

Access osteotomy for infratemporal tumors: Two case reports

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ABSTRACT

Tumors occurring in the infratemporal region present a surgical challenge and access osteotomies of the facial skeleton is the answer to access these deeply situated, inaccessible tumors of the head and neck. Various approaches have been devised for their better exposure and it is our expertise as maxillofacial surgeons to provide surgical access by transmaxillary, transzygomatic and transmandibular approaches. We followed this concept in our institute and report here two case reports. The first is a 45-year-old female who presented with right facial pain and temporal swelling due to schwannoma in the right infratemporal region extending into middle cranial fossa. This was jointly treated by a team of neurosurgeons, maxillofacial surgeons and ENT surgeons by right temporal craniotomy, right transmandibular and transzygomatic approach. The second is a rare tumor occurring in a 26-year-old male with the chief complaint of right frontal headache and diplopia. The tumor was excised via access through the zygomatic arch and lateral orbital wall; diagnosed later as Rosai Dorfman disease. No recurrence was seen at follow-up period of 2 years. These approaches help to reduce the surgical morbidity. Thus, oral and maxillofacial surgeons form a vital role in the multidisciplinary approach to provide access to difficult anatomic locations.

Keywords: Access osteotomy, infratemporal, Rosai Dorfman disease, schwannoma

INTRODUCTION

Access osteotomies are performed for better exposure and access to deeply situated, inaccessible tumors of the head and neck using osteotomies of facial skeleton and repositioning of the bony segments following resection of the tumor. This concept is not new and dates back to 1859 when Von Langenbeck performed a horizontal osteotomy in the maxilla, later described as Le Fort I level. These techniques have undergone various modifications and advancements with the introduction of stainless steel and titanium plates and screws. These surgical approaches such as midface access or transmandibular access provide access to surgically challenging areas by giving a better and direct exposure of the lesion and the surrounding vital structures. Maxillo-facial region being the surgical home of our specialty, it is our major strength to provide access for these pathologies and be a part of the multidisciplinary approach.

A variety of osteoplastic flaps have been devised for the transoral or extraoral access to base of the skull, infratemporal region, retromaxillary/pterygoid space. This article highlights two such cases of infratemporal schwannoma with middle cranial fossa extension and infratemporal Rosai Dorfman disease. The surgical approach was systematically discussed and planned by a team of neurosurgeon, maxillofacial surgeon and ENT surgeon.

CASE REPORTS

A 45-year-old female reported to the Department of ENT with right facial and ear pain for 3 months and right temporal swelling for 4 years [Figure 1]. An ultrasound-guided FNAC proved it to be schwannoma. The rest of her medical history was noncontributory. Examination showed right preauricular swelling and tenderness. A smooth bulge was present in the right zygomatic region with no signs of inflammation. Intraoral

examination revealed chronic gingivitis. Patient underwent routine blood investigations, CT Scan and MRI brain. MRI showed predominantly right infratemporal mass with extension into middle cranial fossa suggestive of recurrent infratemporal schwannoma with intracranial extension [Figures 2 and 3].

The surgery was planned by a team of maxillofacial surgeon, neurosurgeon and ENT surgeon. General anesthesia was administered through nasoendotracheal intubation. An Alkayat Bramely incision was given on the right side extending down to the tragus. Layer-wise dissection was done in the scalp and temporalis muscle was exposed. The muscle was incised at its origin and reflected inferiorly to expose the skull. Access to middle cranial fossa was achieved by right temporal craniotomy. Brain was retracted and the middle cranial extension of the schwannoma was visualized. Dissection was done in the preauricular region to expose the zygoma. One-centimeter of the zygomatic arch was intentionally fractured and access to infratemporal region was achieved. Right submandibular incision was given, layer-wise dissection was done and mandible exposed. Access osteotomy was done in the subsigmoid region [Figure 4].

All tumor extensions were identified. The tumor removal began from the cranial extension with minimal dissection done

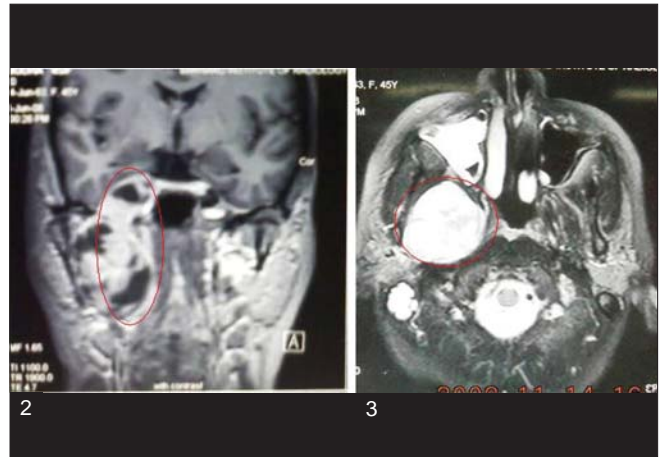
between duramater and capsule. It was attempted to push the tumor inferiorly in the infratemporal region accessed by maxillofacial surgeon. Lesion was then delivered from through the infratemporal region.

Hemostasis was secured and temporalis muscle was returned. Scalp was closed in layers. The zygomatic arch was repositioned and fixed with wires and mandible with plate and screws. The wound was closed layer wise. Postoperative period was uneventful [Figure 5]. The postoperative histopathological diagnosis was schwannoma with cystic changes [Figure 6]. There has been no recurrence in follow-up period of 2 years.

The second was a case report of a 26-year-old male [Figure 7] with the complaint of right frontal headache and double vision since one month. On examination, he had relative afferent papillary defect and mild exophthalmus in the right eye. Patient underwent routine blood investigations, CT scan PNS, CT angiogram and MRI brain and orbit. MRI showed erosion of posterosuperior wall of right maxillary sinus, heterogeneously enhancing mass in the right pterygopalatine fossa extending through pterygomaxillary fissure to infratemporal fossa [Figures 8 and 9]. Diagnostic nasal endoscopy revealed crusts in the right middle meatus. A specialty opinion was inconclusive and it was decided to go for excision



Figure 1: Preoperative – Case 1



Figures 2 and 3: MRI-showing lesion – Case 1

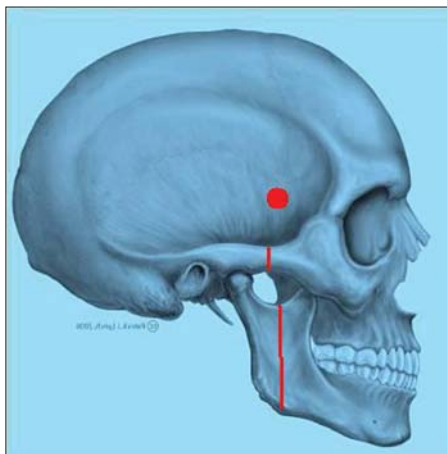


Figure 4: Access osteotomy site – Case 1



Figure 5: Postoperative – Case 1

of the mass through an external approach. The histopathological report revealed it to be Rosai Dorfman disease (sinus histiocytosis with massive lymphadenopathy) [Figure 10]. Postoperatively, vision improved and there was no restriction of extraocular muscles [Figure 11]. General anesthesia was administered through nasoendotracheal intubation. A lateral Fisch type D2 approach was taken and layerwise dissection was done in the scalp and temporalis muscle was exposed. A similar access osteotomy of the zygomatic arch as in the previous case was done along with osteotomy of the lateral wall of orbit. The tumor was identified and excised in toto. The lateral orbital wall and zygomatic arch were repositioned and fixed with plates and screws [Figures 12-15]. The wound was closed in layers.

DISCUSSION

We were able to achieve total removal of these infratemporal tumors by transzygomatic and transmandibular approach. The basic advantage of this procedure is its simplicity. The facial nerve is preserved as it was retracted with the preauricular flap medially. Facial aesthetics are maintained and incision is cosmetically acceptable. The splitting of zygoma to access the infratemporal region has been previously described by Hamlyn *et al.*,^[1] but they used a Weber fergusson incision. Later a bicoronal

approach for better exposure was described by Grime *et al.*^[2] They also described a Weber-fergusson incision combined with extension superiorly over temporalis muscle and extending down to zygoma. This gave wider exposure to combine zygomatic-temporal technique with hemimaxillectomy. Alternatively, both the maxilla and the zygomatic bone can be removed in one piece as described by McGurk and Lello.^[3] Both these methods are variations of a technique first described by Crockett^[4] and later modified by Worthington.^[5] But, we were able to achieve adequate access by Alkayat Bramely incision and splitting of zygoma in the first case while lateral Fisch-type D2 approach and osteotomising the zygoma and lateral orbital wall in the second.

The transfacial lateral rotation technique as described by Altemir,^[6] gives good access to the retromaxillary area but is inadequate if the interorbital area has to be approached. Later, a trans-naso-orbito maxillary approach to anterior and middle cranial fossa was described by Salins PC^[7] for wider exposure. The main advantage of the technique was to remove lesions like angiofibroma without transecting them and reduce blood loss. This can be combined with Le Fort I and mandibulectomy to gain wider access.

Infratemporal fossa lies below the middle cranial fossa communicating with it through foramen ovale and foramen

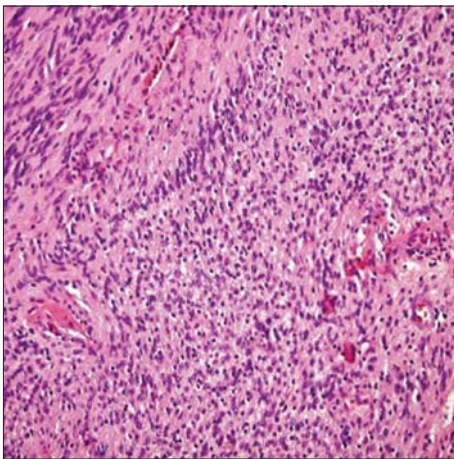


Figure 6: Histopathological picture of Schwannoma (H&E, 10x)



Figure 7: Preoperative -Case 2

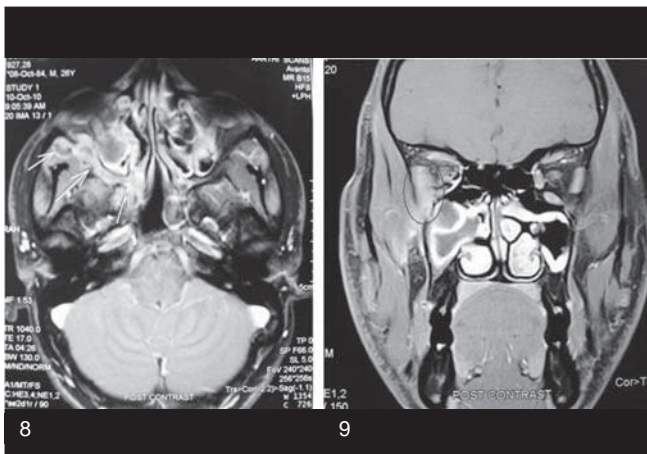


Figure 8,9: MRI and CT scan showing lesion - Case 2

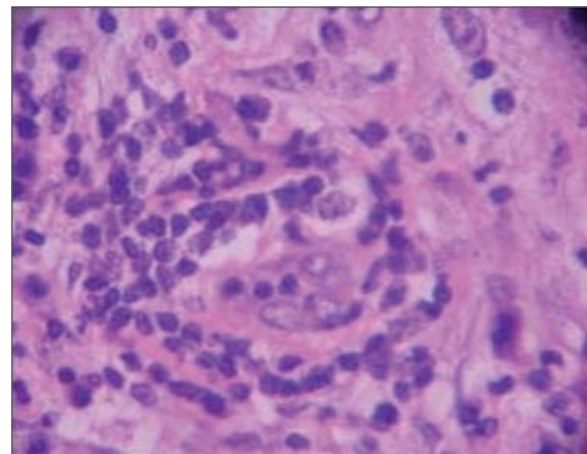


Figure 10: Histopathological picture of Rosai Dorfman disease

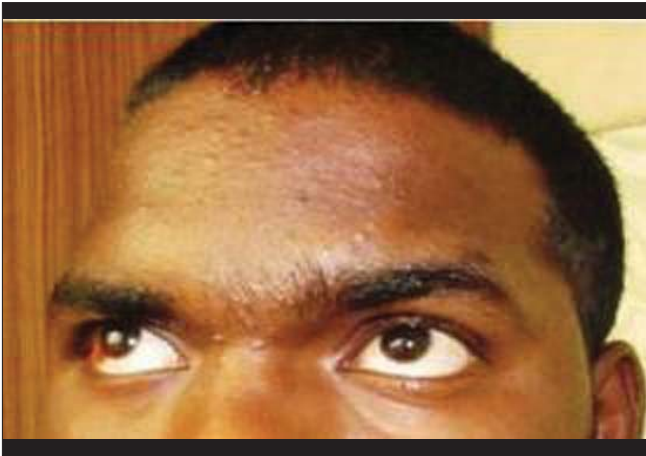


Figure 11: Postoperative – Case 2

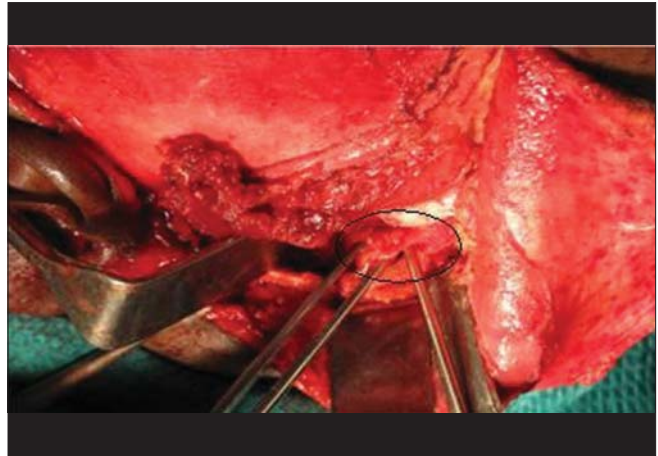


Figure 12: Removal of tumor – Case 2

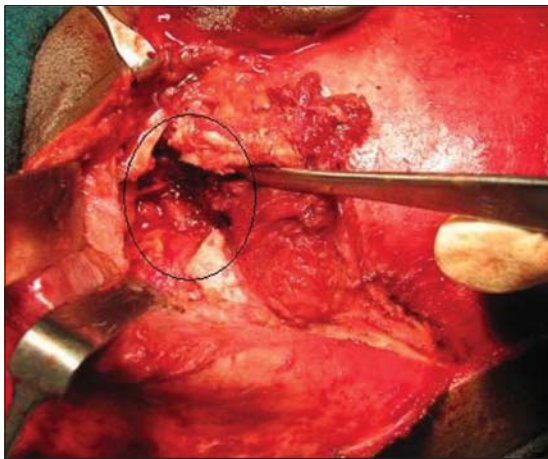


Figure 13: After tumor removal – Case 2

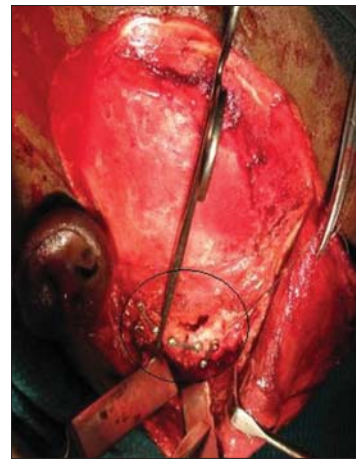


Figure 14: Fixing osteotomy site with plates and screws – Case 2



Figure 15: Excised specimen – Case 2

spinousum; with orbit through infraorbital foramen; with the temporal fossa through a gap deep to the zygomatic arch; and with pterygopalatine fossa through pterygomaxillary fissure. It is bounded anteriorly by body of the maxilla and medial surface of the zygomatic bone; posteriorly by the styloid process and muscles attached to it; medially by lateral pterygoid plate; laterally

by ramus of the mandible; and superiorly by infratemporal crest and infratemporal surface of greater wing of sphenoid.

Schwannoma, also called Neurolemmoma, is a benign tumor derived from Schwann cells, usually encapsulated. They were first described by Verocay in 1908.^[8] Later Stout recognized their schwannian derivation.^[8,9] They commonly arise from spinal nerve roots, intracranial nerves of the face, neck, extremities, mediastinum and pelvis. Most commonly affected nerve is the VIII cranial nerve.^[8,10] It has no gender or age predilection.^[11] A slow growing lesion which is usually painless until it causes pressure on adjacent nerve rather than the nerve of origin. It is usually a single circular nodule with no pathognomonic features. Extracranially 25% of all schwannomas are located in the head and neck region, but only 1% show an intraoral origin.^[12] Intraorally tongue has the highest predilection.^[13] Histologic picture is pathognomonic with presence of two types of tissues- Antoni type A and Antoni type B. Verocay bodies are characteristically present.^[11] Treatment of schwannoma is complete surgical excision of the lesion which does not result in any recurrence. In our case too there was no recurrence till 6 months of follow up.

Rosai Dorfman disease is an idiopathic, relatively rare benign lesion based on a nodal and/or extranodal histiocytic proliferative

disorder that usually resolves spontaneously. It is not only limited to lymph nodes but can occur in every organ of the body. Most commonly occurs in children and young adults but can occur at any age with a slightly male predominance. Histopathological picture shows a fibrotic capsule and the histiocytes have vesicular nuclei, distinct nucleoli and abundant pale cytoplasm. The electron microscope picture shows lipid vacuoles and lysosomes in cytoplasm and emperipolesis in lymph nodes and no Birbeck granules. Rosai-Dorfman histiocytes stain with S100 antibodies, PAS, CD 68, CD 14, HAM 56 and do not stain with CD 1a antibodies. The disease cannot be diagnosed preoperatively and can be operated if symptomatic. No satisfactory result is achieved with medical approach while surgical excision of the tumor is the treatment of choice. Some cases resolve spontaneously and there are 2% chances of recurrence.

These approaches are a major determining factor in decreasing the morbidity rate. The size, location, histopathology and extension of lesion should be the deciding factor in planning the surgical approach.

CONCLUSIONS

We form a vital role in the multidisciplinary approach toward removal of these tumors of the head and neck. Such involvement of oral and maxillofacial surgeons will encourage them to think beyond the conventional and develop newer innovative techniques in cranial base surgery.

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