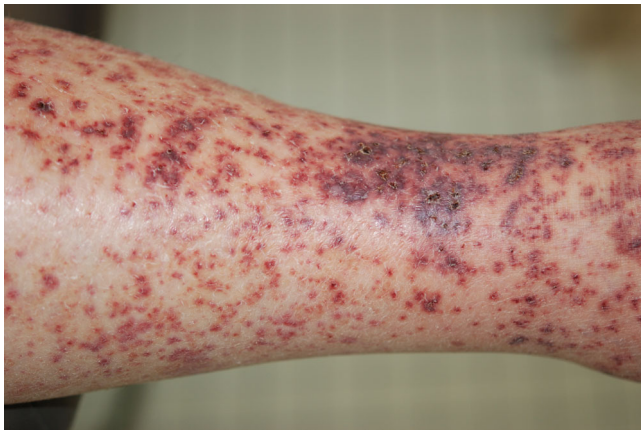

FIGURE 1 Palpable purpura. Dark red to dark purple round macules and papules, with areas of confluence, erosion, and necrosis

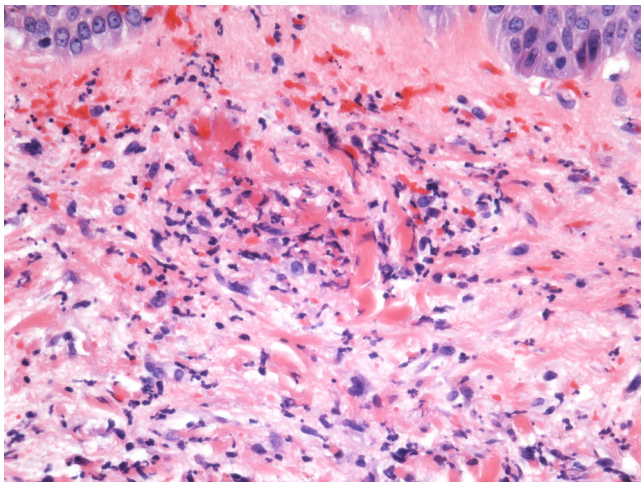

FIGURE 2 Leukocytoclastic vasculitis. Vascular damage with fibrin deposition and a neutrophilic infiltrate with leukocytoclasia and extravasated erythrocytes (H&E, ×400)

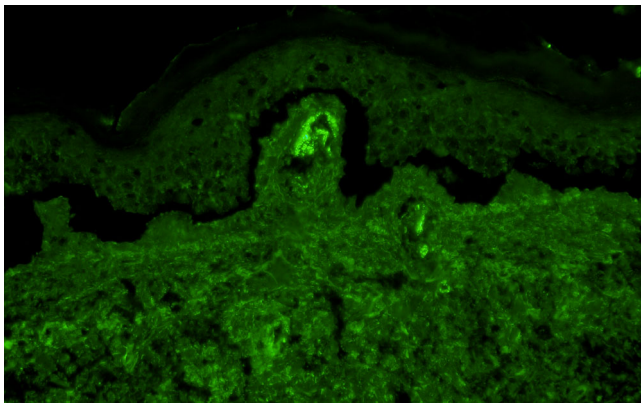

FIGURE 3 IgA vasculitis, direct immunofluorescence study. IgA immune deposits within superficial and upper dermal blood vessels (×400)

hypothyroidism, and chronic anemia. His chronic medications included apixaban, cyanocobalamin, dutasteride, ferrous sulfate, folic acid, furosemide, levothyroxine, omeprazole, pravastatin, an angiotensin-converting enzyme inhibitor, and sertraline.

Skin biopsy showed fibrin deposition around small vessels surrounded by extravasated erythrocytes, neutrophils, and leukocytoclasia involving the superficial dermis (Figure 2) with IgA immune deposits in the blood vessel walls detected by direct immunofluorescence microscopy (Figure 3) and fibrinogen around upper dermal blood vessels. There were no significant deposits of IgM, C3, IgG, or IgG4. There was no thrombotic vasculopathy. Immunohistochemical staining was negative for SARS-CoV-2 spike protein (using two different antibodies, SinoBiological, and GeneTex) and nucleoprotein (Thermo Fisher).

He was started on prednisone 60 mg/day given the creatinine that peaked at 2.4 mg/dL. There was rapid resolution of the skin rash, and his urinalysis and creatinine returned toward normal over the ensuing months.

3 | DISCUSSION

IgA vasculitis (IgAV) may be idiopathic or associated with infection (bacterial or viral including SARS-CoV-2), medications, malignancy, or vaccination. Post-COVID-19 vaccination reactions include new-onset leukocytoclastic vasculitis or exacerbation of pre-existing vasculitis.[7,8] In children, IgAV is the most common immunization-related vasculitis, with influenza vaccine being the most commonly associated vaccine with all types of vasculitic events.[9] In one case report of ANCA-associated vasculitis following influenza immunization, it was posited that hyperreaction to viral RNA in the influenza vaccine triggered a systemic vasculitis.[10] We were unable to document SARS-CoV-2 spike protein deposition within the skin sample, and hypothesize that the immune stimulant could be any component of the vaccine including the nucleoside-modified messenger RNA (mRNA) or the lipid packaging membrane. Alternatively, IgAV could be secondary to nonspecific immune complex formation in the setting of recent COVID-19 vaccination.

Cutaneous leukocytoclastic vasculitis with perivascular deposits of IgA has been termed Henoch–Schönlein purpura (HSP) as well as IgA vasculitis. HSP and IgAV have a controversial relationship and are considered to be the same entity by many. Both HSP and IgAV may be post-infectious, present with palpable purpura involving the lower half of the body, have similar biopsy and direct immunofluorescence findings, and have common systemic symptoms (e.g., joint pain, gastrointestinal, and/or renal).

In one study, the most common malignancies associated with HSP/IgAV in the adult were non-small-cell lung, prostate, and renal cancer.[11] Our patient had previously undergone complete prostatectomy. HSP has been associated with *Staphylococcus aureus* infection and sepsis with or without endocarditis; our patient had a bioprosthetic aortic valve but no symptoms or signs of infectious endocarditis. HSP has been reported post-COVID-19 infection,[12,13] and renal damage in such cases may be due to either direct kidney infection through angiotensin-converting enzyme-2 receptors expressed in tubular cells and podocytes or secondary to a COVID-19 cytokine storm resulting in endothelial and glomerular damage.[12] In our patient, the temporal relationship of his IgAV to vaccination and the rapid resolution of disease implicate mRNA-1273 vaccination as a trigger for IgAV.

4 | CONCLUSION

We report a case of IgAV in an adult, presumed to be secondary to mRNA-1273 COVID-19 vaccination. The pathogenesis of this self-limited reaction is unclear, but in this one case, immunohistochemistry for SARS-CoV-2 spike protein was negative. Awareness, recognition, and future study of this potential post-vaccine reaction may help elucidate the underlying mechanisms.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Christine J. Ko https://orcid.org/0000-0003-2270-2524

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