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and HMB-45. Our case included histiocytic cells in a storiform pattern with immunostaining positive for CD68 and PGM1 (histiocytic markers) as well as factor XIIIa (marker of fibrohistiocytic proliferation). The tumor did not stain with S-100 (a marker of nerve sheath tumors and melanoma) and did not show cytologic atypia. In general, the differential diagnosis for benign fibrous histiocytoma can include nodular fasciitis, amelanotic melanoma, lymphoma, juvenile xanthogranuloma, nodular episcleritis, spindle cell carcinoma, and solitary fibrous tumor. The lack of atypia, negative S-100 staining, and negative hematopoietic markers make some of these other tumors less likely. Based on the clinical presentation, lipodermoid was considered, although the histology did not display the typical abundant adipose tissue or epidermal appendages. The findings in this case are most consistent with benign fibrous histiocytoma.

Surgical excision required extensive dissection from the atrophic medial rectus muscle, its tendinous insertion, and sclera. This case is a unique presentation of benign fibrous histiocytoma in that it involved the medial rectus muscle and its tendinous insertion in addition to the sclera.

Literature Search
A comprehensive and systematic search was performed for English-language results, without date restrictions, in the PubMed, EMBASE (1947–present), and Ovid (MEDLINE) databases. Search terms included benign fibrous histiocytoma eye muscle, benign fibrous histiocytoma extraocular muscle, and benign fibrous histiocytoma eye. Articles were excluded from detailed review if the full text was not available, if the description of location of the benign fibrous histiocytoma did not involve an extraocular muscle, if the article described a malignant fibrous histiocytoma, or if the article did not discuss human subjects.

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Acquired Brown syndrome following COVID-19 infection in a child
Rachana Haliyur, MD, PhD, Kevin Firl, MD, Sameera Nadimpalli, MD, Ahmad Halawa, MD, and Adam Jacobson, MD

Coronavirus disease 2019 (COVID-19) is a highly virulent multisystem disease caused by the SARS-CoV-2 virus. Symptoms of COVID-19 infection commonly include fever, malaise, cough, and shortness of breath. Numerous manifestations affecting nearly every organ system have been described. Ophthalmic manifestations, though rare, have been reported, including, most commonly, conjunctivitis in both adults and children, which often occurs as part of a multisystem inflammatory syndrome in children. However, pediatric ocular findings of COVID-19 are poorly understood. We present a case of acquired Brown syndrome in a child following COVID-19 infection.

Case Report
A 12-year-old girl with no significant past medical or ocular history presented at a local urgent care facility for fever (100.4F), headache, chills, and myalgias. Ocular examination at that time was described as “normal,” without mention of conjunctival injection. The patient tested positive for COVID-19 on real-time polymerase chain reaction testing and was discharged in stable condition without treatment. At that time, she began to experience intermittent vertical diplopia, blurry vision, and dull right-sided peribulbar pain.

Two weeks after her COVID-19 diagnosis, she was evaluated emergently for 2 days of constant vertical diplopia, worsening right peribulbar pain, and an inability to “move the right eye upward.” At that time, review of systems was negative for recent fevers, chills, numbness,
tingling, weakness, abdominal pain, diarrhea, joint pains, dermatologic rashes, oral or genital ulcers, or other symptoms. Family history was notable for congenital nystagmus and esotropia requiring surgical intervention in her mother and rheumatoid arthritis in her maternal grandmother.

On examination, visual acuity was 20/20 in both eyes, pupillary examination was normal, and intraocular pressure was 10 mm Hg in the right eye and 11 mm Hg in the left eye. External examination revealed mild tenderness to palpation of the superomedial corner of the right orbit overlying the trochlea. She was orthotropic in primary position and downgaze; however, on attempted upgaze, there was limited elevation of the right eye, worse in adduction than abduction (Figure 1A).

Magnetic resonance imaging (MRI) of the brain and orbits revealed focal enhancement of the right trochlea, without inflammation of the muscle belly or surrounding tissue, consistent with trochleitis (Figure 1B-C). No sinus disease was present, and no other intracranial or vascular abnormalities were identified. Laboratory work-up was notable for white blood cell count of 8.7 K/µl with leukopenia (30.7% neutrophils) and lymphocytosis (60.8% lymphocytes). Extensive infectious and autoimmune testing was negative, including a comprehensive metabolic panel, erythrocyte sedimentation rate, C-reactive protein, antinuclear antibodies, rheumatoid factor, antineutrophil cytoplasmic antibody, rapid plasma reagin, and tuberculosis interferon gamma release assay.

She was diagnosed with acquired Brown syndrome of the right eye secondary to trochleitis in the setting of recent COVID-19 infection and discharged. Follow-up in the pediatric ophthalmology clinic 1 week later revealed persistent Brown syndrome, with a 10Δ right hypotropia on elevation in abduction increasing to 25Δ on elevation in adduction, and significant tenderness with palpation of the trochlea. She was otherwise orthotropic in all other gazes with preserved stereopsis and no abnormal head position. She was prescribed a methylprednisolone taper (Medrol Dosepak, Pfizer, New York, NY) because of symptomatic diplopia in upgaze. After 1 month, minimal improvement in alignment was noted, with complete resolution of periorbital pain. Four months later, the patient reported improving diplopia in upgaze, without pain. Given the manageable symptoms and family hesitation to try further pharmacological intervention, the patient and her mother opted for continued observation.

Discussion

COVID-19, initially thought to be a respiratory illness, is now known to affect nearly every organ system. Ocular manifestations of COVID-19 primarily consist of conjunctivitis, although cases of extraocular muscle dysfunction and/or orbital inflammation primarily in adults have been reported. We report a case of Brown syndrome secondary to trochleitis following recent COVID-19 infection in a child.

Brown syndrome, a restriction of oculomotor elevation in adduction, results from dysfunction of the superior oblique tendon and trochlea complex. Symptoms include diplopia, reduced stereopsis, and sometimes periorbital pain, which is often worse with extraocular movements. An abnormal head position may be seen to maintain fusion in both congenital and acquired cases. It is caused either by congenital abnormalities of the superior oblique muscle, tendon, trochlea and/or surrounding extraocular muscle pulleys or acquired secondary to trauma, infection including sinusitis, or inflammatory diseases affecting the orbit.

When an inflammatory etiology is suspected, a systemic workup should be performed. Rheumatologic workup can include complete blood count, comprehensive metabolic panel, erythrocyte sedimentation rate, C-reactive protein, antinuclear antibodies, rheumatoid factor, thyroid panel,
antimicrosomal antibodies, and angiotensin converting enzyme to investigate associated systemic disorders, such as rheumatoid arthritis, juvenile idiopathic arthritis, and systemic lupus erythematosus, as well as mimics, such as thyroid disease and sarcoidosis. Less commonly associated pathologies include psoriasis and enteropathic arthropathy. Most cases of trochleitis are idiopathic and a negative workup is not uncommon.6,7 Furthermore, most inflammatory cases resolve spontaneously; thus, treatment is largely conservative. Indications for surgery include persistent diplopia in primary position and abnormal head position.8

We present a case of acquired Brown syndrome in a child that was associated with a diagnosis of COVID-19. Only one previous case report by Kızıltunc¸ and colleagues9 describes similar findings in an adult with notable differences. First, this 12-year-old patient presented with mild COVID-19 symptoms without a systemic inflammatory response, in contrast to the published adult case who developed trochleitis in the setting of a multisystem inflammatory syndrome treated with intravenous steroids. Second, neuroimaging of the adult described by Kızıltunc¸ and colleagues9 showed diffuse orbital inflammation, which likely influenced the development of trochleitis. Our case, by comparison, showed inflammation strictly limited to the trochlea without myositis or inflammation of the surrounding orbit. Self-limited ophthalmic manifestations of COVID-19 in the absence of multisystem inflammatory syndrome have been documented, including a report of acquired abducens palsy following COVID-19 infection.10 This report additionally notes focal tenderness overlying the trochlea and relevant negative testing results.

Short- and long-term effects of SARS-CoV-2 are still being discovered 2 years after the initial outbreak and discovery of the virus. Given the high phenotypic variability and often unpredictable nature of COVID-19, it is important to continue reporting on the various infectious and autoimmune manifestations seen in the population.

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Dupilumab-associated ectropion and punctal stenosis treated with tacrolimus ointment (0.03%) in a 15-year-old girl

Abiram Sivanandam, BSc,a
Victoria Sattarova, MD,b and
Raymond G. Areaux Jr., MDb

A 15-year-old Asian girl with severe atopic dermatitis was referred for dupilumab-associated blepharoconjunctivitis. Medical history was significant for severe atopic dermatitis. She was started on prednisolone acetate 1% ophthalmic suspension three times daily, and dupilumab injections were withheld after the initial visit. The patient was noted to have right lower eyelid ectropion, cicatricial occlusion, and severe punctal stenosis 6 weeks later. She was started on 0.03% tacrolimus ointment to the eyelid margin. Resolution of ectropion and restoration of punctal patency with residual stenosis were observed 4 weeks later. This is the first reported adolescent case of dupilumab-associated ectropion and punctal stenosis successfully treated with topical tacrolimus ointment.

Dupilumab is a human monoclonal IgG4 antibody that blocks the interleukin-4 receptor, inhibiting interleukin-4 and interleukin-13, important signaling molecules in inflammatory processes.1 Approved for and commonly used in treatment of atopic dermatitis (AD) and persistent asthma in patients 12 years and older, dupilumab generally has mild side effects, conjunctivitis being the most common. However, several cases of severe...