



Case Series of Endoscopic Transoral Excision of Huge Parapharyngeal Tumors: Pushing the Boundaries

Case Report

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Abstract

Endoscopic transoral excision of parapharyngeal space (PPS) tumors is often condemned for its many limitations. We revisit this approach and aim to introduce some updated perspectives following the advancement of endoscopic instrumentation, robotic transoral surgery, and radical tonsillectomy. We illustrate the techniques that were deployed for six patients with huge benign PPS tumors originating from the pre-styloid compartment at our center. Only patients who had a tumor size of five cm or larger were included in this study. We summarized our patients' outcomes, the important considerations, and the advantages and disadvantages of this approach. With accurate selection and surgical strategy, all our patients had good clinical outcomes. We demonstrated that even larger tumors can be safely removed endoscopically. Surely, this approach will gain traction, and better-designed studies should be conducted in the future to assess its credibility.

Keywords: Parapharyngeal space, neoplasm, endoscopy, surgery, case report

Introduction

Traditionally, transoral surgery has been limited to only small-sized benign pre-styloid parapharyngeal space (PPS) tumors. Many authors have discouraged this approach due to the belief that the risk of damaging the critical neurovascular structures, incompleteness of removal and tumor spillage were higher than external approaches (1). With the expansion of endoscopic technology, powered instruments and transoral robotic surgery in recent years, the transoral approach has regained momentum. We would like to document six cases of huge PPS tumors originating from the pre-styloid compartment that were successfully removed at our center. Concurrently,

we summarize the important surgical pearls, the future direction, and their role in the armamentarium of the otorhinolaryngology field.

Case Presentation

A total of six patients who were diagnosed with benign tumors of five cm or larger, originating from the pre-styloid PPS underwent a transoral endoscopic excision at the University of Malaya Medical Centre between January 2014 and February 2019. The diagnosis was concluded after a thorough history review, physical examination, and imaging that included both computed tomography (CT) and magnetic resonance imaging (MRI) scans. Only patients with tumors

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anteromedial to the internal carotid artery without any signs of malignancy were included (Table 1).

All surgeries were conducted by a senior surgeon under general anaesthesia via contralateral nasotracheal intubation. Patients were placed in Rose position and a Boyle Davis mouth gag was used to retract the tongue. Throat packing using ribbon gauze was also placed. An assistant held the endoscope and provided necessary retraction or suctioning to aid the primary surgeon (four-handed technique).

A vertical curvilinear mucosal incision from the soft palate to the lower pole of the mass was made with monopolar cautery. The submucosa, loose connective tissue and superior constrictor muscle were then precisely split without violating the tumor capsule. A healthy cuff of tissue on the anterior pillar was conserved to close the defect and lateralize the preserved tonsil. Blunt dissection was then commenced to gently detach the tumor along its capsule using a combination of Yankauer suction, Kittner sponge on tonsil clamp, hurd dissector, long

curved bipolar and finger dissection. The dissection was done slowly and meticulously, releasing the tumor from its loose attachments within the PPS. We worked from the area where visualization and tissue mobilization were the easiest to free the tumor before proceeding to the deeper aspects. Small vessels or oozing were secured with bipolar cautery while any feeding vessels found over the lower pole of the tumor were ligated. The wound bed was then inspected under magnification and irrigated with saline thoroughly to eliminate any possible residual tumor cells. Surgicel was inserted into the wound cavity before closing it with interrupted 3-0 absorbable sutures. All the tumors were removed en bloc successfully. Patients were started on nasogastric tube feeding and antibiotics for at least 72 hours after surgery to prevent infection. On the second postoperative day, they were allowed to take fluids and stepped up progressively weaning off the nasogastric tube before discharge.

Despite the tumor sizes being at least five cm, all were completely excised without tumor spillage (Figures 1-3).

Table 1. Summary of patients' clinical outcomes

No.	Demography	Tumor size (cm)	HPE	Days of admission	Adverse effect	Follow up	Blood loss (cc)	Surgery time (min)
1	71 yo, male	6x4	Schwannoma	3	None	6 years	25	35
2	29 yo, female	8x7	Neurofibroma	4	None	5 years	38	40
3	75 yo, female	8x7	Pleomorphic adenoma	4	None	7 years	40	45
4	64 yo, male	5x5	Pleomorphic adenoma	3	None	5 years	30	30
5	55 yo, female	7x7	Schwannoma	3	None	6 years	35	40
6	40 yo, male	7x6	Schwannoma	3	None	5 years	30	35

HPE: Histopathological examination, yo: Years old

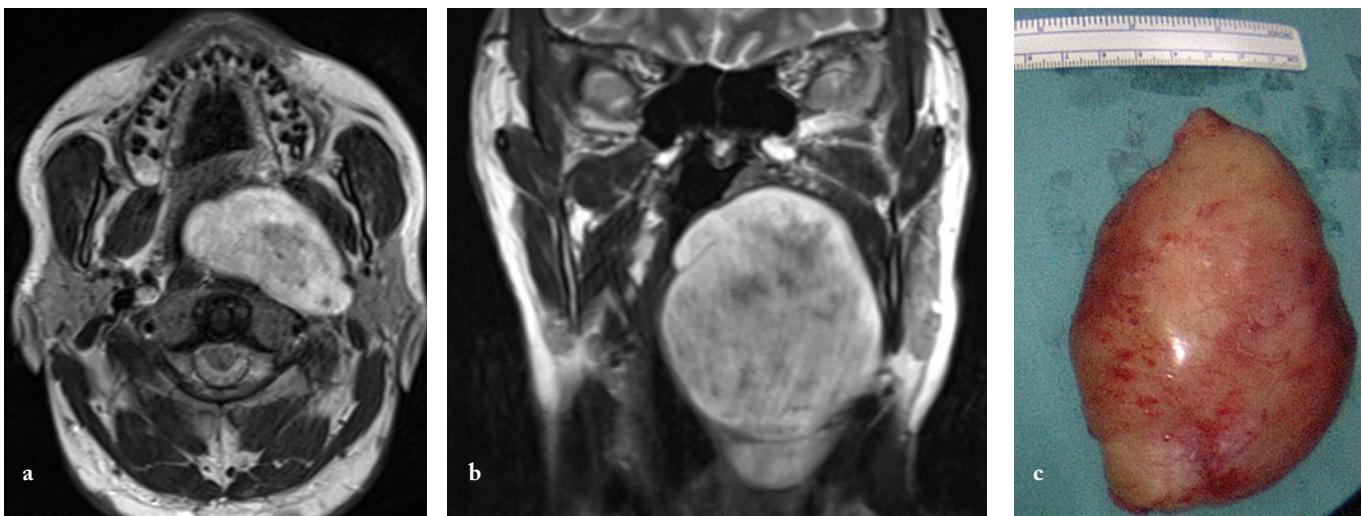


Figure 1. a, b) MRI scan showing tumor with a clear plane from the left parotid gland and skull base, c) specimen removed measured 8x7 cm with an intact capsule

MRI: Magnetic resonance imaging

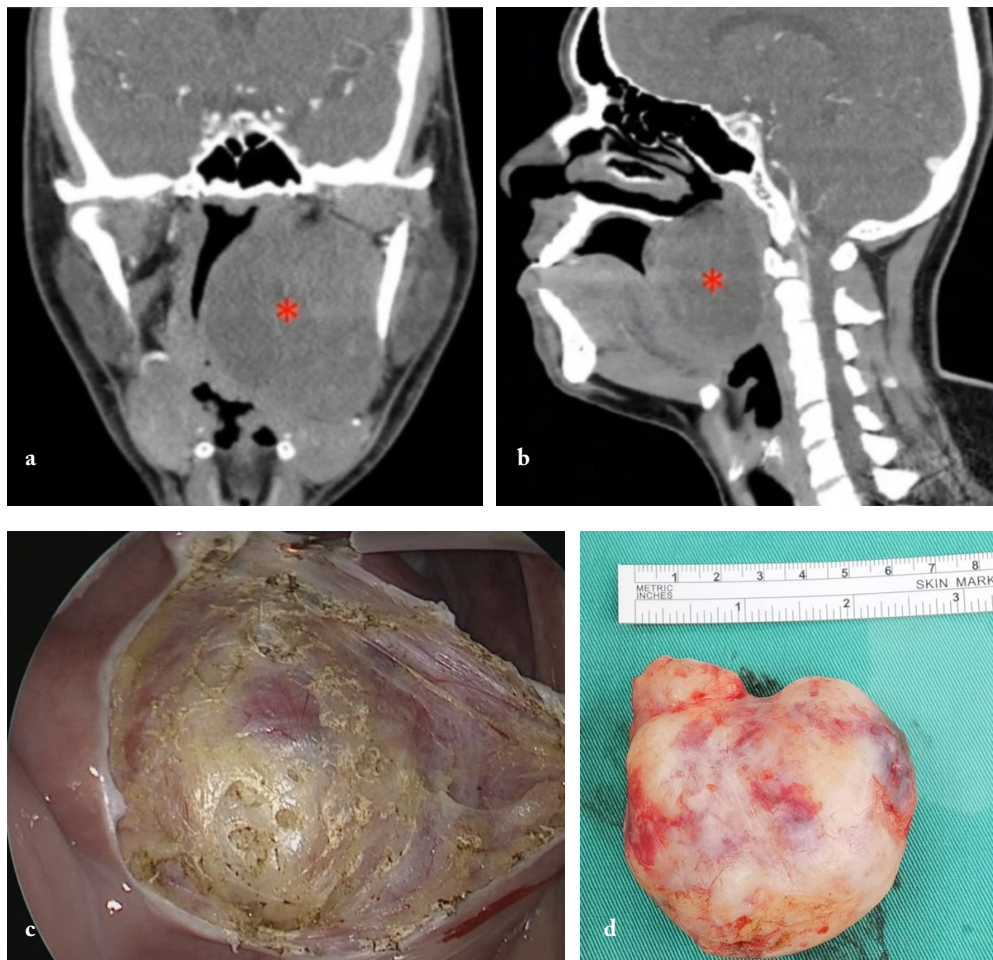


Figure 2. a, b) CT scan showed a huge tumor obstructing the upper aerodigestive tract, c) layers of incision slowly exposing the tumor capsule transoral, d) tumor removed was reported as schwannoma
CT: Computed tomography

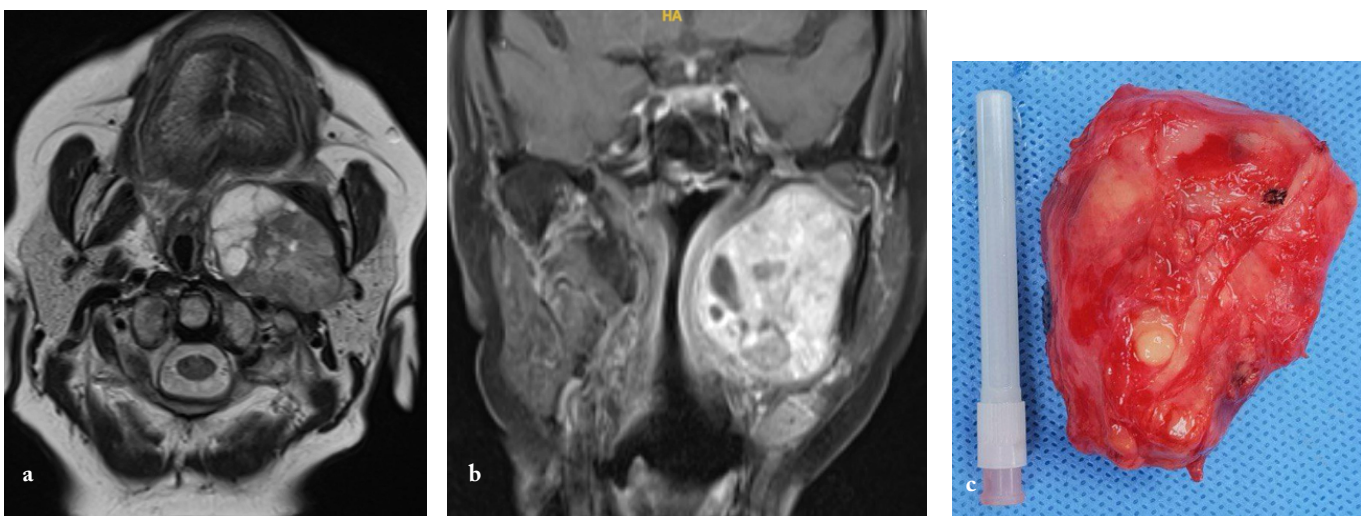


Figure 3. a, b) MRI scan showed multilobulated tumor originating from the deep lobe of the left parotid gland with clear margins superiorly, c) surgical specimen with intact capsule was reported as pleomorphic adenoma
MRI: Magnetic resonance imaging

The blood loss during the surgeries was all less than 50 cc. Operative time was not more than one hour in every case without any complications. The majority of our patients experienced tolerable pain and were discharged after three to four days once they were able to resume a regular diet. We did not resort to inserting a drainage tube to minimize discomfort and to allow earlier weaning off the nasogastric tube. Hitherto, we have observed no signs of recurrence during the years of follow-up. All the patients' wounds healed well, and they regained normal swallowing after surgery.

Written informed consent was obtained from the patients for the publication of this report.

Discussion

External approaches including transcervical, transparotid and combined transmandibular were the main workhorses employed in the removal of PPS tumors. Lately, with the evolution of endoscopic technology, endoscopic transoral surgery has garnered more attention and is being used more frequently due to its many advantages. Among them, the endoscopes allowed enhanced and clearer anatomical structures and a wide-angle visual field with better lighting. It allowed superior appreciation of the anatomical planes, and easier identification of microvessels to allow precise, en bloc resection. Moreover, a recent meta-analysis concluded that PPS pre-styloid benign tumors were most suited for this approach, considering that patients benefited from shortened surgical times, lesser bleeding, faster postoperative recovery, shorter hospitalization, scar-free surgery, and fewer complications with comparable outcomes (2). In particular, it reduced the morbidity led by external approaches, especially regarding the significantly higher risk of facial nerve deficit, first-bite syndrome, sialocele, and functional disability (3).

Some surgeons do not favor the transoral approach mainly because of the limited exposure space, poorer hemostatic control, and purported higher risk of tumor spillage and carotid sheath injury (4). The reduced maneuverability of instruments in the surgical field may also be associated with an increased likelihood of capsular disruption, tumor recurrence and neurovascular damage (5). Direct contact with oral flora during surgery often requires temporary fasting and prophylactic antibiotics to prevent postoperative infections (5). These are the important considerations when choosing a suitable patient in a center with an experienced surgeon and backup. Interestingly, there has been no reported complication of major vascular injury during transoral endoscopic surgery. Many authors have also described a nearly non-existent complication rate using this approach through proper tumor and patient selection (6,7).

Therefore, rigorous patient selection is the most crucial step for successful endoscopic transoral PPS tumor removal. It begins with a thorough history and physical examination

to assess the state of the upper aerodigestive tract including the airway, speech, and swallowing. Any tell-tale signs of malignancy, such as significant weight loss, cervical lymphadenopathy, and cranial nerve dysfunction, are cardinal features to note. Imaging will usually consist of both CT and MRI scans to analyze the tumor characteristics, tumor-normal tissue plane, tumor hypervascularity, and importantly, its relationship to the major neurovascular structure and skull base. Certainly, any features that suggest malignancy, such as irregular tumor margins, poor tissue fascial planes, lymphadenopathy and invasion into adjacent muscle, fat or bone, would not have an equally good clinical outcome.

Our patients' tumor sizes were significantly larger than the conventional ones that underwent endoscopic transoral excision as described in the literature (1). Other than having the advantage of a skilled surgeon, we avoided this approach if the tumor was located lateral or posterolateral to the carotid sheath. We also made sure that the tumor had a clear margin from the skull base without any features of malignancy. In this day and age, with the expanded usage of transoral robotic surgery, a better understanding of radical tonsillectomy, and ever-improving endoscopic instrumentation, this approach deserves its merits for obviating the need for a mandibular split, especially in tumors extending superior-medially to the skull base. A good command of the external approaches and appropriate counselling on the possible need to convert to them is vital to avoid medical entanglement.

Our experiences with large benign pre-styloid PPS tumors challenged the conventional surgical boundaries for an endoscopic transoral approach. Certainly, our small patient sample limits drawing any conclusions about how precisely valuable the surgical technique is. However, with the advancement of endoscopic instrumentation and minimally invasive approaches, we believe it will only become more widely deployed and allow future better-designed clinical studies to evaluate its credibility.

Informed Consent: Written informed consent were obtained from the patients for the publication of this case report.

Authorship Contributions

Surgical and Medical Practices: C.C.L., Y.T.L., S.G., P.N., Concept: C.C.L., Y.T.L., S.G., P.N., Design: C.C.L., Y.T.L., S.G., P.N., Data Collection and/or Processing: C.C.L., Y.T.L., S.G., Analysis and/or Interpretation: C.C.L., Y.T.L., S.G., P.N., Literature Search: C.C.L., Y.T.L., S.G., P.N., Writing: C.C.L., Y.T.L., S.G., P.N.

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Main Points

- Endoscopic transoral surgery has been limited to only small benign parapharyngeal space tumors.
- External approaches including transcervical, transparotid and combined transmandibular were more routinely employed.
- Endoscopic surgery allows a clearer wide-angled visual field for superior appreciation of the anatomical planes and en bloc resection.
- Patients benefit from shortened surgical times, lesser bleeding, shorter hospitalization, faster recovery, and scar-free surgery, with fewer complications and morbidities.
- Large tumors can be removed with good outcomes by having accurate patient selection and surgical strategy.

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