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ANCA-Associated Vasculitis Following Pfizer-BioNTech COVID-19 Vaccine

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continues to spread around the world. As of the end of June 2021, there were approximately 181 million confirmed cases and more than 3.9 million deaths across the globe. The colossal impact of coronavirus disease 2019 (COVID-19) is driving the biggest vaccination campaign in human history. All 3 vaccines authorized for emergency use by the US Food and Drug Administration (Pfizer-BioNTech, Moderna, and Janssen/Johnson & Johnson) have been thoroughly studied and found to be safe and effective in preventing severe COVID-19 cases. While short-term side effects of COVID-19 vaccine resemble those of other vaccines, long-term side effects remain unknown. Rare side effects continue to surface as millions of people receive COVID-19 vaccines around the world, as compared with the thousands enrolled in the clinical trials. We report a case of new-onset renal-limited ANCA-associated vasculitis (AAV) in a 78-year-old woman with previously normal kidney function after receiving the Pfizer-BioNTech COVID-19 vaccine. The patient developed acute kidney injury with proteinuria and microscopic hematuria with many dysmorphic red blood cells in the urine. Anti-myeloperoxidase antibody titer was elevated. Kidney biopsy showed pauci-immune crescentic necrotizing glomerulonephritis. Kidney function improved after treatment with steroids and rituximab. Our patient had normal routine laboratory testing before the vaccination. Although this case cannot demonstrate a causal relationship between COVID-19 vaccination and AAV, ongoing surveillance for similar complications would be prudent as worldwide vaccination efforts continue.

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Introduction

As of June 2021, a total of 33 million cases of coronavirus disease 2019 (COVID-19), with more than a half-million COVID-19–related deaths, have been reported in the United States alone.[1] The US Food and Drug Administration (FDA) issued an emergency use authorization for 2 COVID-19 vaccines (Pfizer-BioNTech and Moderna) in December 2020 and a third (Janssen/Johnson & Johnson) in February 2021. Large clinical trials showed that the vaccines are safe and effective. Common adverse events include mild-to-moderate tenderness at the injection site, fever, fatigue, body aches, and headaches.[2,3] Reports of anaphylaxis to COVID-19 vaccines also started to surface soon after the COVID-19 vaccination campaign began,[4,5] but long-term sequalae of the vaccines remain unknown.

Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) is a small vessel vasculitis hallmarked by the presence of antibodies against antigens in cytoplasmic granules of neutrophils.[6] While there are many case reports describing a temporal association between influenza vaccination and new onset/relapse of AAV,[7-11] there are few reports of this occurring after receiving the COVID-19 vaccine.[12] We report a case of new-onset renal-limited anti-myeloperoxidase (MPO) AAV following COVID-19 vaccination.

Case Report

A 78-year-old woman with a past medical history of type 2 diabetes mellitus, hypertension, and paroxysmal atrial fibrillation received her first dose of the Pfizer-BioNTech COVID-19 vaccine in early February 2021, after which she developed nausea, vomiting, and diarrhea. Routine laboratory assessments obtained 16 days after vaccination were notable for a serum creatinine level (Scr) of 1.31 mg/dL and urinalysis with blood (3+), 99 red blood cells (RBCs) per high-power field, 7 white blood cells (WBCs) per high-power field, and 100 mg/dL protein (Table 1). Routine laboratory assessments obtained a few weeks prior to vaccination were notable for an Scr of 0.77 mg/dL and urinalysis with absent hematuria and proteinuria. Her symptoms improved spontaneously, and she received the second dose of the Pfizer-BioNTech COVID-19 vaccine 22 days after the first injection. After the second dose, she once again noted symptoms of nausea, vomiting, and diarrhea, as well as new-onset lethargy. At the time of presentation, 28 days after the first vaccine dose, laboratory assessments were notable for an Scr of 3.54 mg/dL and urinalysis with blood (3+), 56 RBCs per high-power field, 13 WBCs per highpower field, and 100 mg/dL protein (Table 1). The patient had no documented history of COVID-19.

She was referred to the emergency department, where computed tomography of the abdomen and pelvis showed no acute abnormality. She was started on intravenous crystalloid, without improvement in Scr, prompting nephrology consult. A manual urine microscopy revealed 1-2 granular casts per high-power field, few renal tubular epithelial cells, too-numerous-to-count RBCs (>10% dysmorphic), and few WBCs. Random urinary albumin-creatinine ratio was 2.05 g/g.

The patient was found to have an elevated titer of anti-MPO antibody (titer: 1.1 AI; normal: <0.2 AI). Complement levels and other serologic tests were unremarkable. She was started on intravenous methylprednisolone for 3