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Footnotes and Disclosure

The authors have no proprietary or commercial interest in any materials discussed in this article.

Intraorbital foreign body giant cell granuloma secondary to a gelatin sponge

Gelatin-based sponges are water-insoluble hemostatic agents derived from purified porcine skin and gelatin granules. These sponges are approved for placement against mucosalized surfaces and within soft tissues.[1,2] Herein, the authors report a case of an orbital foreign body giant cell granuloma secondary to a gelatin sponge.

A 69-year-old woman underwent excisional biopsy of a left-sided, well-circumscribed 2.1 cm × 2.0 cm × 1.5 cm superonasal orbital mass via a medial upper lid crease approach. Preoperatively, there was evidence of left-sided compressive optic neuropathy including counting fingers visual acuity, a relative afferent pupillary defect (RAPD), and severe optic nerve head edema. Intraoperatively, the lesion was quickly located within the superonasal intraconal space and, after 360 degrees of dissection, the mass was excised in toto with the aid of a cryoprobe. Histologic analysis revealed the lesion to be a cavernous angioleiomyoma—an infrequent, but previously reported orbital tumour.[3] Diffuse intraconal bleeding from the orbital fat was observed immediately after excision. Bipolar cautery was not applied, as a culprit vessel could not be identified. The patient's blood pressure was normal, and there was no history of anticoagulant use or systemic coagulopathy.

Despite reverse Trendelenburg positioning, lowering of blood pressure, and modest manual pressure applied for several minutes, bleeding did not abate. A single 2 cm × 6 cm × 0.7 cm gelatin-based sponge (Surgifoam, Ethicon, Somerville, NJ)[2] was flattened and placed within the surgical field, and pressure was again applied to the orbit. After several minutes, complete hemostasis was achieved. However, when the sponge was manipulated for removal, mild bleeding recommenced. Thus, the gelatin sponge was left in place, hemostasis was confirmed, and the lid crease incision was closed with 5-0 plain gut fast-absorbing suture. Performing a prophylactic canthotomy cantholysis or placing an orbital drain were not considered given that hemostasis was attained after replacing the gelatin sponge.

One-week postoperatively, the patient had unremarkable mild lid edema and visual acuity remained counting fingers OS. Two weeks postoperatively, the patient presented with 72 hours of discomfort, infraplacement of the left globe, and a visible left upper eyelid mass (Fig. 1). The mass was indurated, and there was increased resistance to retropulsion of the globe.

Hours later, the patient underwent a second superonasal orbitotomy, during which pale, firm, and poorly delineated tissue was found extending from the subcutaneous plane to deep within the superonasal intraconal space. Multiple deep incisional biopsies were performed and sent for histopathological analysis, which revealed multinucleated giant cells engulfing foreign material (Fig. 2). The lesion resolved within 2 weeks of biopsy, during which debulking and injection of triamcinolone (0.5 cc, 40 mg/mL) into the firm tissue were also performed.

Uncontrolled hemostasis during orbital surgery can lead to an expanding retrobulbar hematoma and result in potentially devastating compressive optic neuropathy. During our patient's first surgery, diffuse bleeding from intraconal orbital fat was noted. Low-risk hemostatic manoeuvres, including reverse Trendelenburg positioning, blood pressure reduction, and manual pressure applied to the orbit (hand over closed eyelids), did not stop the bleeding. Bipolar cautery was avoided owing to the absence of an identifiable culprit vessel and the risk of damaging delicate intraconal structures. The placement of a single gelatin sponge, combined with pressure, eventually achieved hemostasis.

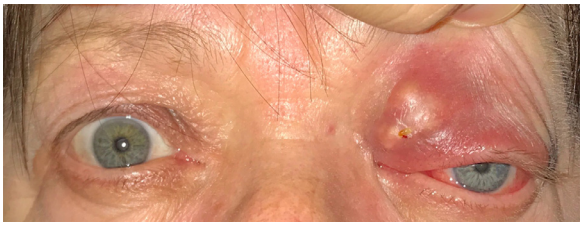

Fig. 1—Clinical photograph of the patient 2 weeks after complete excision of a benign orbital mass. A pale left medial upper eyelid mass is present with surrounding erythema and edema. The left upper eyelid is ptotic, and distraction of the eyelid reveals infraplacement of the left globe.

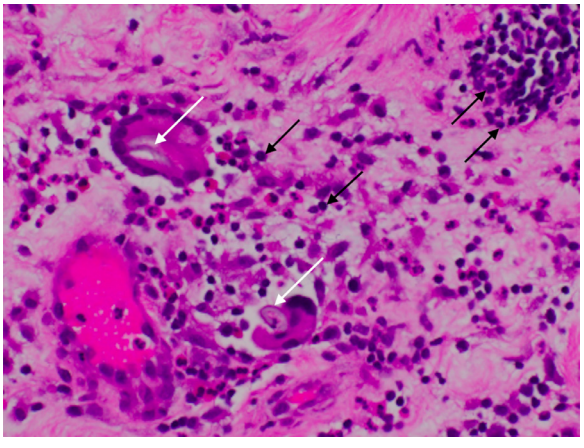

Fig. 2—Hematoxylin and eosin stain revealing multinucleated giant cells engulfing foreign material (white arrows) and numerous lymphocytes (black arrows), consistent with a foreign body giant cell granuloma.

Gelatin sponges are water-insoluble, nonelastic, porous products prepared from purified pork and gelatin capsules.[1,2] Placement of a gelatin sponge against a bleeding surface produces a mechanical matrix that facilitates clotting.[4] As platelets enter the sponge, they may become damaged, releasing thromboplastin, which may interact with prothrombin and calcium to produce thrombin and set off the clotting cascade.[4] According to the product monographs, gelatin sponges can be used dry or saturated with sterile sodium chloride, and are indicated for hemostasis when "capillary, venous, or arteriolar bleeding by pressure, ligature or other conventional procedures is ineffective or impractical."[1,2] When not used in excessive amounts, gelatin sponges can be placed within soft tissue, and wound closure can be performed overtop.[1,2] Gelatin sponges cause little more than the cellular infiltration of the blood clot they induce, and, within soft tissue, absorption of the sponge occurs in 4–6 weeks.[1,2]

Although gelatin sponges are generally well tolerated, adverse events have been reported when left within soft tissue. The most common events include fever without a proven site of infection, true infection, abscess formation, fluid encapsulation, and hematoma encapsulation.[1,2] Gelatin sponges may also swell upon absorbing fluids.[1,2] The effect of swelling is most relevant in confined spaces, such as the orbit, that house delicate structures within noncompliant walls. Therefore, whenever possible, gelatin sponges should be removed from confined boney spaces and when used in close proximity to the optic nerve and chiasm.[1,2] However, in our patient's case, the benefits of leaving the sponge in place were considered to outweigh the risk of hematoma formation.

Granulomatous reactions within the orbit have occurred after the placement of bone wax,[5] oxidized regenerated cellulose,[6] and microfibrillar collagen.[7] However, only 4 cases of gelatin sponge foreign body giant cell granuloma have been previously reported, and each of these cases involved sponge left within cerebral tissue (Supplementary Fig. 1, available online). Histological studies suggest that gelatin sponges normally induce a foreign body reaction with infiltration of mononuclear cells, giant cells, and fibrosis, which is then absorbed by phagocytosis over weeks.[8] However, in certain instances, an excessive or prolonged foreign body reaction may occur. Risk factors for an exuberant immune response to gelatin-based material remain unknown. One explanation may be immunologic hypersensitivity against specific antigens: gelatin is derived from the separation of collagen molecules into single-peptide chains,[9] and immunologic hypersensitivity to animal collagen may occur in up to 3% of the population.[10] Another hypothesis for disproportionate inflammation is that of excessive packing at the surgical site. Gelatin sponges expand with fluid absorption and, when excessively packed, could potentiate prolonged inflammation and granuloma formation.[1,2]

To the authors' knowledge, this is the first reported case of an orbital foreign body granuloma caused by a gelatin sponge. Orbital granulomas secondary to gelatin sponges may be under-reported owing to medicolegal concerns. Nevertheless, surgeons should be aware of their potential development and equipped to offer timely management. In general, gelatin sponges are effective hemostatic agents that are safe to leave within soft tissue. However, this case serves as a reminder of the risks associated with their use, including an exceedingly rare foreign body giant cell granuloma reaction. When possible, surgeons should consider removing gelatin sponges from the orbit once hemostasis has been achieved. If deemed most prudent to leave a gelatin sponge within the orbit, it should be placed as far as possible from the optic nerve. One must also use the minimal volume of sponge necessary for hemostasis, as swelling can induce a mass effect and overpacking may increase the probability of granuloma formation. Surgical debulking and intralesional steroid injections proved effective in managing the granulomatous foreign body reaction in this case.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.jcjo.2020.10.010.

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Capnocytophaga sputigena as a cause of severe orbital cellulitis and subperiosteal abscess in a child

Orbital cellulitis is an infection of the soft tissues lying behind the orbital septum. The etiologic agents differ across age group, but gram-positive cocci colonizing the skin and the nasopharynx, such as *Staphylococcus* and *Streptococcus* species, are most commonly identified in children. *Haemophilus influenzae*, a gram-negative facultative anaerobe, was frequently identified before the introduction of the Haemophilus vaccine in 1985. We report the case of a 15-year-old man who presented with a severe orbital cellulitis complicated by a subperiosteal abscess (SPA) secondary to *Capnocytophaga sputigena*.

A 15-year-old man presented with a 1-week history of fever and right periorbital swelling and erythema. The patient reported a general feeling of discomfort, headaches, and diplopia with both upward and downward gaze. He denied any recent travel, or orbital trauma, but had an upper respiratory tract infection preceding the onset of symptoms. His medical history was significant for an attention-deficit/hyperactivity disorder, and his immunization status was up-to-date. He had no known medication allergy and had not been treated with antibiotics before presentation.

On examination, the patient was febrile at 38.2°C, and visual acuity was 20/60 in the right eye and 20/20 in the left eye. Pupils were round and reactive to light, and there was no afferent pupillary deficit. The right eye showed motility restriction in upgaze and downgaze, moderate chemosis, and a 9-mm proptosis. The remainder of the examination was otherwise normal. At this stage, the blurred vision in the right eye was attributed to chemosis and pooling of tears. A computed tomography scan revealed a right-sided pansinusitis involving predominantly the ethmoid and maxillary sinuses. The adjoining orbit showed soft tissue stranding and a subperiosteal gas-containing fluid collection measuring 41 mm in anteroposterior dimension and 10 mm in thickness along the floor of the orbit (Fig. 1). The patient was diagnosed with a right orbital cellulitis complicated by an SPA. The presence of gas within the abscess was suspicious for a more aggressive anaerobic infection. Other laboratory tests included a normal white blood cell count of 7.7×10^9/L (reference range 4–10.5), an elevated erythrocyte sedimentation rate of 25 mm/hour (reference range

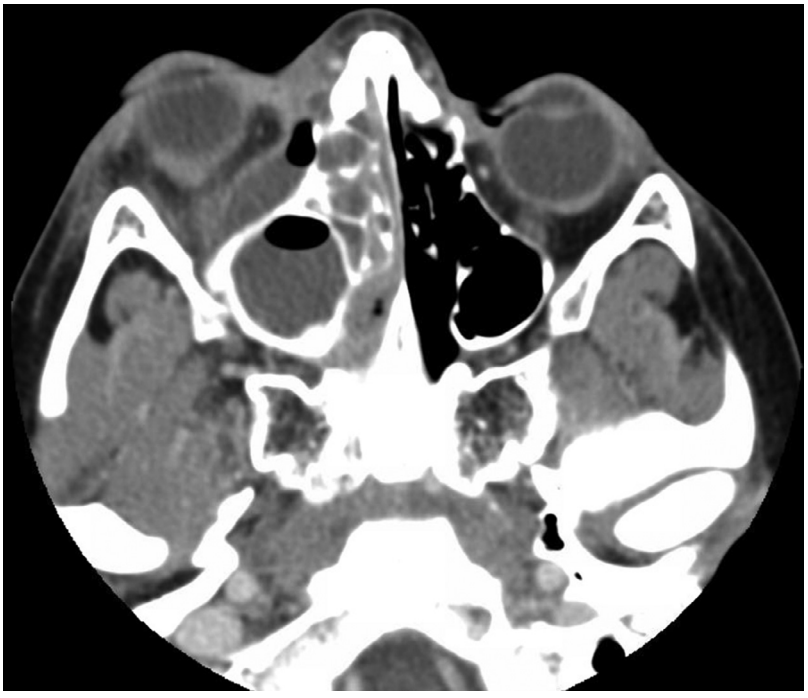

Fig. 1—A computed tomography scan showing a large, gas-containing inferomedial subperiosteal abscess, associated with a right-sided pansinusitis and orbital cellulitis.