Novel Surgical Technique for Parapharyngeal Liposarcsoma: Case Report of a Rare Disease and Literature Review

Wang-lin Ng[1], Tsz-wai Lee[2], Chat-fong Ng[1], Wai-shun Ng[2], Calvin Hoi-kwan Mak[1],Tsun-cheong Chu[2], Hunter Kwok-lai Yuen[3], Fung-ching Cheung[1]

1 Department of Neurosurgery, Queen Elizabeth Hospital, Hong Kong
2 Department of Ear-Nose-and-Throat, Queen Elizabeth Hospital, Hong Kong
3 Department of Ophthalmology, Hong Kong Eye Hospital, Hong Kong

OBJECTIVE

To present a case of **parapharyngeal liposarcoma resection** performed via multidisciplinary **triportal** minimally invasive surgical technique comprising **Trans-Oral Robotic Surgery (TORS)** , **Trans-Nasal Endoscopic Surgery** and **Trans-Orbital Neuroendoscopic Surgery (TONES)**, and to review the literature.

CLINICAL CONTEXT

- **History:** 57-year-old gentleman with good past health presented with recurrent right otorrhea for a few years
- **Physical examination:** Right tympanic membrane was moist and perforated. Facial nerve was intact. There was no head and neck swelling or mass
- **Nasoendoscopy**: Whitish firm mass obliterating the right Eustachian tube
- **MRI**: 4cm lipomatous lesion at right parapharyngeal space
- **Biopsy**: Well-differentiated liposarcoma

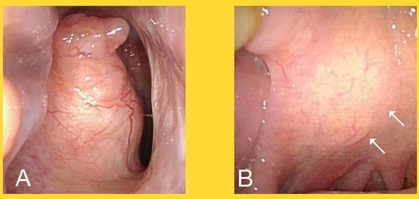

Fig. 1 Endoscopic view of right parapharyngeal space tumour.
(A) Tumour bulged out and obliterated the right Eustachian tube.
(B) Smooth swelling over the right side of soft palate.

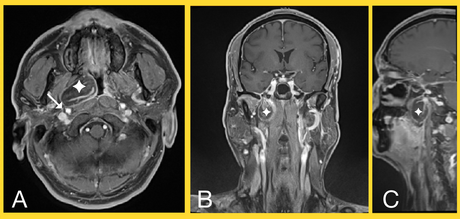

Fig. 2 Anatomy and characteristics of the tumour on contrast MRI.
(A) Axial T1-weighted postcontrast MRI showing a 4cm lipomatous lesion (✦) with internal enhancing septations at the right parapharyngeal space (PPS). The lesion abut the right internal carotid artery (ICA) posteriorly (arrow), and bulged the lateral wall of nasopharyngeal mucosa medially.
(B) Coronal T1-weighted postcontrast MRI showing the lesion extended to the inferior aspect of right petrous bone.
(C) Sagittal T1-weighted postcontrast MRI showing the lesion extended down to the soft palate level.

SURGICAL TECHNIQUE

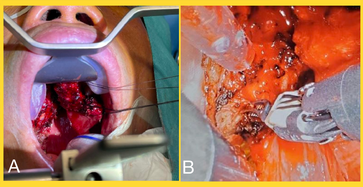

Fig. 4 Robotic-assisted trans-oral approach.
(A) Lateral palatal flap was created to provide access to the tumour.
(B) The infero-medial aspect of the tumour was dissected up to the level of nasopharynx using robotic system (Da Vinci Xi).

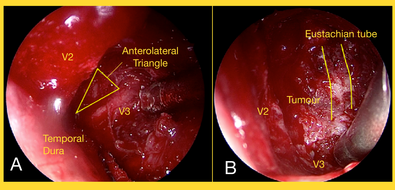

Fig. 5 Endoscopic trans-orbital approach (ETOA/TONES).
(A) The inferior orbital fissure was opened by drilling the inferior part of the greater wing of sphenoid. V2 and V3 were identified. The anterolateral triangle was drilled down to expose the tumour situated postero-medial to V2 and V3.
(B) The ICA was identified and the superior pole of tumour was dissected away from the Eustachian tube.

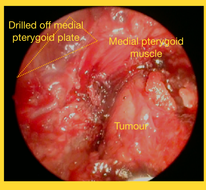

Fig. 6 Endoscopic trans-nasal approach.
The posterior end of medial pterygoid plate was drilled to expose the antero-medial aspect of the tumour. The dissection continued with the ICA protected at the postero-lateral aspect of the tumour by the trans-orbital port.

DISCUSSION

- **Parapharyngeal space liposarcoma** is a **rare disease.** It has been described in a few case reports, and to our knowledge, this is the **first reported case in Hong Kong**
- Majority of parapharyngeal tumors are benign tumours (82%)[1]. Whilst liposarcoma is the most common sarcoma in adults, it is **rare to be found in head and neck region**[2]
- **Surgical management of parapharyngeal space tumour is often challenging** owing to the **anatomical complexity** of this area and **adjacent critical neurovascular structure**
- The **triportal minimally invasive surgery** described above is a **novel technique**, and to our best knowledge, the **first reported application in the literature**
- Transcervical, cervical-parotid and mandibulotomy are the **commonly reported approaches** to resect papharyngeal space tumours. However, they are bounded by either **exposure limitations** or **high surgical morbidities**[3]
- The use of **endoscopic approaches** (e.g. Trans-oral, Trans-nasal) and **TORS** have been attempted to **improve visualization** and **reduce surgical morbidities**, yet their application is **limited in tackling lesions situated in upper and lateral infratemporal fossa / parapharyngeal space**[4] [5]
- **Endoscopic trans-orbital approach** performed by neurosurgeon and ophthalmologist can be used to **overcome such shortcoming** and **provide additional operative corridor**[6]

CONCLUSION

Triportal minimally invasive surgery can be considered as an alternative approach for superior and deep-seated lesion in parapharyngeal space to achieve:

1. **En-bloc tumour resection**
2. **Reduced surgical morbidity**
3. **Excellent cosmetic outcome**

Fig. 7 Surgical outcome.
(A) En-bloc resection of tumour achieved at the end of the surgery.
(B) Appearance of eyelid, palatal and intra-nasal wounds taken at 6th week post-operation.

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