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Case Report

Mandibular swing approach for high parapharyngeal space schwannoma

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ABSTRACT

Parapharyngeal space tumours are rare, comprising 0.5% of all head and neck neoplasms. Different surgical approaches to this space have been described based on various criteria. Here, we are presenting a case report of a 65-year-old woman with left vagal schwannoma splaying the left internal carotid artery and internal jugular vein superiorly and splaying the left internal carotid artery and external carotid artery inferiorly, with its upper edge about 0.7 cm caudal to skull base. Surgery by a combined trans-cervical and mandibular swing approach was adopted for this case. The tumour which was extending so close to the skull base was removed in toto with an intact capsule and the neurovascular structures like the carotids, internal jugular vein and the vagus were preserved through a trans-mandibular approach. Postoperatively patient had no neurovascular compromise. Histopathological examination revealed vagal schwannoma. Trans-mandibular approach may appear complex, but it offers excellent surgical field to keep the delicate surrounding structures intact, to reduce the risk of haemorrhagic and avoid neurological complications.

Keywords: Parapharyngeal tumour, Vagal schwannoma, Transmandibular approach, Transparotid approach, Transcervical resection, Neck mass

INTRODUCTION

Parapharyngeal space (PPS) is an inverted cone shaped fascial space which lies in the suprahyoid region of neck between the hyoid and skull base, alongside the pharynx.[1,2] Its medial wall is formed by the lateral pharyngeal wall and tonsillar fossa, whereas the pterygoid muscles, parotid gland, and the prevertebral muscles enclose it laterally. The tensor veli palatini muscle and styloid process divides the PPS into 2 parts i.e., pre and post styloid compartments. Parapharyngeal space tumours comprises 0.5% of all head and neck neoplasms.[3] Among the PPS tumours, approximately 80% are benign.[4] Salivary neoplasms are known to be the most common tumours followed by neurogenic tumours. Pleomorphic adenoma in the pre-styloid region, paragangliomas and schwannomas in the post styloid region are the most frequently occurring neoplasms.[5-8] Computed tomography (CT) and magnetic resonance imaging (MRI) are useful in localizing and providing a potential diagnosis.[1,9-11] Surgery is the modality of treatment for these tumours. However various vital structures like carotid artery, jugular vein, cranial nerves, makes the approach bit difficult.[9,12,13] Various surgical approaches have been described in the literature. Here, we present a case of vagal schwannoma which was surgically removed via a trans-cervical and mandibular-swing approach (a type of trans-mandibular approach). This case has been reported by using the surgical case report (SCARE) guidelines.[14]

CASE REPORT

A 65-year-old female presented with painless swelling in the left side of the neck for 2 years, which was insidious in onset and gradually progressive. Patient developed compressive symptoms suggested by dysphagia more for solids than liquids, difficulty in breathing and slurring of speech for past 3 months on presentation (Figure 1).

Figure 1: Pre-operative mouth opening showing left parapharyngeal tumour pushing the medial oropharyngeal wall causing complete obstruction of airway.

CT scan of the neck with contrast and MRI imaging showed enhancing well-defined ovoid heterogenous mass lesion of size about 8.4×6.2×4.3 cm with heterogenous mild contrast enhancement and smooth margin is seen centred in left carotid space with splaying of left internal carotid artery and internal jugular vein superiorly and splaying of left internal carotid artery and external carotid artery inferiorly with narrowing of nasopharyngeal and oropharyngeal airway lumen. Left internal carotid was bowing over anteromedial surface of tumour; it was pushed anteromedially very close towards pharyngeal mucosa. Upper edge of the lesion was almost reaching skull base, about 0.7 cm caudal to skull base. Overall, according to CT and MRI scan tumour was looking encapsulated and benign (Figure 2).

Preoperative tracheostomy under local anaesthesia was done as there was significant airway narrowing. Then the patient was planned for parapharyngeal space tumour removal by a trans cervical and mandibular swing approach under general anaesthesia (GA) as the tumour was extending up to the skull base.

Then Chevron chin contour lipsplit incision and cervical incision along the lower border of hyoid bone was made extending till the sternocledomastoid muscle (Figure 3) and the soft tissue in the neck was dissected between sternocleidomastoid muscle and suprahyoid muscles to identify the common carotid , external and internal carotid. Then,tumour was identified between carotid bifurcation, which was dissected and tumour was released from the carotids on all sides with finger dissection.

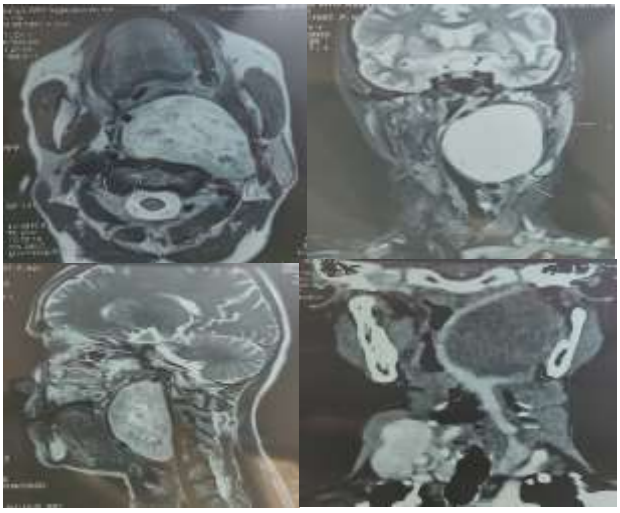

Figure 2: CT and MRI pictures showing extent of the tumour till skull base and causing airway compromise.

Figure 3: Marking for Chevron chin contour lipsplit incision and cervical incision.

Then the lower lip incision was deepened through skin and soft tissue. The mucosa of the lower gingivobuccal sulcus was divided keeping a cuff of mucosa and submucosal tissue about a centimeter wide on the mandibular side for a secure closure at the end of the operation. Only a limited inferior cheek flap was elevated for paramedian osteotomy to preserve mental nerve. The location of the paramedian osteotomy was selected between the diverging roots of adjacent teeth of the canine and first molar. This allowed division of the mandible without extracting any teeth and maintained adequate bone to avoid exposure of the dental roots. Then with the monopolar cautery markings were made at the junction of canine and first molar for the up coming para median mandibulotomy. Periosteum over mandible was elevated for 1 cm away from paramedian mandibulotomy markings and holes on eitherside were drilled for future screws to be placed. Then osteotomy in angular fashion was made with small, powered drill with little bone loss for better bone healing and alignment at the junction of canine and first molar level without extracting the tooth (Figure 4).

Figure 4: Osteotomy between roots of canine and first molar. Control holes for future plates and screws was made on either side of osteotomy.

With the osteotomy completed, the divided mandibular segments were distracted to put the floor of the mouth mucosa on stretch. This mucosa was incised keeping a cuff approximately 1-cm wide attached to the lower alveolus. Care was taken to include not only an adequate mucosal cuff but also underlying soft tissue to allow secure closure of the floor of the mouth at the end of the operation. And the mucosal incision was extended posteriorly to the anterior tonsillar pillar.

Then the mylohyoid muscle was divided to allow wide retraction of the mandibular segments and to provide adequate exposure of the medial and superior aspect of parapharyngeal tumour. Under vision, blunt dissection of the tumour freed it from internal carotid medially and skull base superiorly (Figure 5). This allowed mobilization of tumour all around and 8×5 cm tumour was delivered in toto (Figure 6).

Figure 5: After dissection of tumour from skull base.

After resection of the tumor was complete, a nasogastric tube was inserted. The mucosal incision in the floor of the mouth was repaired with absorbable interrupted sutures in a posterior to anterior direction.The underlying soft tissue was included as a buttress with the mucosa to minimize the risk of suture line dehiscence. The mandibular bony segments were now brought into apposition, and the previously contoured miniplates were screwed into position at the prelocalized drillholes on the mandible. Care was taken to avoid any soft tissue interposition across the osteotomy or into the drillholes while placing the screws, as this impedes healing. A suction drain was placed in the neck, and the lower lip, chin, and neck incisions were sutured in layers.

Figure 6: Tumour specimen.

Postoperative care consists of nasogastric tube feeding for about a week and vigorous oral hygiene. Oral intake with pureed food was then gradually advanced to a soft diet, and with progressive healing, the patient gradually returned to normal diet without restriction in 10 days. Tracheostomy was closed on 3rd post operative day. Histopathology report was Schwannoma.

Patient had pain on opening mouth for 2 weeks which resolved with oral muscle relaxant. Patient regained normal mouth opening without pain in a month. No neurological deficit was observed in our patient. Lip split was faintly visible on 3rd postoperative month (Figure 7).

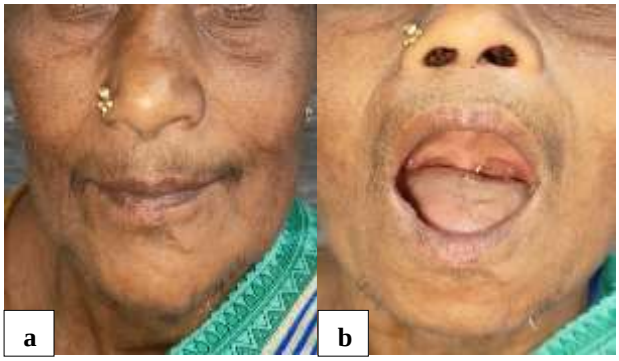

Figure 7: (a) Post-operative patients picture showing scar at 3rd month, and (b) post-operative adequate mouth opening and airway.

DISCUSSION

PPS tumours are one of the most challenging head and neck tumours to diagnose because their symptoms are subtle. In our case, as the patient had bigger tumour, so she presented with neck mass, difficulty in breathing and swallowing.

CT and MRI are useful tools for further investigating the tumour– host interface, involvement of major neurovascular structures, glandular tissue, and the relationship to the craniofacial skeleton, including the skull base. MRI provides better resolution for identifying neurovascular structures than does CT.[15]

The PPS is an anatomically complex region, which contains several vital structures, including the carotid artery, jugular vein, and cranial nerves. PPS tumours originate from a variety of histology, including neurogenic, vascular, and salivary gland. Therefore, there is no single best treatment approach for PPS tumours.[15]

The trans-mandibular, trans-cervical, and trans-parotid surgical approaches are used to manage benign PPS tumours. Skull base approach is reserved for suspected malignant lesions of PPS.[16,17] Trans oral robotic surgery (TORS) is newer option available.[18]

The choice of approach is to obtain adequate tumour visualization to ensure complete tumour removal with preservation of the surrounding nerves and vessels and to control any haemorrhage with minimum functional and aesthetic morbidity as a consequence of the surgery.[19]

Papadogeorgakis et al considered five points to be the main parameters in selecting the best approach in treating tumours of the PPS: the proximity and the projection of the tumour to the oropharyngeal wall or the neck, the size of the tumour, the suspicious of malignancy, the vascularity, and relation of the tumour to the neck neurovascular bundle.[20,21]

Although the transoral approach is a cosmetic approach and offers a direct access to the bifurcation of the carotid artery and the parapharyngeal space it gives a limited exposure to the PPS beyond the styloid process with consequent unsatisfactory control of great vessels at PPS, making it difficult in controlling massive haemorrhage, and increased incidence of nerve damage and capsular rupture leading to tumour recurrence.[15,20] Nowadays this approach is reserved for well defined, avascular tumours less than 3 cm, projecting in the oropharynx, and very near to the mucosa.[20] In tumours with superior border above the styloid process and under the inner surface of the mandible, surgical dissection in the highest and deepest part is difficult with this approach. TORS have been safe and effective than the transoral approach but this approach too has a limitation of reach in far lateral and superior areas of PPS.[22,23]

The commonest approaches used according to literature reporting big series of PPS tumours are the trans-cervical with the trans-parotid approach. Although preferred by many authors to achieve safe complete excision of most PPS tumours with better cosmetic results, including those arising from the deep lobe of the parotid gland, such approaches may not give an adequate exposure in certain cases. The main exposure difficulty that hampers resection attempts of PPS tumour is the mandible. Attempts to anteriorly sub lux the mandible gives limited improvement and carries the risk of permanent damage of the temporomandibular joint. Although there is a wide agreement that the widest exposure of the PPS is obtained by mandibulotomy, its rate is reported among several published series is between 2% and 10%. Most publications cite the size, vascularity, malignancy, invasion of skull base, recurrence, and site being confined to the superior aspect of the PPS as the criteria for selecting this approach.[20]

The trans-cervical with trans-mandibular approach allowed complete, safe excision of the whole tumour without breach of the capsule. Moreover, the wide exposure obtained by such approach enabled adequate intact resection of the salivary and highly vascular lesions with visualization and protection of the important neurovascular structures.[20]

Another big advantage of the trans-mandibular approach in excision of paragangliomas is that it allowed the direct access to and exposure of the medially and anteriorly displaced internal carotid artery. Trans-mandibular approach is better selected to excise the vascular lesions of the PPS. This is specially recommended, when lesions occupy its superior aspect or when vascular control of the cranial segment of the carotid artery is not achieved through the cervical route. It is also preferred in solid benign or malignant tumours more than 5 cm especially if recurrent.[20]

As trans-mandibular approach gives a wider exposure till skull base, this approach is used for tumours in a high position that compressed the carotid artery or internal jugular vein, the trans-parotid approach is preferred for tumours that were located behind the mandible ramus, and the transcervical approach was used in all other tumours located below the styloid process. Two important considerations are vascular control and exposure of the cranial nerves. The trans-mandibular approach provides good access to the base of the PPS. Therefore, if unexpected bleeding occurs during dissection, this approach offers an adequate surgical field to control the bleeding. Although some surgeons may have concerns about possible facial, lingual, or hypoglossal nerve injuries during osteotomy and dissection of the soft tissue surrounding the mandible, experienced surgeons can avoid these complications.[15]

In our case we used Chevron chin contour lipsplit incision to reduce visibility of scar; osteotomy was planned between diverging roots of adjacent teeth of the canine and first molar to avoid extraction of tooth; and performed control holes for future screws before initiating the mandibular osteotomy to get good alignment for preventing malacclution. These three steps helped us to overcome major hurdels in performing trans-mandibular approach. Finally combined trans-cervical and trans-mandibular approach helped us to remove PPS

schwannoma in toto without any neurovascular morbidities

CONCLUSION

Trans-cervical with trans-mandibular approach may appear more radical and complex, but it is more logical and conservative approach owing to the excellent surgical field it offers, able to keep the delicate surrounding structures intact, to reduce the risk of haemorrhagic and neurological complications.

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