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Mandibular access osteotomy: Gate way to parapharyngeal space – A case report

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ABSTRACT

INTRODUCTION: Para pharyngeal tumors often pose a challenge to surgeons for surgical interventions. Maxillofacial access osteotomies offer excellent visualization and permit unhindered surgical manipulation. Access osteotomy allows the surgeon an adequate access of the surgical field to resect the tumor completely and to preserve vital structures. Though numerous techniques exist, selection of the proper technique is the key factor in reestablishing the function and cosmesis. This article describes our experience with mandibular swing approach that has facilitated complete removal of a parapharyngeal space tumor.

CASE PRESENTATION: 35years old female complained of deviation of tongue to one side and swallowing difficulty. Clinical and radiographic examinations were suggestive of a skull base lesion involving the hypoglossal nerve. After evaluation the tumor was excised through a mandibulotomy approach. Post operatively the patient was relieved completely of the symptoms and without any postoperative sequelae.

CLINICAL DISCUSSION: Accessibility is the main concern while dealing with skull base lesions. But the success of surgery lies on the selection of right approach. Paramedian mandibular swing approach has its own advantages over various other facial osteotomies. The swinging of the mandible gives advantage of accessing neck and skull base together, which is not possible with other facial osteotomies.

CONCLUSION: Management of skull base tumors involve a multidisciplinary approach. Choosing the right approach is often a major dilemma. Access osteotomies of facial skeleton is a hatchway to the skull base lesions. Of which mandibular swing approach is a good option for skull base tumors because of the ease of surgical technique even in inexperienced hands.

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1. Introduction

Para pharyngeal space is an anatomically complex and difficult to access terrain for surgical interventions. Para pharyngeal tumors often pose a challenge to surgeons for complete resection of the tumor. Access osteotomies of facial skeleton offer a pathway to tackle these problems by providing better access and exposure. Von Langenback was the first one to perform access osteotomy for the removal of a benign nasopharyngeal polyp in 1859 [1]. A methodical approach to facial access osteotomies for the cranial base lesions has had its beginning from the works of Tessier who described the concept of total facial osteotomy for craniofacial synostosis syndromes in 1867 [2]. Literature reviews are suggestive

of multiple approaches to access the parapharyngeal space neoplasms. Commonest approaches used are trans parotid and trans cervical [3,4]. But trans mandibular approach becomes the module of choice when wide exposure is required. Here we would like to stress the importance of maxillofacial access osteotomies for treating parapharyngeal lesions as a multidisciplinary approach in the light of a case report, treated in our tertiary care hospital. This case is reported in accordance with the SCARE 2020 guidelines [5].

2. Presentation of case

A 35-years old unemployed female reported in oral and maxillofacial surgery OPD with a history of difficulty in swallowing, feeling of lump in the throat, and deviation of tongue to one side on protrusion for ten months. She was ambulatory and accompanied by a relative. She had visited multiple medical centers for the same. No history of any specific interventions reported. History of oral antibiotic intake was reported for the same. No previous history

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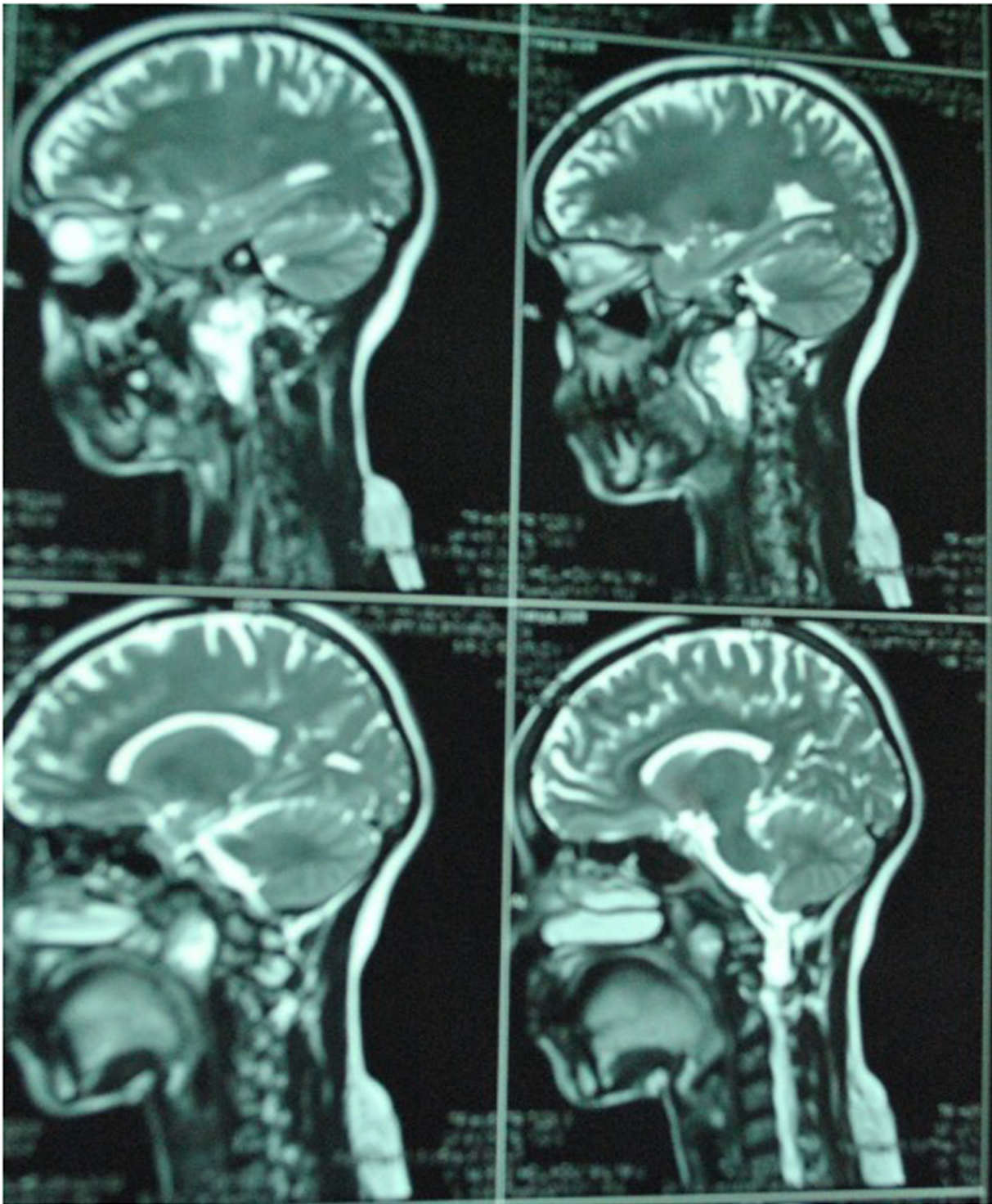


Fig. 1. MRI showing the lesion.

of trauma, vomiting, tinnitus or impaired hearing was elicited. No history of hoarseness of voice was reported. No relevant medical, surgical, drug, or psychosocial history noted. No history of carcinomas in the family. No history of any substance abuse.

2.1. On examination

Moderately built and nourished. Conscious and oriented with respect to time and place. Higher mental functions were normal. No focal neural deficits. Afebrile with stable vitals. On examination

the tongue was deviating to the left side on protrusion. Intra oral examination revealed a diffuse mass in the lateral pharyngeal area. Mucosa appeared to be nonadherent. Thorough palpation was not possible due to the gag reflex. No other abnormalities detected in physical and general examination. Patient was sent for radiographic and hematological investigations and she came back with investigation reports after 24 h. Incisional biopsy was a practically difficult choice due to its location. Lateral pharyngeal abscess was excluded from the differential diagnosis as the lesion was not subsided by

antibiotics and also due to its duration. Hematological examination reports were within normal limits.

2.2. MRI findings

MRI showed an enhancing lesion extending to the hypoglossal canal in the base of skull adjacent to jugular fossa (Fig. 1).

She was referred to the Oncology department for expert opinion. After multidisciplinary discussion with oncology and maxillofacial surgery team and based on the clinical and radiological findings, a provisional diagnosis of hypoglossal nerve tumor was arrived. The decision of surgical excision was planned under general anesthesia. Mandibular swing approach was decided as the choice of access osteotomy. Surgical intervention was done exactly one week after her first visit.

3. Surgical Procedure

Under general anesthesia, patient in supine position, head turned to the left side and the neck extended with a sandbag under right shoulder, sterile draping was done. Procedure was performed by maxillofacial and oncology team. A curvilinear incision was made from right mastoid region extending to the chin along the superior skin crease of the neck. Skin flap was raised to the lower border of mandible at a subplatysmal level. Lip split incision was made (Fig. 2) and periosteum was elevated from mandible. Mental foramen and nerve was exposed. Two 4 holed plates with gap were adapted one above and one below anterior to foramen (Fig. 3). Mandibulotomy was done between 43 and 44 teeth to avoid damage to the roots (Fig. 4). Mandible was then swung around laterally and superiorly. Care was taken to elevate the lingual tissues subperiosteally to favor reattachment.

Dissection was done at neck level to expose the carotid sheath and was traced superiorly along the course of internal carotid artery. The lesion was then identified. It was observed that the internal carotid artery was displaced medially by the lesion. Tumor was also seen encircling the hypoglossal nerve and was isolated. Once the tumor was exposed (Fig. 5) it was taken through a piecemeal approach to avoid damage to the vital structures involved. After complete removal and achieving hemostasis (Fig. 6), the



Fig. 2. Lip splitting incision.

mandible was replaced and stabilized with the pre adapted plates and fixed with six 2 × 6 mm screws. Wound was then closed in layers. Post operative period was uneventful. Excised specimen was sent for histopathological examination (Fig. 7). We had given a broad spectrum antibiotics along with an anaerobic coverage. Ryles tube feeding was planned for two weeks, but we extended that period as she had a difficulty in swallowing. Swallowing difficulty improved in 3 months time. Both clinical and radiographical follow up examinations after one year were satisfactory with the reestablishment of function and cosmesis. (Figs. 8 & 9).

4. Discussion

Tumors originating from or extending into the parapharyngeal space are rare and literatures are suggestive of the occurrence of only 0.5% among all head and neck tumors [6]. Parapharyngeal space is the area between skull base and hyoid bone and contains the carotid artery, jugular vein, cranial nerves ix, x, xii and the sympathetic chain. Tumors may arise from any of the above mentioned



Fig. 3. Preadaptation of miniplates before osteotomy.



Fig. 4. Mandibulotomy cuts.

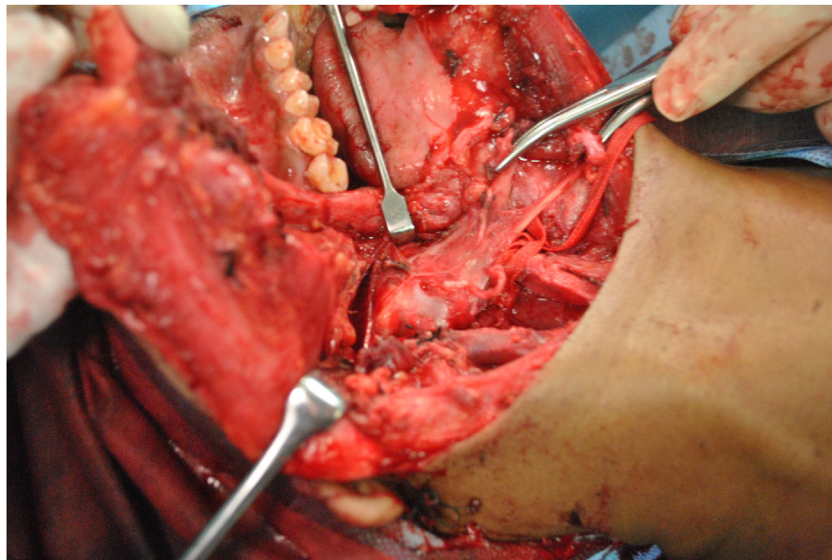


Fig. 5. Tumor exposed.

anatomical structures. Since this space is bounded by mandibular condyle and ramus laterally, the ramus restricts superior and medial access to parapharyngeal space. Here comes the importance of mandibular access osteotomy. Numerous techniques and designs of mandibular access osteotomy to access the parapharyngeal space has been described in the literature. Historically it was Martin in 1957 who described a simple mandibular anterior distraction, but limited access was the drawback of that technique [7]. Later Spiro et al. proposed a trans labial access with mandibulotomy and Seward described another technique by a transcervical approach without labiotomy involving a mandibulotomy anterior to the mental foramen thus sparing the inferior alveolar nerve [7].

Later Roux recommended division of lower lip and mandible for improved access for tongue carcinomas [8]. All these techniques have its own advantages and disadvantages. The aims of the selection of an approach to access a parapharyngeal lesion should be complete removal of lesion, maintenance of occlusion, good

temporomandibular function and preservation of inferior alveolar nerve.

According to Papadogeorgakis et al. [9], the five points to be considered in selecting the best approach in treating tumors of Parapharyngeal space are, 1. Proximity of the lesion to the pharyngeal wall. 2. The size of the tumour. 3. It's malignant potential as wide access is required to obtain sufficient clearance. 4. The vascularity of the tumour, 5. The relation of the tumour to the neurovascular structure.

In the present scenario the tumour had extended to the jugular fossa. By considering all the above factors, we selected the paramedian mandibular osteotomy with lip splitting technique. This approach helped in complete removal of tumor by providing adequate access. The main advantage that we felt with this technique was a reduction in the operative time and also the requirement of minimal dissection in the sub condylar region. Another added advantage is minimal damage to floor of mouth as

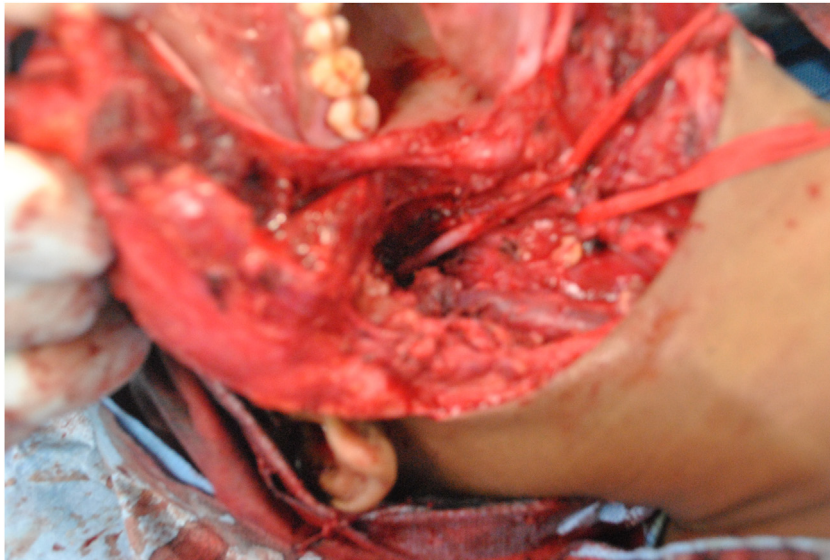


Fig. 6. After complete tumor excision.

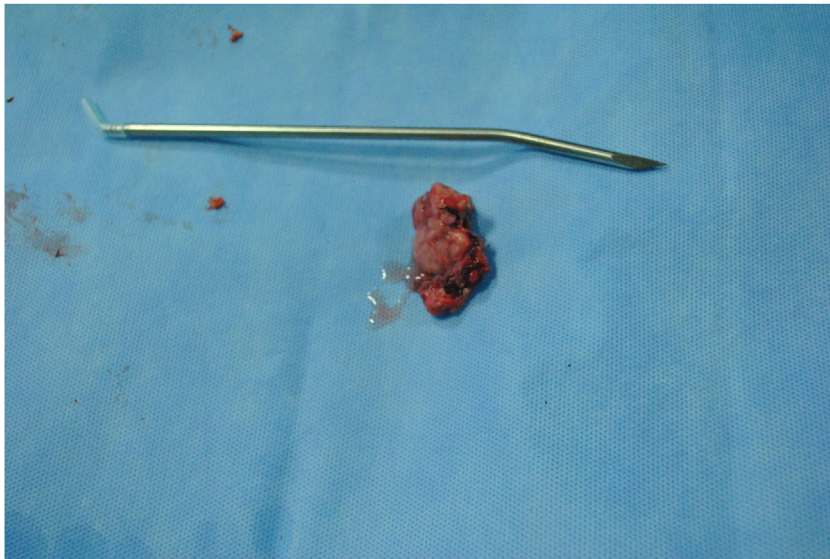


Fig. 7. Excised specimen.

we had elevated the tissues subperiosteally which favored us in easy adaptation back to the bone during closure. Then again, with the single osteotomy technique, edema or even displacement of the articular disc can happen in the temporomandibular joint if there is excessive lateral distraction of the mandible [10].

Removal of a mandibular incisor to allow for the anterior mandibular osteotomy is another recommended technique [11,12]. We avoided this approach due to its potential for irreparable damage to the occlusion. Extraction of a mandibular incisor combined with a lip split technique may adversely affect the aesthetics. As an alternative, we used a thin bur to complete the osteotomy within the few mm of interdental alveolar bone between the teeth thus avoiding the need of tooth removal. We also preferred to perform the osteotomy immediately anterior to the mental foramen in order to avoid damage to the nerve. During reapproximation of bone we found a 2 mm gap in the buccal cortex. The reason was the width of the bur which was used for osteotomy. The use of a reciprocating saw would have reduced the amount of bone lost during the osteotomy.

The most common problem following mandibulotomy is malocclusion. It was Riddle et al. who found that 24 of 31 midline mandibular osteotomy patients complained of a change in their occlusion [13]. There are literatures which advocate the use of arch bars and intermaxillary fixation for controlling the occlusion during and after rigid fixation. We didn't put our patient under intermaxillary fixation after rigid fixation and no associated malocclusion was observed till our last follow up.

5. Conclusion

Surgical access is the primary difficulty in the management of inaccessible tumors of parapharyngeal region. The most suitable surgical method can be determined considering size and location of the tumor, extension to adjacent structures, and experience and skill of the surgical team. Trans mandibular approach can be considered as an excellent option for treating the tumors extending to the skull base. We were able to safely access and completely remove the lesion with satisfactory reestablishment of function and esthetics

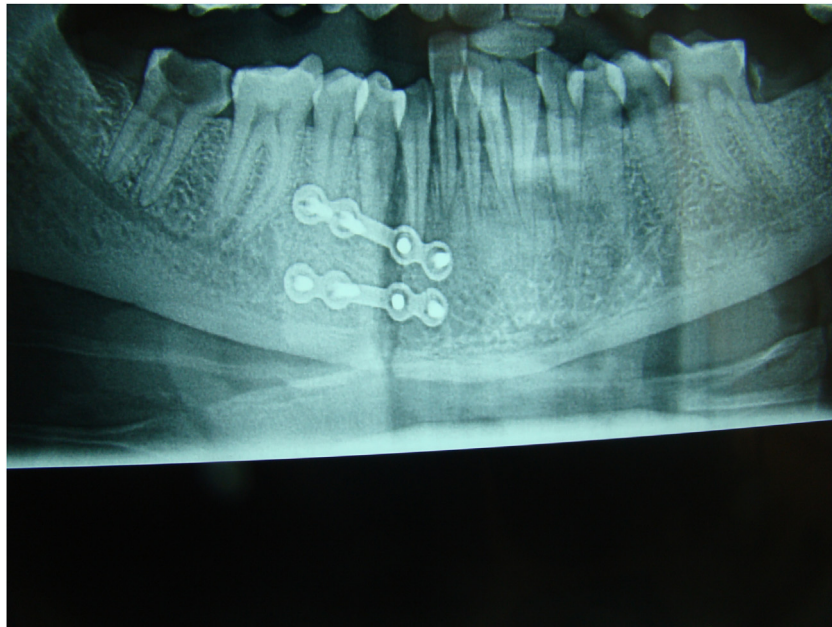


Fig. 8. Post-operative orthopantomogram after one year.



Fig. 9. Occlusion after one year.

using this approach. The swinging of the mandible gives advantage of accessing neck and skull base together, which is not feasible with other facial osteotomies.

Conflicts of interest

No conflict of interests

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Consent

Consent form obtained.
Also the authors have not disclosed any details which may identify the patient.

Author contribution

First author: Dr.Surej Kumar L.K MDS, FDS RCPS(Glasg) – contribution by performing the surgery and in preparation of manuscript.

Second author: Dr.Dilna S MDS- contributed in assisting the surgery and in manuscript preparation and data collection.

Third author: Dr.M M Jacob MS,MCH- contributed in surgery and manuscript preparation

Registration of research studies

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