Concurrent anti-GBM nephritis and ANCA-mediated glomerulonephritis after second dose of SARS-CoV-2 mRNA vaccination

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Title: Concurrent anti-GBM nephritis and ANCA-mediated glomerulonephritis after second dose of SARS-CoV-2 mRNA vaccination

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To the Editor:

Recently, a few cases have been reported of patients developing either anti-GBM nephritis or ANCA-mediated nephritis following vaccinations with either the Pfizer-BioNTech and Moderna SARS-CoV-2 mRNA vaccines.\(^1\)\(^-\)\(^2\) We describe a rare case of concurrent anti-GBM and ANCA-mediated glomerulonephritis following COVID-19 vaccination with the second dose of the Moderna vaccine.

A 23-year-old Hispanic male with a history of Fragile X syndrome and interstitial lung disease of unclear etiology presented with three months of weakness, fatigue and weight-loss that started approximately two weeks after receiving his second dose of Moderna vaccine. On presentation, he had a creatinine of 14 mg/dL, hemoglobin 7.4, urinalysis showed large blood (62 RBC/hpf) and spot UPCR was 1.5 g/g. Serologic workup was significant for positive c-ANCA at 1:5240, anti-MPO IgG 249 AU/mL (anti-PR3 WNL), positive anti-GBM antibody, ANA titer 1:80 with speckled pattern and normal complements. He had no known prior renal disease, and had creatinine of 0.7 mg/dL in 2017.

The kidney biopsy showed a diffuse crescentic glomerulonephritis picture with about 80-90% of the glomeruli showing crescents and associated with variable extent of ruptured capillary tufts, karyorrhectic nuclear debris and disruption of Bowman’s capsule (Figure 1); rare periglomerular multinucleate giant cell was also noted, a feature often reported in concurrent cases.\(^3\) The interstitium showed a mixed inflammatory infiltrate, patchy acute tubular injury and few red cell casts. Immunofluorescence study showed strong linear staining of glomeruli for IgG, kappa and lambda.

This is the first case of a concurrent ANCA and anti-GBM glomerulonephritis following COVID-19 vaccination. A heightened awareness should be maintained for such unfortunate kidney complications, particularly in patients with pre-existing diseases or known immune dysregulation.\(^4\)
References:


Figure 1

A. Strong linear glomerular basement membrane staining on IgG immunofluorescence, X 400
B. Pure cellular circumferential crescent with a ruptured glomerulus at its center, Jones silver X 400
C. Two glomeruli, each showing contracted ruptured capillary tufts and surrounded by organizing crescents, associated with fibrinoid necrosis (left glomerulus), Bowman’s capsule rupture and periglomerular inflammation, PAS X 200
D. A single glomerulus with near-complete destruction, Bowman capsule rupture and a periglomerular multi-nucleate giant cell, PAS X 400