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The Lower Cheek Flap Combined with Neurosurgical Approach for Infratemporal Fossa Tumour

ABSTRACT

Objective: To describe our experience in performing the lower cheek flap for access to the infratemporal fossa combined with the neurosurgical approach.

Methods:

Design: Case Report

Setting: Tertiary Referral Center

Patients: Two

Result: Two unusual tumours involving the infratemporal and middle cranial fossa were excised using this combined approach. The infratemporal fossa tumour was accessed via the lower cheek flap while the intracranial portion was resected from above via craniotomy.

Conclusion: The lower cheek flap in combination with the neurosurgical approach allows optimal exposure to tumours involving the infratemporal and middle cranial fossae. It has less complications and better aesthetic outcome compared to other approaches.

Keywords: *lower cheek flap, infratemporal fossa tumour*

Infratemporal fossa tumours are usually extensions of tumours from surrounding structures. Tumours extending into this region pose a surgical challenge due to its difficult access and various important structures contained within. We treated two such cases in Universiti Kebangsaan Malaysia Medical Center (UKMMC) where the tumour involved both the intracranial and the infratemporal fossa. We describe our experience using the lower cheek flap as described by Balm *et al*¹ to excise the tumour in the infratemporal region combined with neurosurgical approach.

METHOD

The patient is placed in supine position with head fixed with the Mayfield clamp. Incision is made from the mid lower lip down to the neck and continued up to the preauricular region

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where it is joined with the coronal incision (*Figure 1*). The skin flap is raised in the subplatysmal plane at the upper horizontal neck incision until the lower border of mandible with preservation of the marginal mandibular nerve. A midline lower lip incision is made and extended inferiorly to meet the upper horizontal neck incision. The mucosa is incised intraorally from the midline until the inferior gingivobuccal sulcus posteriorly, exteriorizing the retromolar trigone and maxillary tuberosity. The lower cheek flap is raised subperiosteally from midline to angle of mandible. The mental nerve is sacrificed. Muscles attached at the the coronoid process are detached and coronoidectomy is performed to allow good access to the infratemporal fossa (*Figure 2*).

A craniotomy incision is then made and continued inferiorly at the preauricular crease to join the neck incision for the excision of the intracranial portion of the tumour.

RESULTS

Case 1

A 68-year-old male with recurrent extracranial meningioma presented with swelling at the right temporal region. The mass was partially excised three years prior to the current presentation.



Figure 1. Skin markings for the lower cheek flap combined with craniotomy



Figure 2. Infratemporal fossa tumour visualized after coronoidectomy

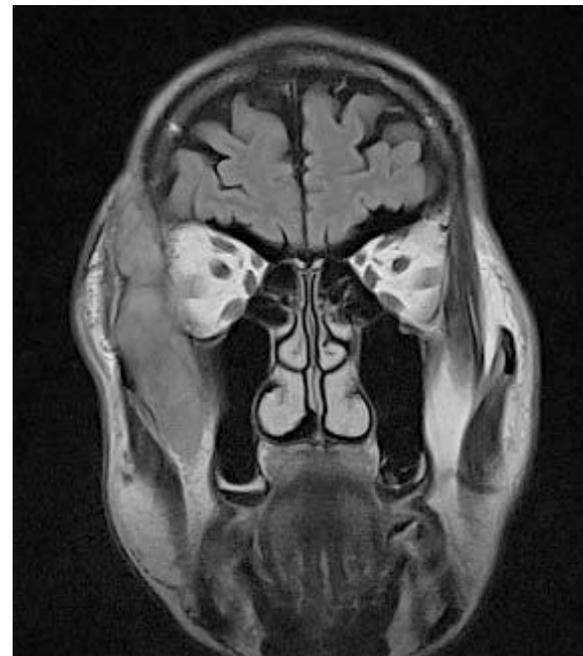
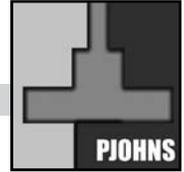


Figure 3. MRI of recurrent extracranial meningioma in the right temporal region with intracranial (extradural) extension

Histopathological examination revealed extracranial meningioma WHO grade II. A CT scan showed a mass in the right temporal region with intracranial extension. Further assessment with MRI revealed a right temporal mass measuring 8.5x2.4x3.0cm extending intracranially through the right pterygomaxillary fissure into the middle cranial fossa causing meningeal thickening. Inferiorly, it extended to the infratemporal fossa and superiorly to the level of the temporalis muscle (*Figure 3*). The tumour was excised using the combined approach described above. The patient had an uneventful postoperative recovery and was discharged in stable condition 3 days later. Histopathological examination confirmed clear margins. He remains tumour free at 6 months.

Case 2

A 57-year-old lady presented with a right cheek mass associated with facial numbness, right eye strabismus and diplopia. There was also involvement of the right II, III, IV, VI and VIIIth cranial nerves. Examination revealed a large cheek swelling with right hard palate mass. A biopsy was taken and histopathological examination reported the mass as chordoma. MRI showed a heterogenous mass in the infratemporal fossa measuring 6.8x8.4x12.2cm. It extended intracranially to involve the temporal lobe and basal ganglia. Inferoposteriorly it extended into the postnasal and oropharyngeal space. There was no clear demarcation of the tumour from the clivus and and prevertebral space at the region of the first and second cervical vertebrae. Tumour debulking was done using this combined approach. She had an uneventful post operative



recovery with no further neurological deficit.

DISCUSSION

The infratemporal fossa is a deep concealed space in the lateral facial skull bounded by the ramus of the mandible, maxilla, lateral pterygoid plate and sphenoid. Tumours of this region are usually an extension from surrounding regions. When dealing with such large tumours preoperative planning is essential to achieve the desired results while maintaining good functional and cosmetic outcome. Over the years, various approaches to the infratemporal fossa have been described.

In general the infratemporal fossa may be approached anteriorly or laterally.² The anterior approach is through the maxilla either by a Caldwell-Luc incision or the Weber-Ferguson incision. The Caldwell-Luc incision is most aesthetically pleasing but provides limited exposure and is thus reserved for small tumours. The Weber-Ferguson approach allows wider exposure but may cause ectropion of the lower eyelid and risks injury to the infraorbital nerve. Through the incision the infratemporal fossa is accessed via a maxillectomy or a maxillary swing. This approach allows exposure to the infratemporal fossa medial to the pterygoid plate but only gives a limited view of the lateral regions.³ It is also time consuming with higher morbidity.

The lateral approach may be either trans-zygomatic or trans-mandibular. The trans-zygomatic approach allows good access to the superior part of infratemporal fossa but involves resection of the zygoma. The trans-mandibular approach is achieved via a parotid incision and dissection through the parotid gland thus risking facial nerve injury.⁴ Access to the infratemporal fossa is then gained through the mandible via osteotomy of the condylar or coronoid process or even a mandibular swing for wider access. A mandibulotomy involves sacrificing the inferior alveolar nerve and requires plating which is costly for patients in our center.

Tumours involving both the infratemporal fossa and the intracranial fossa are best resected by a combined approach with the neurosurgical team. These dumbbell-shaped tumours have been previously described and resected by various methods such as the zygomatic infratemporal fossa approach combined with mandibular osteotomy, zygomatic transpetrosal approach combined with mandibular osteotomy and lateral basal subtemporal approach with resection of the root of zygoma.⁵ These approaches were tailored to the respective tumour regions with the latter two being more useful for tumours in the posterior cranial fossa.

We found the lower cheek flap a useful approach to the infratemporal fossa in our two cases. It allowed optimal exposure to the anterolateral region of infratemporal fossa and was easily combined with the craniotomy incision. Unlike the transparotid approach, there was minimal risk to the facial nerve and neither of the two patients developed facial nerve palsy. It has better cosmesis than the Weber-Ferguson incision. Furthermore, this incision allows a selective neck

dissection of level I-III to be done and may be extended to the upper gingiva allowing a total maxillectomy if needed. Using this method, we were able to fully excise the tumour in the first case while the second patient only needed tumour debulking for symptomatic relief. This method is simple and has minimal morbidity compared to other approaches to the infratemporal fossa.

As with other approaches, the lower cheek flap also has its own disadvantages. The mental nerve cannot be saved which theoretically will lead to lip numbness. However, neither patient complained of this side effect when questioned. The flap is also raised in the subplatysmal plane risking injury to the marginal mandibular nerve. Another concern is that dissection around the pterygoid region may lead to trismus due to scarring of the pterygoid muscles. Nevertheless, none of our patients developed trismus. There is also concern of possible brain contamination with the microbial normal flora from the oral cavity. This risk is low in our two cases as there had been no intradural extension of tumour.

Infratemporal fossa tumours remain a challenge and surgical approaches to this region need to be tailored to patient needs and tumour extension. The lower cheek flap allows optimal exposure to the anterolateral part of the infratemporal fossa with minimal morbidity, is less time consuming and has better aesthetic outcome.

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