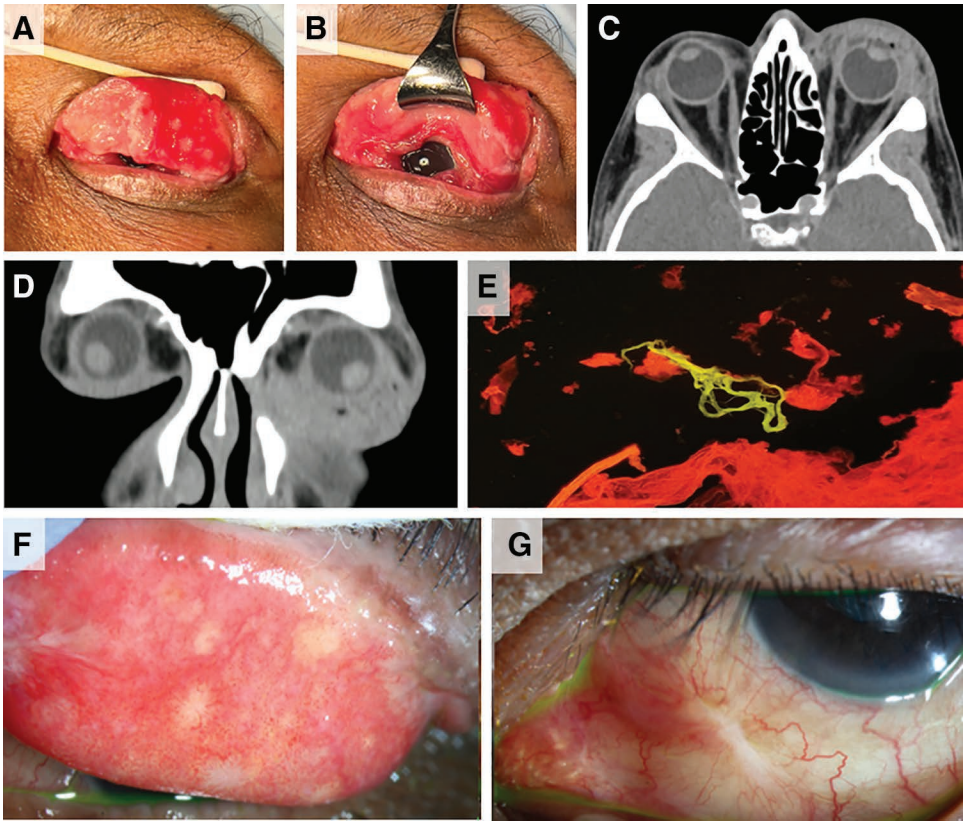

A 60-year-old man referred of a left anterior orbital mass that, despite prior treatment with high-dose systemic and topical corticosteroids, had become worse in both severity and extent over a 2-year-period after external dacryocystorhinostomy. The right side was unaffected. **A**. Grossly inflamed and swollen tarsi were present, with areas of slough (thought clinically to be necrotic tissues or metaplastic keratin). **B**. there was marked proliferation of tissues over the whole ocular surface, including in the deep upper fornix. **C and D**. Orbital CT showed minimal left proptosis with nonspecific soft-tissue thickening of the eyelids, extending over the anterior part of the orbit and surface of the globe. **E**. Fluorescence microscopy of a bacterial culture from the tissues shows a fluorescent yellow aggregate of acid-alcohol-fast bacilli showing the phenomenon of "cording," the latter being associated with higher virulence subtypes (Auramine stain; ×100). Although his brother had been treated for pulmonary tuberculosis 40 years ago, the patient had no known recent contact with the disease and a thorough investigation showed no evidence of systemic infection. With just 3 weeks of systemic and topical antituberculous medications, there was a marked reduction in the tissue swelling on the tarsus **(F)** and bulbar conjunctiva **(G)**.

ACKNOWLEDGMENT

The authors gratefully acknowledge the help of Dr Ula Mahadeva, consultant histopathologist at Guy's and St Thomas' NHS Trust, London, for providing the photomicrograph.

REFERENCES

1. Jennings A, Bilous M, Asimakis P, et al. Mycobacterium tuberculosis presenting as chronic red eye. *Cornea* 2006;25:1118–1120.
2. Fernandes M, Vemuganti GK, Pasricha G, et al. Unilateral tuberculous conjunctivitis with tarsal necrosis. *Arch Ophthalmol* 2003;121:1475–1478.
3. Chaurasia S, Ramappa M, Sangwan V, et al. Chronic unilateral conjunctivitis. *Lancet Infect Dis* 2012;12:354.
4. Pommier S, Chazalon E, Morand J-J, et al. Chronic cicatrising conjunctivitis in a patient with hemifacial cutaneous tuberculosis. *Br J Ophthalmol* 2008;92:616, 712–616, 713.
5. Alcolea A, Suarez MJ, Lizasoain M, et al. Conjunctivitis with regional lymphadenopathy in a trainee microbiologist. *J Clin Microbiol* 2009;47:3043–3044.
6. Vazquez-Perez A, Magan T, Volpe G, et al. Necrotising blepharoconjunctivitis and keratitis in human monkeypox. *JAMA Ophthalmol* 2023;141:285–288.
7. de Freitas Santoro D, Polizelli MU, Cervi Rosa PA, et al. Necrotizing streptococcus pyogenes infiltrating conjunctiva and tenon´s capsule: a case report. *Case Rep Ophthalmol* 2021;12:146–149.
8. Domínguez I, Cartes C, Sabat P, et al. Isolated conjunctival granuloma as first manifestation of parinaud´s oculoglandular syndrome: a case report. *Am J Ophthalmol Case Rep* 2019;14:58–60.
9. Pai M, Denkinger CM, Kik SV, et al. Gamma interferon release assays for the detection of mycobacterium tuberculosis infection. *Clin Microbiol Rev* 2014;27:3–20.
10. Zellweger JP, Sotgiu G, Corradi M, et al. The diagnosis of latent tuberculosis infection (LTBI): currently available tests, future developments, and perspectives to eliminate tuberculosis (TB). *Med Lav* 2020;111:170–183.

Infection of a Nylon Foil Orbital Implant Due to *Fusarium brachygibbosum* and *Lomentospora prolificans* After Intranasal Methamphetamine Use

Paul S. Zhou, M.D.,*
Christopher R. Dermarkarian, M.D.,*
*Rosa M. Andrade, M.D.†, and Jeremiah P. Tao, M.D.**

Abstract: **The authors describe a case of nylon foil implant infection caused by *Fusarium brachygibbosum*, and**

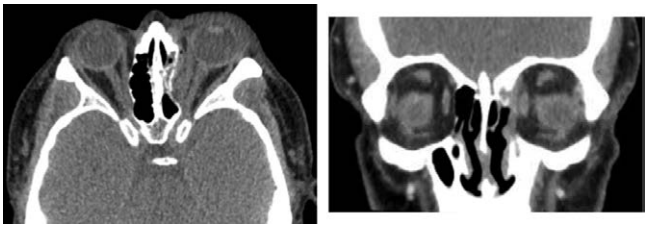

FIG. 1. Axial and coronal CT images immediately after injury demonstrating moderately comminuted fracture of the medial wall of the left orbit with depression of fracture fragments into the left ethmoid air cells.

Lomentospora prolificans **following medial orbital wall fracture repair in the setting of postoperative nasal methamphetamine use. A 61-year-old male presented with OS pain and swelling after a physical assault on his face. A CT of maxillofacial bones without contrast showed a moderately comminuted fracture of the medial wall of the left orbit with depression of fracture fragments into the left ethmoid air cells. Six days after repair of the medial wall fracture, the patient returned with a new onset headache, OS pain, and swelling to the left medial canthal area. He reported snorting methamphetamine approximately 48 hours before his current presentation. CT imaging showed fat stranding and soft tissue density in the extraconal space adjacent to the left medial rectus muscle and chronic fracture deformity of lamina papyracea with approximately 4 mm of medial displacement of the fracture fragments. The patient showed little clinical improvement after 48 hours of intravenous antibiotics, which led to the removal of the nylon foil implant by a left orbitotomy. Intraoperative tissue cultures grew coagulase-negative** ***Staphylococcus, F. brachygibbosum*****, and** ***Lomentospora (Scedosporium) prolificans*****. The patient was subsequently transitioned to oral clindamycin 600 mg three times daily and voriconazole 200 mg two times daily. To the authors' knowledge, this is the first case report to document an association between snorted methamphetamine and a fungal infection of an orbital implant.**

Blowout fractures of the medial wall frequently coincide with blowout fractures of the orbital floor.[1] However, isolated blowout fractures of the medial orbital wall may also occur independently as a result of facial trauma. Surgical intervention is indicated in cases complicated by muscle or tissue entrapment, persistent restrictive diplopia, or cosmetically unacceptable enophthalmos.[1–3] During the surgical repair, placement of an orbital implant over the fracture can help prevent recurrent adhesions and orbital tissue prolapse. Postoperative complications associated with alloplastics implants such as a nylon foil include hemorrhage, migration or extrusion of the implant, infection, mucocele, fistula, and abscess formation.[4,5] While early infections such as orbital cellulitis and abscesses are less common, traumatic inoculation, systemic infection, intravenous drug use, and immunocompromised status are known risk factors for postoperative infection after orbital fracture repair.[6,7]

*Department of Ophthalmology; and †Department of Infectious Diseases, University of California-Irvine, Irvine, California, U.S.A.

Accepted for publication August 29, 2023.

The authors have no financial or conflicts of interest to disclose.

This manuscript has not been previously presented at a local or international conference. Gavin Herbert Eye Institute is recipient of an institutional Research to Prevent Blindness grant.

Address correspondence and reprint requests to Christopher R. Dermarkarian, M.D., Department of Ophthalmology, University of California-Irvine, 110 N. Corcoran Street - Apartment 1007, Durham, NC 27701. E-mail: christopher.dermarkarian@gmail.com

DOI: 10.1097/IOP.0000000000002527

The reported incidence of infections after an orbital implant ranges from 1% to 13%.[4,5,7–9] This variable rate depends on the surgical techniques, the type of implant used, and associated comorbidities.[3,8,9] Overall complication rates with the use of a nylon foil implant are estimated to be only 1.7%.[10] The most common organisms involved in orbital implant infections include gram-positive bacteria such as *Staphylococcus aureus* and *Streptococcus* species, gram-negative such as *Pseudomonas aeruginosa*, and anaerobic bacteria.[5,8] In rare cases, fungal infections may also occur.[9,11] Similarly, immunocompromising conditions such as diabetes mellitus can predispose patients to fungal sinusitis.[12]

Proper surgical techniques and prophylactic antibiotics administered preoperatively can prevent orbital implant infections. In mild cases of implant infections, oral antibiotics may be sufficient, while in more severe cases, intravenous antibiotics may be required and implant removal and debridement of infected tissue.[8]

We describe a case of nylon foil implant infection caused by *Fusarium brachygibbosum*, and *Lomentospora prolificans* following medial orbital wall fracture repair in the setting of postoperative nasal methamphetamine use. To our knowledge, this is the first case report to document an association between snorted methamphetamine and a fungal infection of an orbital implant. This case report adheres to the Declaration of Helsinki and the United States Health Insurance Portability and Accountability Act of 1996.

CASE PRESENTATION

A 61-year-old male with a past medical history of uncontrolled diabetes mellitus and hypertension presented with OS pain and swelling after a physical assault to his face. He complained of swelling and double vision. The patient's visual acuity was 20/20 OD and 20/40 OS on the initial presentation. Intraocular pressure was 12 mm Hg OU. There was no relative afferent pupillary defect in either eye. Extraocular movements showed restricted abduction of the OS with corresponding horizontal diplopia on medial and lateral gaze. Confrontational visual fields were full OU. On the anterior segment examination, there was mild periorbital edema and ecchymosis of the upper lid OS, mild chemosis of the conjunctiva OS, and an oblique conjunctival laceration OS. The remainder of the anterior segment examination was within normal limits. The dilated fundus examination demonstrated commotio retinae to the temporal macula OS. The rest of the posterior segment examination was within normal limits. A CT maxillofacial bones without contrast performed after the initial injury showed a moderately comminuted fracture of the medial wall of the left orbit with depression of fracture fragments into the left ethmoid air cells, resulting in a small left orbital emphysema (Fig. 1). HIV testing was negative.

At his 1-week follow-up, the patient reported a pressure-like sensation around his OS and pain and a "pulling" sensation with eye movements OS. After a detailed risk and benefit discussion, the patient agreed to surgical repair of the left medial orbital

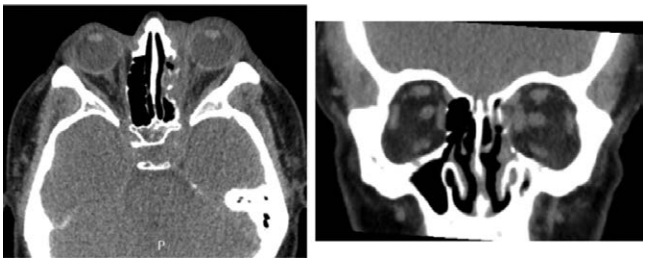

FIG. 2. Axial and coronal CT images roughly 2 weeks after repair demonstrating left-sided soft tissue swelling and scattered fat-stranding within the left orbit, concerning for possible infection.

wall fracture with a nylon foil implant. Repair was achieved by creating a small incision at the caruncle and dissecting it down to the periosteum, which was then elevated. Subperiosteal dissection was continued along the medial wall until the fracture was identified. The fracture site was then covered with a nylon foil implant. There was no evidence of restriction on forced duction testing after the placement of the orbital implant. At his follow-up 1-week postoperatively, the patient noted significant improvement in OS discomfort. The patient returned 6 days later with a new onset headache, OS pain, and swelling to the left medial canthal area. Visual acuity of the OS had decreased to 20/60 OS. The examination was notable for new tenderness to palpation of the left medial canthus, left upper and lower eyelid edema, and left medial canthal erythema. He reported snorting methamphetamine approximately 48 hours before his current presentation. CT imaging showed fat stranding and soft tissue density in the extraconal space adjacent to the left medial rectus muscle and chronic fracture deformity of lamina papyracea with approximately 4 mm of medial displacement of the fracture fragments (Fig. 2). Due to concerns about an infected orbital implant, the patient was admitted and started on empiric intravenous vancomycin and piperacillin/tazobactam. However, the patient showed little clinical improvement after 48 hours of intravenous antibiotics which led to the removal of the nylon foil implant by a left orbitotomy via a transcaruncular approach. Intraoperative tissue cultures grew coagulase-negative *Staphylococcus*, *F. brachygibbosum*, and *Lomentospora (Scedosporium) prolificans*. The patient was subsequently transitioned to oral clindamycin 600 mg three times daily and voriconazole 200 mg two times daily as an infectious diseases consultant recommended.

The patient reported improved OS pain and swelling at his 3-month follow-up after 6 weeks of treatment. Visual acuity had improved to 20/30 OS. His clinical examination showed improved erythema, medial canthus edema, ptosis, and lagophthalmos OS. Extraocular motility was improved OS. A repeat CT scan of the left orbit showed a stable chronic fracture deformity of the left lamina papyracea and redemonstrated mild enlargement and medial deviation of the left medial rectus muscle and decreased inflammatory change and soft tissue density in the extraconal space adjacent to the left medial rectus muscle and along the intraconal fat.

DISCUSSION

To our knowledge, this is the first case report associating snorted methamphetamine use and fungal infection of an orbital implant. Specifically, *L. prolificans* and *F. brachygibbosum* were isolated from the explanted nylon foil device.

Lomentospora (Scedosporium) prolificans, an endemic fungus in the southern United States, can cause disseminated and localized infections in humans.[13] *Scedosporium* species, particularly *L. prolificans*, can cause keratitis and endophthalmitis; however, there are no reports of this fungus causing orbital implant infections.

L. prolificans has been reported to cause endophthalmitis in patients who are immunosuppressed, particularly transplant recipients.[14] *Lomentospora* keratitis and endophthalmitis may occur in immunocompetent patients who have undergone recent surgery, suffered corneal trauma, and were exposed to traumatic inoculation.[15,16] IV drug use, long-term retained intraocular contact lens, and contiguous spread from an adjacent site can also lead to intraocular *L. prolificans* infections.[17] The available antifungal spectrum for *Lomentospora* infections is limited as this pathogen is resistant to various antifungal agents such as 5-fluocytosine, amphotericin B, and first-generation triazole medications such as fluconazole and itraconazole.[18] Furthermore, it has demonstrated susceptibility to echinocandins such as caspofungin. Systemic voriconazole is the first-line treatment for *Lomentospora* infections. Successful outcomes have been reported with terbinafine addition to a voriconazole-based regimen for invasive *L. prolificans* infections.[19] Surgical debridement to decrease mold burden helps to improve outcomes.[13,17,18]

Fusarium species are ubiquitous in the environment. They are primarily plant pathogens that can cause botanic diseases such as root rot and head blight and occasionally cause opportunistic infections in animals such as sea turtles.[20–24] In humans, *Fusarium* species enter through the airways, followed by the skin at the site of tissue breakdown and possibly the mucosal membranes. They cause a broad spectrum of infections, including superficial keratitis, locally invasive, or disseminated infections, with the last occurring almost exclusively in severely immunocompromised patients. *Fusarium* species have been reported in cases of endophthalmitis in immunocompetent patients due to complicated keratitis or postsurgery, while hematogenous spreading occurs in immunosuppressed patients.[25] *Fusarium* species have variable susceptibility to antifungals depending on their subspecies. However, to our knowledge, this is the first report of a human orbital infection caused by *F. brachygibbosum*.

We postulate that the patient's uncontrolled diabetes mellitus, active use of snorted methamphetamines, and a recent traumatic event contributed to the increased susceptibility to this infectious complication. Given the intranasal route of methamphetamine use, it is also probable that mold could have been introduced directly, contaminating the orbital implant and surrounding structures via the nasal passages. To the authors' knowledge, this is the first reported instance of early postoperative orbital implant infection caused by fungal organisms in the setting of intranasal use of methamphetamine.

REFERENCES

1. Burnstine MA. Clinical recommendations for repair of isolated orbital floor fractures. *Ophthalmology* 2002;109:1207–10; discussion 1210.
2. Kersten R, Vagefi MR, Bartley GB. Orbital "blowout" fractures: time for a new paradigm [Published online ahead of print June 2018]. *Ophthalmology* 2018;125:796–798.

3. Bratton EM, Durairaj VD. Orbital implants for fracture repair. *Curr Opin Ophthalmol* 2011;22:400–406.
4. Seen S, Young S, Lang SS, et al. Orbital implants in orbital fracture reconstruction: a ten-year series. *Craniomaxillofac Trauma Reconstr* 2021;14:56–63.
5. Custer PL, Lind A, Trinkaus KM. Complications of supramid orbital implants. *Ophthal Plast Reconstr Surg* 2003;19:62–67.
6. Shew M, Carlisle MP, Lu G, et al. Surgical treatment of orbital blowout fractures: complications and postoperative care patterns. *Craniomaxillofac Trauma Reconstr* 2016;9:299–304.
7. Wladis EJ. Are postoperative oral antibiotics required after orbital floor fracture repair? *Orbit* 2013;32:30–32.
8. Joseph J, Glavas IP. Orbital fractures: a review [Published online January 2011]. *Clin Ophthalmol* 2011;5:95–100.
9. Jung SK, Cho WK, Paik JS, et al. Long-term surgical outcomes of porous polyethylene orbital implants: a review of 314 cases. *Br J Ophthalmol* 2012;96:494–498.
10. Park DJ, Garibaldi DC, Iliff NT, et al. Smooth nylon foil (SupraFOIL) orbital implants in orbital fractures: a case series of 181 patients. *Ophthalmic Plast Reconstr Surg* 2008;24:266–270.
11. Bedi H, Hussain A, Wright J, et al. *Phialophora verrucosa* infection of an orbital implant peg system - case report and review of the literature. *Can J Pathol* 2017;9:59–73.
12. Cohen Atsmoni S, Brener A, Roth Y. Diabetes in the practice of otolaryngology. *Diabetes Metab Syndr* 2019;13:1141–1150.
13. Cortez KJ, Roilides E, Quiroz-Telles F, et al. Infections caused by *Scedosporium* spp. *Clin Microbiol Rev* 2008;21:157–197.
14. Vagefi MR, Kim ET, Alvarado RG, et al. Bilateral endogenous *Scedosporium prolificans* endophthalmitis after lung transplantation. *Am J Ophthalmol* 2005;139:370–373.
15. O'Hearn TM, Geiseler PJ, Bhatti RA, Eliott D. Infection and endophthalmitis.
16. Singh RP, McCluskey P. *Scedosporium prolificans* sclerokeratitis 10 years after pterygium excision with adjunctive mitomycin C. *Clin Experiment Ophthalmol* 2005;33:433–434.
17. Arthur S, Steed LL, Apple DJ, et al. *Scedosporium prolificans* keratouveitis in association with a contact lens retained intraocularly over a long term. *J Clin Microbiol* 2001;39:4579–4582.
18. Ramirez-Garcia A, Pellon A, Rementeria A, et al. *Scedosporium* and *Lomentospora*: an updated overview of underrated opportunists. *Med Mycol* 2018;56:S102–S125.
19. Jenks JD, Seidel D, Cornely OA, et al. Voriconazole plus terbinafine combination antifungal therapy for invasive *Lomentospora prolificans* infections: analysis of 41 patients from the FungiScope® registry 2008–2019. *Clin Microbiol Infect* 2020;26:784.e1–784.e5.
20. Karaca U. Scedosporium apiospermium keratitis: a case report. *J Med Case Rep* 2022;16:91.
21. Konsoula A, Tsioutis C, Markaki I, et al. *Lomentospora prolificans*: an emerging opportunistic fungal pathogen. *Microorganisms* 2022;10:1317.
22. Bragard C, Di Serio F, et al; EFSA Panel on Plant Health (PLH). Pest categorisation of *Fusarium brachygibbosum*. *EFSA J* 2021;19:e06887.
23. Cafarchia C, Paradies R, Figueredo LA, et al. *Fusarium* spp. in loggerhead sea turtles (*Caretta caretta*): from colonization to infection. *Vet Pathol* 2020;57:139–146.
24. Chiam N, Rose L, Waters K, et al. *Scedosporium prolificans* endogenous endophthalmitis [Published online December 2013]. *J AAPOS* 2013;17:627–629.
25. Nucci M, Anaissie E. Fusarium infections in immunocompromised patients. *Clin Microbiol Rev* 2007;20:695–704.

A Rare Case of Methotrexate-Associated Lymphoproliferative Disease in the Orbit

Jane Z. Spadaro, M.D., PHARM.D.†,*
Brittany Perzia, M.D.,*
Sudhir Perincheri, M.B.B.S., PH.D.‡, and
Larissa Habib, M.D.§*

Abstract: **An 80-year-old Caucasian female with a history of rheumatoid arthritis presented with a 6-month history of progressive right upper eyelid ptosis, edema, erythema, and pain. MRI demonstrated a superior orbital mass. An incisional biopsy was performed, and pathologic analysis revealed an atypical lymphoid infiltrate, co-expressing both B and T-cell markers, with a low proliferation rate. Flow cytometry and IgH rearrangement study did not demonstrate any B- or T-cell monoclonal proliferation. Based on these findings, she was diagnosed with an iatrogenic immunodeficiency-associated lymphoproliferative disorder. Discontinuation of methotrexate resulted in the complete resolution of her symptoms, and she remains in remission 18 months later. Given the increased risk of lymphoproliferative disease in patients with rheumatoid arthritis, careful evaluation and close monitoring upon immunosuppressive medication withdrawal is necessary to confirm the diagnosis.**

Lymphoproliferative disorders arising in immune deficiency/dysregulation, also known as other iatrogenic immunodeficiency-associated lymphoproliferative disease (OIAA-LPD), encompasses lymphoid proliferations or lymphomas that develop in patients treated with immunosuppressive medications.[1] LPDs can range from benign and self-limited proliferation to various types of lymphomas. Since the first reports of methotrexate-LPD (MTX-LPD) in immunosuppressed patients, this condition has also been reported in patients with autoimmune diseases such as dermatomyositis, polymyositis, granulomatosis with polyangiitis, Crohn's disease, and psoriasis, who are treated with methotrexate or disease-modifying antirheumatic drugs.[2–4] We present a case of an 80-year-old female with rheumatoid arthritis (RA) who developed an orbital mass secondary to MTX-LPD, which regressed upon methotrexate withdrawal. Patient consent to obtain photographs was obtained and archived. Collection and evaluation of patient health information is Health Insurance Portability and Accountability Act compliant, and this report adheres to the Declaration of Helsinki.

CASE PRESENTATION

An 80-year-old Caucasian female was referred to our institution for evaluation of progressively worsening right upper eyelid ptosis, edema, erythema, and pain for the past 6 months. She was previously treated with topical antibiotics without any improvement. Her medical history included RA, for which she had been treated with adalimumab and methotrexate (15 mg/week) for 9 years. She had no prior history of malignancy. On examination, her best corrected visual acuity was 20/60 in the OD and 20/25 in the OS, with normal intraocular pressures bilaterally and full extraocular motility. External examination revealed the right hypoglobus, 2 mm of relative proptosis, complete right upper eyelid ptosis, and a palpable superior orbital mass (Fig. 1A,B). Otherwise, the remainder of the ophthalmic examination was normal, and there was no evidence of compressive optic neuropathy. There was no lymphadenopathy on

*Department of Ophthalmology and Visual Science, Yale University School of Medicine, Connecticut, U.S.A.; †Kahana Oculoplastic and Orbital Surgery, Michigan, U.S.A.; ‡Department of Pathology, Yale University School of Medicine, Connecticut, U.S.A.; and §Northeast Ophthalmic Plastic and Reconstructive Surgery, Connecticut, U.S.A.

Accepted for publication August 30, 2023.
The authors have no financial or conflicts of interest to disclose.

Address correspondence and reprint requests to Jane Z. Spadaro, M.D., Pharm.D., Department of Ophthalmology and Visual Science, Yale University School of Medicine, 40 Temple St, New Haven, CT 06510. E-mail: janezspadaro@gmail.com

DOI: 10.1097/IOP.0000000000002528