

CASE REPORT

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# Modified mandibulotomy as an approach to parapharyngeal space tumors: a case report

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## Abstract

**Background** A mandibulotomy approach has been introduced for removal of posteriorly-based tumors of the oral cavity, oropharynx, and certain parapharyngeal tumors with minimum morbidity.

**Case presentation** A middle-aged male presented with a left-sided upper neck mass for last year and difficulty in swallowing for the past six months. A previous history of sclerotherapy and incision and drainage was present and a histopathological examination report from the incision and drainage-derived tissue was suggestive of lymphangioma. On examination, a single soft globular swelling measuring approximately 6 × 4 cm in the left infra-auricular region and a scar of previous incision and drainage measuring approximately 1 × 0.5 cm was present. Oropharynx: tonsillar bulge was present and reaching up to the uvula. Contrast-enhanced MRI revealed an enhancing lesion suggesting a vascular tumour affecting the pre and post-styloid compartment. The patient underwent surgical excision of the lymphangioma by a modified mandibulotomy approach to improve bony stability, avoiding lip split incision and tooth extraction for medically resistant lymphangioma. So, we introduced our modified technique of mandibulotomy in cases of medically resistant parapharyngeal space tumors with a modified lifting step osteotomy with a thin saw blade.

**Conclusion** The modified mandibulotomy approach provides a safe and effective means of tumor resection and this technique not only ensures complete tumour resection but also maintains the integrity and functionality of the mandible.

**Keywords** Head and neck tumors, Parapharyngeal space tumors, Transcervical approach, Mandibulotomy approach

## Background

Tumors of the oropharynx, posteriorly placed oral cavity and certain parapharyngeal space tumors can be effectively removed with a mandibulotomy approach [1–3]. Nevertheless, reports of several associated issues, including iatrogenic fracture of the osteotomy segment, inferior alveolar/mental nerve damage, malocclusion, and

non-union, are associated with it [4–10]. To lessen these complications, numerous surgical osteotomy techniques have been documented in the past, despite the fact that the complication rate for mandibulotomies has decreased significantly [11]. There are still unwarranted procedures like extraction of teeth, fixation, and related morbidity.

There are other approaches to the parapharyngeal space described in the literature; the subtemporal preauricular infratemporal/parapharyngeal approach [12], which requires craniotomy with a considerable excision of the middle cranial fossa's lateral part. It often entails compromising significant neurovascular structures. The extensive resection required to create an adequate corridor brings associated morbidities. Even an endoscopic approach, a combined transantral/endonasal approach [13] but these approaches are better suited only for the

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tumors which are located in the upper part of para pharyngeal space and extend till the skull base with or without intracranial extension.

Even though numerous techniques have been discussed in literature along with their benefits and drawbacks, deciding the right one will ultimately provide access to proper function and cosmesis in the future.

To improve bony stability, avoiding lip split incision and tooth extraction, we introduced our modified technique of mandibulotomy in cases of parapharyngeal space tumors that are not amenable to medical management with a modified lifting step osteotomy with a thin saw blade.

### Case presentation

A middle-aged male patient presented with a left-sided upper neck mass for the last year and difficulty in swallowing for the past six months at Head and Neck Surgery OPD, AIIMS Raipur. The patient had no prior history of addiction and no known comorbidities. A history of previous sclerotherapy and incision and drainage was present. No history of trauma, prior radiotherapy, or chemotherapy was present. The patient presented with a histopathological examination report in OPD (from a prior incision and drainage tissue) and was suggestive of lymphangioma.

### On examination

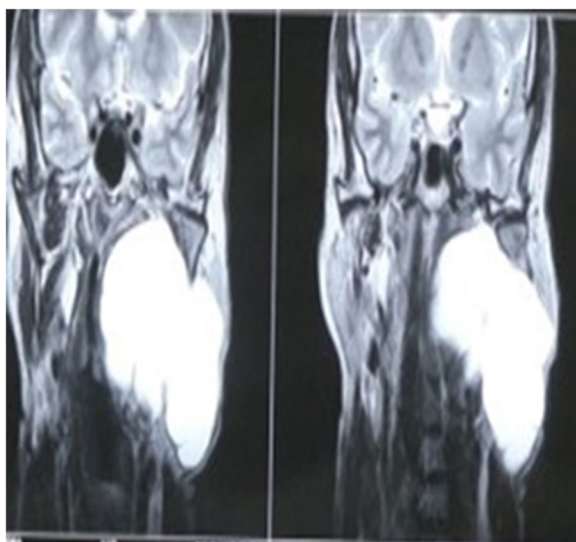
He had a moderate build, good spatial and temporal orientation and a good performance score (ECOG-0). On examination, his vital signs were normal, without any

neurological deficits. Single soft globular swelling measuring approximately 6×4 cm in the left infra-auricular region, a scar of previous incision and drainage measuring approximately 1×0.5 cm was present with transillumination positivity. No fistula, sinus, or dilated veins were present; there was no local rise in temperature, no fluctuation, and the skin was pinchable. Oropharynx: tonsillar bulge was present and reaching up to the uvula. After a comprehensive clinical examination, the patient underwent routine blood examination and contrast-enhanced MRI.

### Cross-sectional imaging

An enhancing lesion on magnetic resonance imaging that suggested a vascular tumor affecting the pre- and post-styloid compartment was present (Fig. 1).

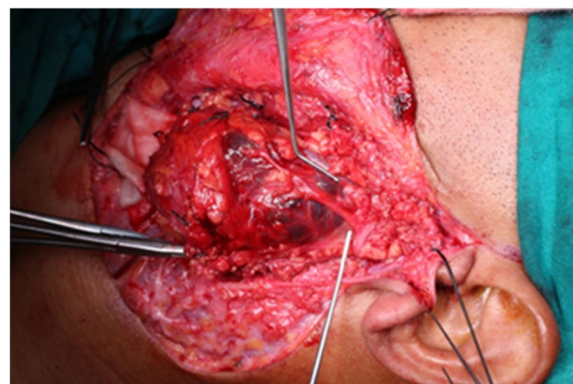
Excision of the tumour was performed by transcervical approach (Fig. 2). Subplatysmal flap elevation was done superiorly and inferiorly, and facial nerve trunk and its branches were found to be splayed by a tumor (Fig. 3). The anterior cut was made anterior to the



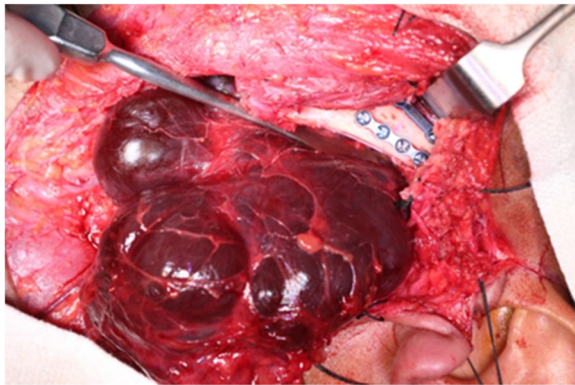
**Fig. 1** An enhancing lesion on magnetic resonance imaging that suggested a vascular tumor affecting the pre- and post-styloid compartment



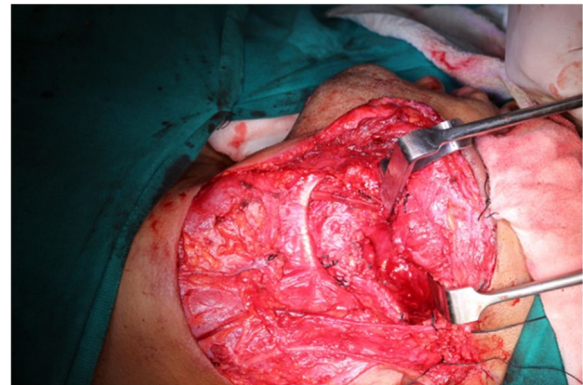
**Fig. 2** Excision of the tumor



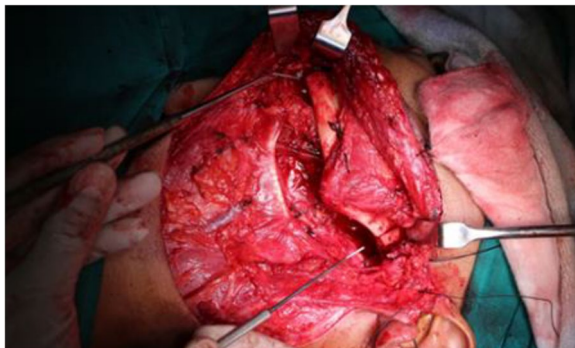
**Fig. 3** Subplatysmal flap elevation was done superiorly and inferiorly, and facial nerve trunk and its branches were found to be splayed by a tumor



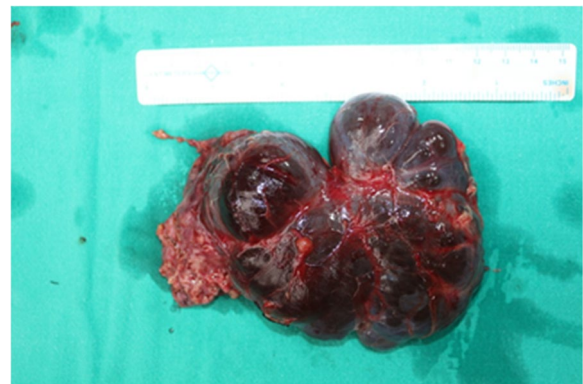
**Fig. 4** 8 mm screws and 2 mm plates, the mandible was preserved in its initial position



**Fig. 6** Lifting and rotating the mandible upwards to expose the surgical bed following the complete excision of the tumor



**Fig. 5** 8 mm screws and 2 mm plates, the mandible was preserved in its initial position



**Fig. 7** Final Specimen

mental foramen at the level of the lateral incisor and canine teeth without extraction of it, and a posterior cut was made at the level of the condyle of the lower alveolus and mandible lifted superiorly while maintaining the neurovascular bundle (mental nerve along with vessels), maintaining the anterior and lateral floors of the mouth, including the mucosa and periosteum of the mandible. Using 8 mm screws and 2 mm plates, the mandible was preserved in its initial position (Figs. 4 and 5). Lifting and rotating the mandible upwards to expose the surgical bed following the complete excision of the tumor (Fig. 6). The final specimen is shown in Fig. 7. The schematic representation of the surgical steps of modified mandibulotomy is as showing in Fig. 8.

Postoperative period was uneventful; the patient was started on oral feeds on the second postoperative day and the patient was discharged in stable condition. During the follow-up period, the patient was asymptomatic with good functional outcome.

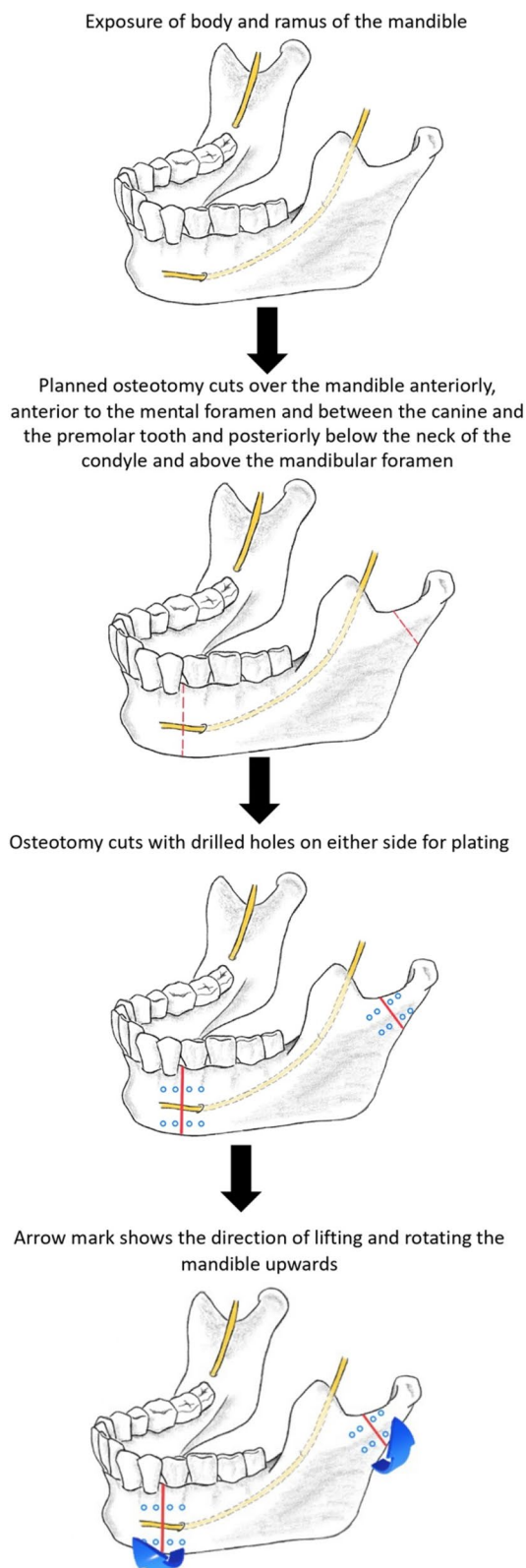
## Discussion

The parapharyngeal space, which is the region between the base of the skull superiorly and the hyoid bone inferiorly, contains the deep lobe of the parotid gland, the carotid sheath with its contents, and the sympathetic chain.

Although sclerotherapy [14], the current standard of care for any lymphatic abnormalities, typically cures this issue without the need for invasive surgery and without the danger of cranial nerve injury in patients who are resistant to the medical line of management and in extensive cases (as in our case) in which surgery becomes the necessity along with mandibulotomy approach.

Mandibulotomy is very important to acquire access to the parapharyngeal area, which is bound laterally by the ramus and condyle of the mandible.

Roux originally described mandibulotomy or mandibular swing in historical terms in 1836 [1]. Dubner and Spiro described the modified mandibulotomies and later para lingual extension in 1959 [15]. Each of the strategies presented has its own benefits and drawbacks.



**Fig. 8** Schematic representation of steps involved in lifting mandibulotomy

In a study, Riddle et al. came to the conclusion that the main complaint in midline mandibular osteotomies is malocclusion [16].

Papadogeorgakis et al. [17] provided five criteria for selecting the most effective strategy.

1. Tumor and neurovascular structure relationship
2. Dimension of the tumor
3. The tumor vascularity
4. Proximity of the lesion to the pharyngeal wall
5. Malignant potential

Described mandibulotomies in literature have their own benefits and drawbacks.

Lateral mandibulotomy, in which a cut is made posterior to the mental foramen during a mandibulotomy. Demerits of this technique—denervation of the distal tooth and devascularization of the mandibular blood supply occur because the cut is posterior to the mental foramen, as muscles pull in different directions, so recovery also gets delayed. Delay in healing occurs precisely at the region of the field when postoperative radiation is intended.

Midline mandibulotomy, in which the central incisor must be removed due to a midline cut, which has a negative cosmetic impact. Moreover, it causes disruption to the floor of the mouth while severing the geniohyoid and genioglossus muscles, which will delay the recovery in swallowing.

Paramedian mandibulotomy—when the mental nerves and blood vessels are preserved during the cut made between the lateral incisor and canine teeth, which is anterior to the mental foramen, but it involves a breach of the lateral floor of the mouth which involves the mylohyoid muscle and ultimately delay recovery.

In our case, it met all the criteria. To avoid damaging the mental and inferior alveolar nerve along with its vasculature, the first cut was made anterior to the mental foramen and posteriorly at the level of the coronoid process.

Advantage of our procedure—the inferior alveolar nerve and vessels can be protected since the posterior cut was made at the level of the coronoid process, and the anterior cut was anterior to the mental foramen; which allows the preservation of the mental nerve and vessels. The major advantage of this technique was the preservation of the floor of the mouth as the muscles and mucosa of the floor of the mouth are kept intact. Later on, no difficulty in swallowing occurred. In this technique, elevation or lifting of the mandible was done superiorly to provide access for the removal of the tumor. Later on, did not give any malocclusion or any kind of deformity with good swallowing.

## Limitations

This approach is limited by its surgical expertise. This technique is difficult in cases where the tumour is particularly mammoth in size or involves critical structures or intracranial extension in the parapharyngeal space. In such cases, the modified mandibulotomy approach may not provide sufficient access or visibility.

## Conclusion

The modified mandibulotomy approach provides a safe and effective means of accessing and removing inaccessible parapharyngeal tumors without compromising critical neurovascular structures. This technique not only ensures complete tumor resection but also maintains the integrity and functionality of the mandible. Its advantage over other osteotomies makes it the preferred choice for the successful management of large parapharyngeal tumors. Hence, we recommend the use of modified mandibulotomy approach for excision of parapharyngeal tumors.

## Future recommendation

A prospective comparative study comparing the modified mandibulotomy approach with other types of mandibulotomy in a larger cohort of patients to decisively conclude its advantage over other approaches.

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## Authors' contributions

AS, RDA, NMN, PD, and MR analyzed and interpreted the patient data and wrote the manuscript. AS, NMN, RDA, and MR had a major role in the surgical planning and removal. All authors read and approved the final manuscript.

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## Availability of data and materials

All data generated or analyzed during this study are included in this published article.

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Written informed consent for the publication has been taken from the patient.

### Competing interests

The authors declare that they have no competing interests.

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