Case Report

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A Case of Giant Cell Arteritis Following Covid-19 Vaccination

Background: MGiant cell arteritis (GCA) is a rare vasculitis which must be recognized promptly to prevent serious consequences, including irreversible vision loss [1, 2]. This can prove difficult, as the triggering events and pathogenesis of GCA are incompletely understood. However, it seems that the innate and adaptive immune system play a significant role in the amplification of inflammatory pathways that lead to vessel inflammation, remodeling, and occlusion [3].

Keywords: Giant cell arteritis ● COVID-19

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Case

We present a case of a 79-year-old man who presented with nightly headaches and vision changes for three weeks. He reported sharp, debilitating, frontal headaches that radiated over the temples bilaterally. The headaches were associated with fever, fatigue, and myalgias. The patient's past medical history included hypertension, hyperlipidemia, atrial fibrillation, hypothyroidism, prostate cancer, and rectal cancer. Symptoms began two days after he received the second dose of a COVID-19 mRNA vaccine. He was seen at an outside hospital emergency department at the onset of symptoms. Infectious workup with chest radiography and urinalysis was unremarkable. He was diagnosed with a mild vaccine reaction and discharged from the emergency department. His symptoms persisted for another week, and he presented to our institution where he was admitted for further evaluation. Lab workup was remarkable for leukocytosis to 16.9 K/uL, mild transaminitis, and elevated inflammatory markers, with CRP 272 mg/L and ESR 97 mm/hr. Infectious workup, with urinalysis and blood cultures, and imaging, with CT and MRI, were unremarkable. His headache improved slightly with acetaminophen and IV fluids, and he was discharged after three days. At his follow up office visit a week later, his headache had become much worse with associated fatigue, scalp tenderness, and three episodes of transient blurred vision in the right and left eye. Each episode resolved after five minutes. He was readmitted due to concern for GCA. On admission, his ophthalmic exam was unremarkable, but he was treated with 60mg oral prednisone due to high suspicion for GCA. His headache completely resolved less than 12 hours after administration of steroids. Bilateral temporal artery biopsies were performed the next day, which can be seen in **Figure 1**.

Both biopsies revealed patchy intramural inflammatory infiltrates composed of lymphocytes and rare multinucleated giant cells at the internal lamina and adventitia consistent with a diagnosis of GCA. The patient was discharged on high dose prednisone 60mg daily, and three weeks later his CRP and ESR improved to <1 mg/L and 2 mm/hr, respectively. He was tapered to prednisone 50mg daily by his 6-week follow up appointment without recurrence of symptoms. The timeline of the patient's symptoms and healthcare interactions is illustrated in **Figure 2**.

Discussion

Concerns have been raised about the relationship between vaccinations and autoimmune disease, including vasculitis.

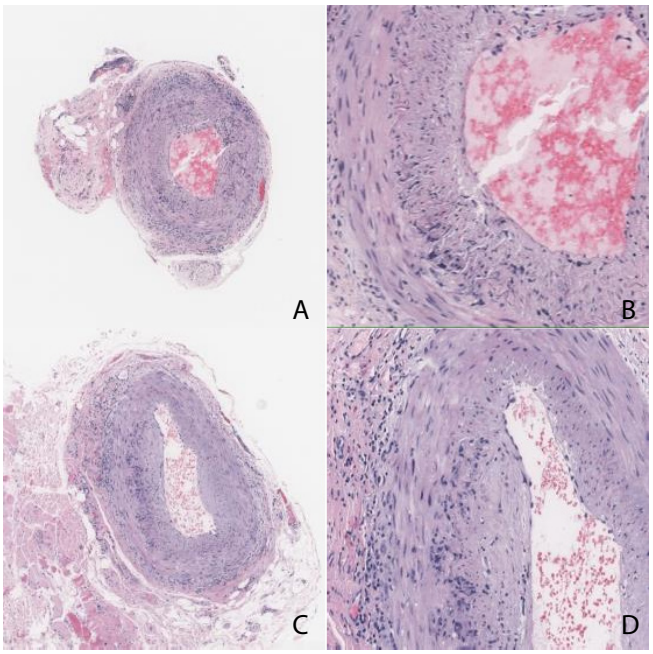

Figure 1. Right temporal artery (A, B) Left temporal artery (C, D): Medium size muscular artery with intramural inflammatory infiltrates composed of histocytes, lymphocytes and eosinophils. Multinucleated giant cells can be identified (arrow). The infiltrate is concentrated at the level of internal elastic lamina and adventitia. H&E stain, magnification 50x (A, C), 200x (B, D).

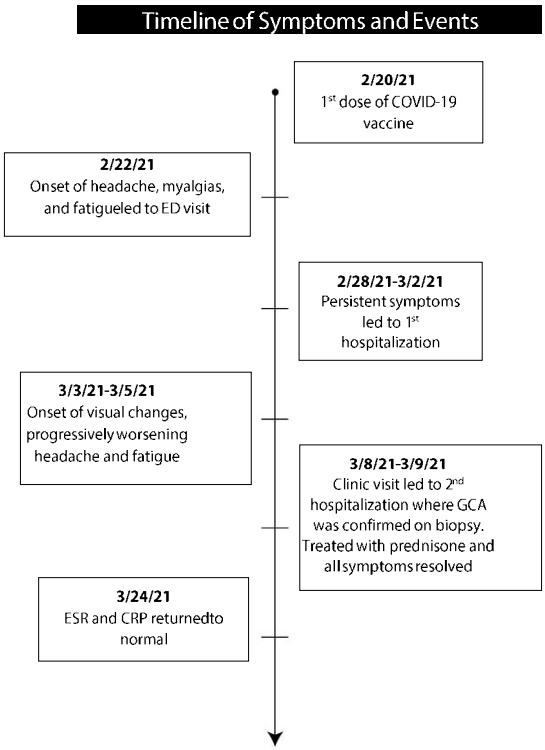

Figure 2. Timeline of Symptoms and Events.

Special focus has been placed on molecular mimicry and the role of adjuvants [4]. These adjuvants increase the innate immune response to foreign antigens, which cause concerns that they may induce reactivity to self-antigens [5]. A review of the literature by Guiamares et al. in 2015 revealed 15 cases of GCA following influenza vaccination [6]. Case reports of varying autoimmune diseases after vaccination led Schoenfeld et al. to coin the term autoimmune/inflammatory syndrome induced by adjuvants (ASIA syndrome) to describe a spectrum of immune dysregulation following vaccination [7].

Vaccine	GCA Cases	References
Influenza	24	[8-16]
Varicella Zoster	1	[17]
COVID-19	0	-

Figure 3. Reported cases of GCA following vaccination.

Although a small number of case reports have been published, no epidemiologic studies have shown a definitive increase in autoimmune disease following vaccination. A committee convened in 2015 by the International Life Sciences Institute (ILSI) and Health and Environmental Sciences Institute (HESI) conducted an extensive literature review and concluded that there is no compelling evidence supporting the association of vaccine adjuvants and autoimmunity [8]. We reviewed the Pubmed and Medline databases by searching case reports with the term "giant cell arteritis" combined with the name of several commonly administered vaccines. No date restriction was placed on the results. The number of cases associated with each vaccine is shown in **Figure 3** [9-13].

The review revealed 24 documented cases of GCA after influenza vaccination, 1 case following tetanus vaccination, and 1 case after varicella zoster vaccination. No cases of giant cell arteritis have been reported

following hepatitis A, hepatitis B, tetanus, measles, mumps, rubella, pneumococcal, meningitis, or COVID-19 vaccinations. Our case represents the first reported case of giant cell arteritis following vaccination with a COVID-19 mRNA vaccine. While limited data exists regarding the relationship between vaccination and giant cell arteritis, the poor understanding of GCA inciting factors means that clinicians must be diligent when looking for possible sources of immune hyperreactivity in patients presenting with GCA symptoms. However, in the setting of a global pandemic with the highly infectious and lethal COVID-19 virus, the benefits of vaccination far outweigh any theoretical risk of autoimmune dysregulation following administration. Our case demonstrates that although the benefits of immunization far outweigh potential risks, further research is necessary to investigate the relationship between rheumatologic disease and the immune response to vaccination [14-17].

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