

## Posterior scleritis following COVID-19 vaccination in an elderly patient

Jennifer Sachs, Guy Negretti, Carol Lally Shields

Department of Ocular Oncology Service, Wills Eye Hospital, Philadelphia, Pennsylvania

### ABSTRACT

We report a case of posterior scleritis masquerading as choroidal melanoma following COVID-19 vaccination. An 86-year-old Caucasian male presented to a retina specialist with a 2-month history of blurred vision and pain right eye (OD). He received his fourth dose of the Pfizer-BioNTech COVID-19 vaccine before developing ocular symptoms. An intraocular mass was found OD and he was referred to our Ocular Oncology Service for potential choroidal melanoma with exudative retinal detachment. On examination, there was a 360-degree episcleral injection and no evidence of choroidal mass OD. Multimodal imaging confirmed no abnormality. Previous ultrasonography demonstrated an echolucent choroidal mass, likely representing choroidal effusion and minimal episcleral Tenon's edema, suggesting posterior scleritis with spontaneous resolution over 1 week. Posterior scleritis following COVID-19 vaccination can masquerade as choroidal melanoma. In our case, the scleritis resolved spontaneously with no treatment and minimal consequences.

**Key words:** COVID-19, Ocular oncology, Pseudomelanoma, Scleritis, Uveitis

Posterior scleritis is an inflammatory condition, often manifesting with pain and vision loss [1]. This inflammation, along with other ocular inflammatory pathologies, has been documented to occur following vaccination, including COVID-19 [2-6]. One of the largest studies looking at ocular inflammation following COVID-19 vaccination, a multinational study from 40 centers, has helped contribute to the prevailing thinking that inflammatory eye conditions linked to COVID-19 vaccination are rare and tend to be self-limiting [6]. Posterior scleritis following COVID-19 vaccination appears to be exceptionally rare with only one case report in the literature [3]. Posterior scleritis is just one ocular disease that can be classified as pseudomelanoma, mimicking choroidal melanoma [7-9].


Herein, we describe a patient with a post-vaccination choroidal mass ultimately determined to be posterior scleritis with localized uveal effusion that may have been related to previous COVID-19 vaccination. The rationale for reporting this case is that it is important to understand the potential connection between this melanoma mimic and COVID-19 vaccination to prevent misdiagnosis and improper management of such ocular findings.

### CASE REPORT

An 86-year-old Caucasian male presented to a retina specialist in late June 2022 with a history of 2 months of blurred vision and pain in the right eye (OD), with more recent worsening of symptoms. He had a history of herpetic eye disease OD at age 12 years and amblyopia OD but no history of autoimmune or inflammatory eye disease. Medical history included atrial fibrillation and lung cancer diagnosed in 2020.

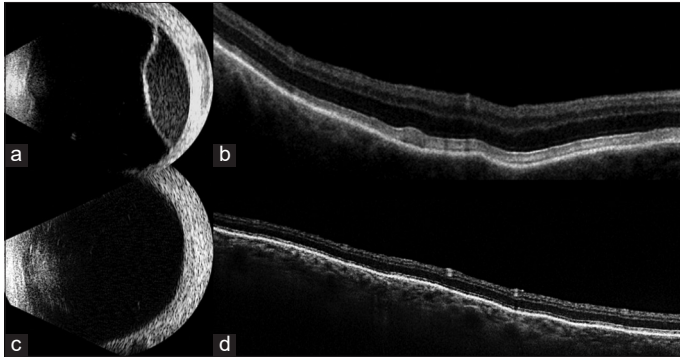
The patient recalled receiving a fourth dose of the Pfizer-BioNTech COVID-19 vaccine on April 8, 2022. He developed symptoms soon after this, which significantly worsened 9 weeks later. 1 week later, he was seen by a retina specialist who found a dome-shaped echolucent solitary choroidal mass (Fig. 1a), suggestive of melanoma. Macular optical coherence tomography (OCT) at that time showed subtle choroidal folds (Fig. 1b).

On referral to our Ocular Oncology Service on June 30, 2022, symptoms were stable and visual acuity was 20/70 OD and 20/25 left eye (OS). There was 360° episcleral injection OD, but the fundus was normal with no evidence of choroidal mass. Ultrasonography confirmed a flat retina with no evidence of an intraocular mass (Fig. 1c). Macular OCT demonstrated minimal choroidal folds (Fig. 1d). On review of the previous ultrasonography with a mass and the current findings with the resolution of the mass, it was

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**Correspondence to:** Carol Lally Shields, Department of Ocular Oncology Service, Wills Eye Hospital, Philadelphia, Pennsylvania. E-mail: carolshields@gmail.com

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**Figure 1:** (a) On June 21, 2022 at 10 weeks following COVID-19 vaccination, ultrasonography of the right eye (OD) demonstrated a dome-shaped choroidal lesion, with low internal echogenicity, measuring 7 mm in thickness. (b) Optical coherence tomography (OCT) of the macula (OD) demonstrated subtle choroidal folds with loss of choroidal vascular details. No cystoid macular edema or subretinal fluid was seen. (c) At our examination 9 days later, ultrasonography revealed flat retina with no evidence of intraocular mass (OD). (d) Macular OCT demonstrated resolving choroidal folds and return of choroidal vascular details

concluded that this represented posterior scleritis with choroidal effusion, consistent with pseudomelanoma. These findings and course were suggestive of COVID-19-vaccine-induced posterior scleritis and choroidal effusion with spontaneous resolution.

## DISCUSSION

The link between vaccinations and autoimmune conditions has been suspected for some time [10]. In the pre-COVID-19 era, Benage and Fraunfelder reviewed a series of 289 cases of vaccine-associated uveitis reported over a 26-year period [11]. The hepatitis B vaccine appeared to have been one of the leading offenders in the past [11]. Proposed immunological mechanisms for how vaccination may trigger autoimmunity include molecular mimicry, delayed-type hypersensitivity with immune complex deposition, and immune responses generated against adjuvants within the vaccine [11].

COVID-19 vaccination is known to be associated with both systemic and local ocular inflammatory conditions [2-6,12-14]. Reported systemic autoimmune conditions include cerebral venous thrombosis, acute myocarditis, and immune thrombocytopenia [12-14]. Testi *et al.*, reported in a multinational study from 40 centers over a 3-month period, 70 cases of likely COVID-19-vaccine-associated ocular inflammation [2]. Anterior uveitis was the most common condition (n=41, 59%) with posterior uveitis (n=9, 13%) and anterior scleritis (n=7, 10%) less commonly found, and no cases or posterior scleritis were reported [2]. Several isolated case reports have linked COVID-19 vaccination to other autoimmune ocular complications including corneal graft rejection, optic neuropathies, herpetic eye disease, and Vogt-Koyanagi-Harada disease [4,6]. One case report has temporally linked COVID-19 vaccination to the acute onset of posterior scleritis [3].

A recent review of 1094 cases of COVID-19-vaccine-associated uveitis from the centers for disease control and prevention vaccine adverse events reporting system found that the majority of vaccine-associated uveitis appears to be associated with the Pfizer-BioNTech BNT162b2 vaccine (n=853, 78%), after the first dose (n=452, 41%), and within the 1<sup>st</sup> week (n=591, 54%) following vaccination [5]. Despite this, the low crude reporting rate and observed-expected ratio in this review led the authors to conclude that there was a low safety concern for vaccine-associated uveitis [5].

Posterior scleritis is one of several conditions that can rarely simulate uveal melanoma (pseudomelanoma) [7-9]. In a series of 1739 patients with pseudomelanoma from a tertiary ocular oncology service between 1978 and 2003, posterior scleritis was found to represent <1% of cases [7]. In the same tertiary ocular oncology service, we have experienced a rise in referrals for a possible intraocular tumor that proved to be posterior scleritis during the COVID-19 pandemic [15].

## CONCLUSION

We report a case of a pseudomelanoma that ultimately was diagnosed as resolving, likely vaccine-induced posterior scleritis. Although we cannot prove a causal link between COVID-19 vaccination and posterior scleritis, the association seems probable given this patient's lack of underlying autoimmune conditions or underlying ocular inflammatory eye conditions. Ultimately, the posterior scleritis resolved spontaneously with no treatment and no visual consequences. In this era of COVID-19 infection and vaccination, suspect ocular oncology tumors could be an inflammatory pseudotumor.

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