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Case report

Giant cell tumor of temporal bone: A case report

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Introduction

Giant cell tumor (GCT) of bone is an uncommon primary bone neoplasm that usually occurs in the long bones. They more commonly occur in bones that develop by endochondral ossification and are relatively rare in skull, although when present, they most typically arise in sphenoid and temporal bones.^{1–3} Their relative absence in cranial bones is not surprising, as less than 25 cases of giant cell tumor of the temporal bone have been reported in the world literature so far.^{5,12} It is a benign neoplasm but can be locally aggressive. It has tendency toward local recurrence and late malignant change with metastases especially to the lung has been reported.^{1,4} Radical surgical removal is the preferred modality of treatment. Due to the rarity of the presentation of GCT of the temporal bone, we report this case, which was treated with radical surgery with a good outcome.

Case report

A 30-year old serving soldier presented with history of gradually increasing swelling in the left temporal region of three months duration, associated with pain which aggravated on movements of the jaw leading to restricted mouth opening.

Clinical examination revealed a diffuse swelling 5 cm × 3 cm in size in the left temporal region, extending anteriorly up to the pre-auricular region. It was firm in consistency, tender and adherent to the underlying structures. Overlying skin appeared to be healthy. His left external auditory canal was occluded and pure tone audiogram revealed 30 dB conducting hearing loss in left ear. The patient had trismus but no cranial nerve deficit, paresis or palsy.

Fine needle aspiration cytology was reported as giant cell tumor (Osteoclastoma). All other pre-anesthetic work up investigations were within normal limits. NCCT scan of

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temporal bone of 3 mm thickness taken through posterior cranial fossa showed 44.2 mm × 27.8 mm × 46 mm well defined mass in temporal region involving left TM joint with variegated density. It was involving the mastoid cavity, attic, zygoma and petrous part of left temporal bone leading to bone erosion and was replaced by soft tissue component. MRI scan with sagittal and coronal cuts revealed 44.2 mm × 27.8 mm mass in left temporal region involving left glenoid fossa [Fig. 1]. There was no involvement of brain parenchyma.

The patient was taken up for excision of the tumor under general anesthesia. Using a combined pre & post auricular and temporo-parietal incision, the mass was resected by drilling the bone all around [Fig. 2]. The tumor was found to be adherent to middle cranial fossa dura onto its lateral surface and inferior surface but could be peeled off the dura. A drain was left in the large dead space created by the removal of the tumor. The large skull base defect was reconstructed with pedicled temporalis muscle graft. The patient had an uneventful post-op recovery without any complications. Histopathological examination of removed mass confirmed the diagnosis of giant cell tumor (Osteoclastoma) (Fig. 3).

Final diagnosis: Giant cell tumor of temporal bone.

Discussion

The first cytological description of giant cell tumor of bone was described in 1818 by Cooper and Travers and its malignant potential by Virchow. They account for 5–9% of all primary bone tumors. The commonest sites of giant cell tumors are epiphysis of long bones i.e. distal femur, proximal tibia and distal radius.¹¹ The skull is a rare location for GCT. In the cranium, sphenoid bone is the commonest site followed by temporal bone.^{1–3} This can be explained by the fact that the tumor genesis occurs in the endochondral bone instead of intramembranous bone.² The temporal bone has two main components – squamous and petromastoid. The squamous portion develops by intramembranous ossification, while the

Fig. 2 – Intra operative photograph showing tumor.

petromastoid portion develops from cartilage (endochondral bone). GCTs are commonly seen to arise from the petromastoid portion. Neoplasia of the skull bones are uncommon accounting for only 2.4%–2.6% of all primary bone tumors.¹ They are most common in young adults aged 25–40 yrs and seen commonly in women than men. GCT is commonly seen in the 30–50 years age group with only 16% of patients below 20 years of age.

Giant cell tumor of bone is a benign lesion that is usually solitary and locally aggressive.⁶ Most patients present with slowly progressive pain with or without a mass. Hearing loss, pain and cranial nerve paralysis of the facial nerve are the common presenting complaints. Symptoms arise when the lesion begins to destroy the cortex and irritate the periosteum, when the weakening of the bone caused by the tumor causes

Fig. 1 – MRI scan (coronal view) revealed 44.2 mm × 27.8 mm mass in left temporal region involving left glenoid fossa.

Fig. 3 – Numerous multinucleate giant cells with varying number of bland oval nuclei evenly scattered in a background of polygonal stromal cells, the nuclei of which are identical to the giant cells. (H&E X 400).

pain, due to imminent pathologic fracture. Tumor is seen as soft brown mass with areas of hemorrhage which appear dark red, and areas of collagen which appear gray. Microscopically, GCT consists of plump spindle shaped or ovoid cells with admixed multinucleated, cytologically benign giant cells. Variable numbers of benign multinucleated cells are seen amidst sheets of benign mononuclear spindle shaped cells with similar nuclear features. The nuclei are generally hypochromatic with inconspicuous nucleoli and mitotic figures are uncommon.³ In 5–10% of cases, the tumors are malignant.⁷ Angiography is usually not required in evaluation of giant cell tumor. Unfortunately overlap in the angiographic features of malignant bone tumors and non-neoplastic lesions preclude the use of angiography in making differential diagnosis.

The treatment of choice is complete surgical excision which if achieved, can be curative.¹ Radiotherapy in modest doses (35 Gy in 15 fractions or equivalent) is a safe and effective option for primary and recurrent giant cell tumors of bone. It should be used if surgery would result in significant functional morbidity.⁸ However, use of cryotherapy with cryosurgery and antiangiogenic therapy with interferon Alfa-2a also has been advocated in cases of recurrent giant cell tumor. During cryotherapy, rapid freeze causes intracellular ice crystals followed by a slow thaw that causes intracellular crystallization. Cryosurgery has been associated with injury to adjacent rim of bone with secondary fractures, skin injury and temporary neuropraxia. The reported rate of local recurrence varies up to 57%.⁹ Interferon Alfa-2a is an angiogenesis inhibitor, known to inhibit mRNA and protein production of two known angiogenic factors b FGF (basic fibroblast growth factor) and interleukin-8. The use is based on a hypothesis that there may be a group of b FGF-dependent diseases, of which hemangiomas and giant cell bone tumors are common.¹⁰

The rate of recurrence is quite high about 40–60%, generally observed within first two years following treatment of the neoplasm. The differential diagnoses consist of central giant cell granuloma (CGCG), aneurysmal bone cyst, chondroblastoma, hyperparathyroidism and fibrous dysplasia.¹¹ The patient was recurrence free for one year post-op.

Conflicts of interest

All authors have none to declare.

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