Giant Cell Granuloma of the Temporal Bone in a Mixed Martial Arts Fighter

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Abstract

Background and Importance Giant cell granuloma (GCG) is a rare, benign, non-neoplastic lesion of the head and neck. More common in the jaw bones, there have been few reports of the lesion arising in the temporal bone. Initially referred to as a "giant cell reparative granuloma," due to the previously accepted notion of its nature in attempting to repair areas of injury, the term "giant cell granuloma" is now more frequently used as this lesion has been found in patients without a history of trauma. In addition, several cases with a destructive nature, in contrast to a reparative one, have been observed.

Clinical Presentation We report a case of GCG presenting as a head and neck tumor with dural attachments and extension into the middle cranial fossa in a mixed martial arts fighter.

Conclusion Giant cell granulomas are typically treated surgically and have a good prognosis; however, care must be taken when they present in unusual locations. This case supports the theory of trauma and inflammation as risk factors for GCG.

Keywords
- giant cell reparative granuloma
- reactive pseudoneoplasms
- giant cell
- reparative granuloma

Introduction

Giant cell granuloma (GCG) is a rare, benign, non-neoplastic lesion of the head and neck, most commonly occurring in the mandible or maxilla.[1,2] Few cases of central GCG arise within the skull base.[3] There are several cases of GCG arising in the temporal bone.[4–14] Initially referred to as a "giant cell reparative granuloma," it is now more commonly referred to as "giant cell granuloma," This is due to the fact that the once perceived notion that the lesion represented an attempt to repair areas of injury. However, it has been shown to occur without a history of trauma. Also, some cases have a more destructive nature.[3,7] Our case represents a rare finding of GCG occurring within the right temporal bone including attachments to the dura. This lesion was associated with CNS symptoms and was believed to be something more ominous. The prognosis is excellent following resection.

Case Report

A 27-year-old African American male presented with a history of headaches, fatigue, lightheadedness, and difficulty concentrating. His symptoms had progressed slowly over the course of 4 to 5 years. The patient had no pertinent medical history, but his social history included being a mixed martial arts fighter. Physical examination was unremarkable. A computed tomography (CT) scan of the head revealed a lytic lesion in the right temporal bone above the temporomandibular joint with internal calcifications (►**Fig. 1**). A right temporal craniectomy with resection of the calvarial lesion

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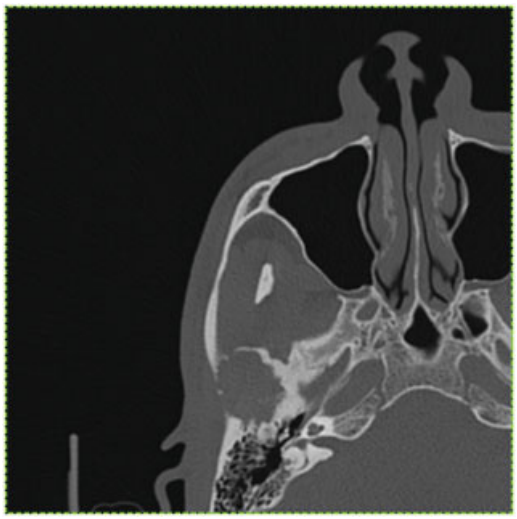

Figure 1 Preoperative computed tomography scans demonstrating a lytic lesion.

was performed (►**Fig. 2**). Upon removal, the lesion was found to have attachments to the dura and extensions into the middle cranial fossa were present.

Methods

Hematoxylin and eosin (H&E)-stained sections showed a dense spindle cell lesion with frequent giant cells and areas with numerous mononuclear cells. There were also areas of fibrosis, reactive bone formation, and extravasated red blood cells (►**Fig. 3**). The lesion appeared very similar to a giant cell tumor of tendon sheath; however, the location within the temporal bone excluded that diagnosis. The differential diagnosis included meningioma, giant cell tumor, brown tumor, histiocytosis, and other spindle cell neoplasms. An immunohistochemical (IHC) evaluation was performed using CD68 (clone KP-1, Ventana, Tuscan, AZ, USA), and CD163 (Biocare Medical, Concord, CA, USA), S100 (Ventana, Tuscan, AZ, USA), synaptophysin (Cell Marque, Rocklin, CA, USA), and EMA (Cell Marque, Rocklin, CA, USA), as well as an iron stain.

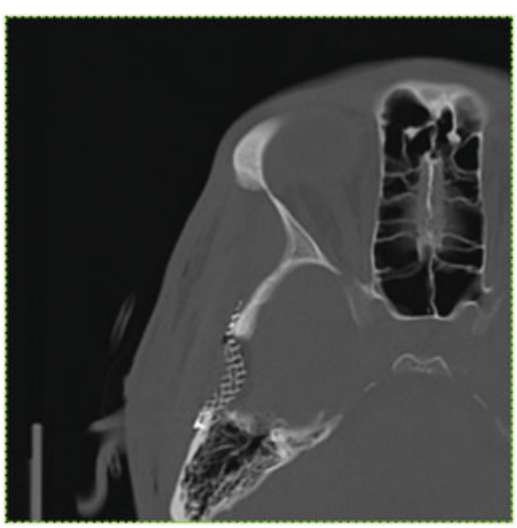

Figure 2 Postoperative computed tomography demonstrating the location of surgical resection.

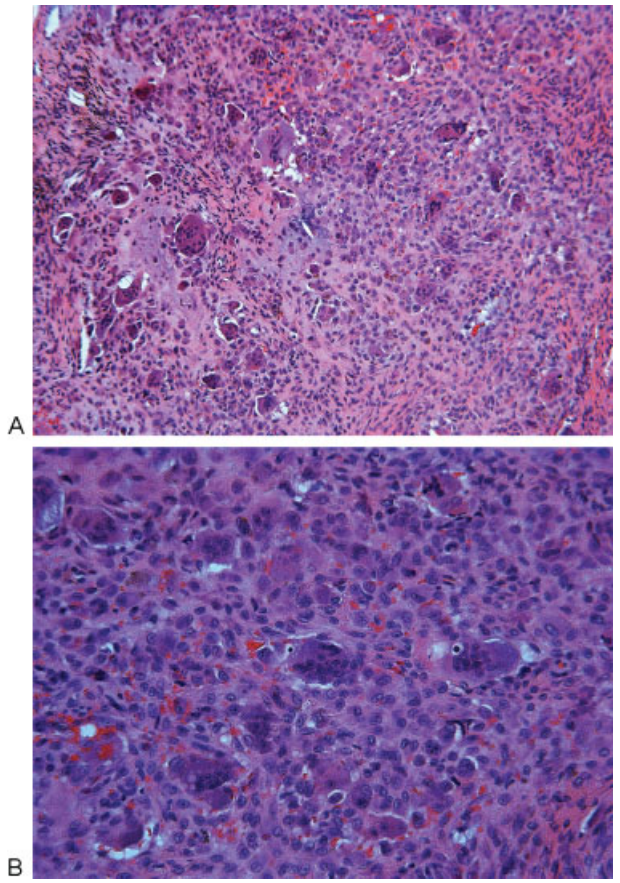

Figure 3 Low-power (A) and high-power (B) views showing the mesenchymal proliferation, giant cells, hemorrhage, and hemosiderin.

Results

IHC showed the lesional cells to be positive for CD68 and CD163, confirming histiocytic origin (►**Fig. 4**). IHC stains were negative for S100, synaptophysin, and EMA. The iron

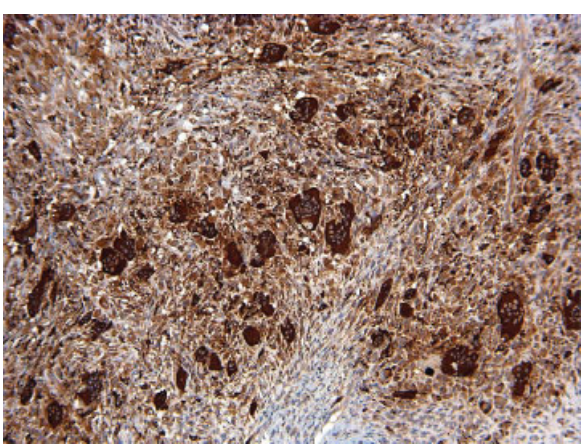

Figure 4 Lesional cells are positive for CD68.

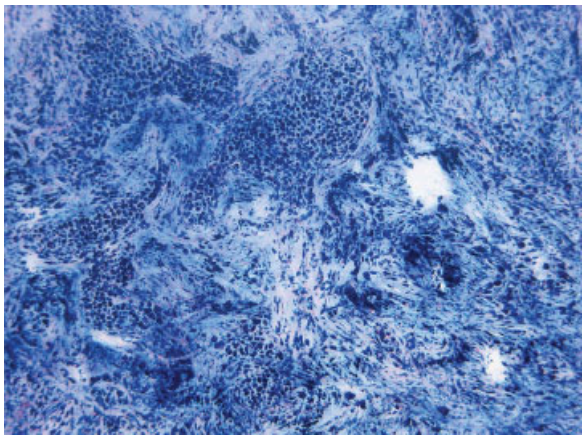

Figure 5 An iron stain highlights the copious amount of hemosiderin present.

stain was strongly and diffusely positive, highlighting the hemorrhage (►**Fig. 5**). These H&E and IHC findings were consistent with a giant cell granuloma of the temporal bone.

Discussion

The first case of GCG in the temporal bone was reported in 1974 by Hirschl and Katz.[14] Since then, there have been additional cases reported in the literature.[4–14] GCG has a female predilection and is commonly seen early in the second decade of life.[10] The etiology is unknown; however, it is theorized that trauma and inflammation may be a risk factor, as represented in this case. The suggested pathological process of posttraumatic granuloma formation begins with hemorrhaging into the bone and excessive macrophage (giant cell precursor) migration into the injured tissue.[15] It has also been found that chronic inflammation giving rise to tissue proliferation may also increase the incidence of granuloma formation.[3,12–15] Radiographic findings tend to demonstrate an expansile radiolucency.[2] Microscopic examination reveals extravasated erythrocytes, an extensive amount of hemosiderin, and clusters of multinucleated giant cells within a scaffold of cellular spindle cells.[2] Positive histological staining includes iron, CD68, and CD163.

The differential diagnosis should consist of giant cell tumor, brown tumor, and aneurysmal bone cysts.[2] GCG is currently considered a benign non-neoplastic lesion. To date, there are no malignant transformations nor metastases reported.[10] It is believed that GCG is often misdiagnosed as other lesions such as giant cell tumor and brown tumor. It is crucial to differentiate these lesions due to the malignant nature of giant cell tumors.

The treatment currently is surgical resection. Numerous GCG cases that were treated surgically have reported no features of recurrence on postoperative follow-up ranging from 7 months to 15 years.[3,5,8,12,13] Supplementary treatments have included corticosteroid intralesional injection and calcitonin for aggressive features such as bony invasion by GCG.[3,12]

Conclusion

GCG is a rare, benign, non-neoplastic lesion of the head and neck. Originally believed to be related to injury or trauma, we now know that these cases can arise de novo and can have a destructive nature. Our case of GCG occurring within the right temporal bone including attachment to the dura and mental status changes shows where these lesions can be aggressive. In addition, the patient's history of mixed martial arts fighting supports the increased risk associated with trauma. As it is hypothesized that GCG is often misdiagnosed, it is crucial to differentiate these lesions from others with a malignant potential. Appropriate diagnosis is supported by patient presentation, history, imaging, pathological findings, and response to surgical resection. Surgical resection remains the treatment of choice along with supplementary corticosteroid injection, and calcitonin if the lesion is considered aggressive. With correct treatment the prognosis is excellent.

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