Giant Parapharyngeal Space Lipoma: Case Report and Surgical Approach

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ABSTRACT

Large parapharyngeal space tumors near critical neurovascular structures pose challenging management problems. Only eight cases of a lipoma in the parapharyngeal space have been reported. We present a surgical approach that permits safe resection of such unusual tumors.

A 49-year-old man had a 2-year history of progressive pain in the left neck radiating from the shoulder to the occiput. Contrast-enhanced computed tomography (CT) of the neck demonstrated a fat-attenuation mass located in the poststyloid parapharyngeal space. The mass extended into the foramen transversarium at the level of the second cervical vertebra and encased the vertebral artery. The tumor was removed through an extended transcervical approach that included transection of the attachments of the sternocleidomastoid, trapezius, splenius capitus, and the longissimus capitus muscles. The approach provided access to the first cervical vertebra, allowing dissection of the tumor from the vertebral artery in the foramen transversarium. An extended transcervical approach provides exposure from the carotid artery to the vertebral artery and facilitates the complete excision of large parapharyngeal space masses.

KEYWORDS: Parapharyngeal space, lipoma, skull base surgery, vertebral artery

Tumors arising in the parapharyngeal space constitute only 0.5 to 0.8 % of all head and neck neoplasms.¹⁻⁴ A large variety of tumors can arise in the parapharyngeal space. Parotid and minor sali-

vary gland tumors account for 35% to 50% of parapharyngeal space masses.^{1,2,5-7} Approximately 60% to 75% of these tumors are benign pleomorphic adenomas. The remainder are malignant and include

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carcinoma ex-pleomorphic adenomas, mucoepidermoid carcinomas, adenoid cystic carcinomas, adenocarcinomas, and acinic cell carcinomas.^{1,2,5-7} The second largest group of parapharyngeal space masses in the parapharyngeal space are tumors of neurogenic origin: paragangliomas (carotid body, vagus nerve, internal jugular vein), neurofibromas, and schwannomas. Tumors of vascular, muscular, connective tissue, and congenital origin have also been described in the parapharyngeal space.^{1,2,5-7}

Large tumors in the poststyloid parapharyngeal space are near critical neurovascular structures and therefore pose challenging management problems (Figs. 1 and 2). We present a patient with a giant lipoma that caused debilitating symptoms

Figure 1 Anatomically the parapharyngeal space is often described as an inverted pyramid. The base of the pyramid is limited superiorly by the temporal bone, and the apex of the pyramid inferiorly is formed by the posterior belly of the digastric muscle and the greater cornu of the hyoid bone. The posterior border is the prevertebral fascia and the anterior limit is the pterygomandibular raphe and pterygoid fascia. The lateral border is the mandible, posterior belly of the digastric muscle, and the medial pterygoid muscle. The medial border is the buccopharyngeal-superior constrictor muscle complex. Reprinted with permission from Carrau RL, Myers EN, Johnson JT. Management of tumors arising in the parapharyngeal space. *Laryngoscope* 1990;100:583-589.

Figure 2 Axial view of the parapharyngeal space at the level of the nasopharynx. The parapharyngeal space is further divided into a prestyloid and poststyloid compartment by a layer of fascia extending between the styloid process and tensor veli palatini. Arrow 1 is the fascia dividing the prestyloid and poststyloid compartments. Arrow 2 is the fascia of the medial pterygoid muscles, part of the lateral boarder of the parapharyngeal space. The poststyloid compartment encloses the hypoglossal nerve, spinal accessory nerve, lymph nodes, and the carotid sheath, which contains the internal carotid artery, internal jugular vein, and vagus nerve. The prestyloid compartment is a potential space that can contain salivary tissue and possibly lymph nodes.^{1,2,5} Reprinted with permission from Carrau RL, Myers EN, Johnson JT. Management of tumors arising in the parapharyngeal space. *Laryngoscope* 1990;100:583-589.

and a surgical approach that allowed safe resection of the lesion (Figs. 1 and 2).

CASE REPORT

A 49-year-old male had a 2-year history of progressive neck pain on the left radiating from the shoulder to the occiput. The intensity of the pain increased when he turned his head to the right. On physical examination the patient had slight fullness of the left submandibular area and a left submucosal pharyngeal mass. Computed tomography (CT) and magnetic resonance imaging (MRI) showed a mass in the parapharyngeal space (Figs. 3 and 4).

The differential diagnosis included lipoma and liposarcoma. The diagnosis of lipoma was favored because there was no significant soft tissue invasion. In addition, if the mass were a liposarcoma, a greater soft tissue component would have been expected on imaging.

The patient underwent general anesthesia, and was placed in Mayfield pins in a slightly recumbent supine position. A transverse skin incision was made in a natural skin crease in the upper neck from the submandibular region to the suboccipital area. The incision was extended approximately 4 cm superior and 3 cm posterior to the mastoid tip. A horizontal limb was extended posteriorly (Fig. 5).

Dissection proceeded anterior to the sternocleidomastoid (SCM) muscle to allow identification of the carotid sheath, posterior belly of the digastric muscle, and hypoglossal nerve. To obtain full exposure of the mass, the SCM was transected at its attachment to the mastoid and reflected inferiorly while the spinal accessory nerve was preserved. In addition, the superior attachments of the trapezius, splenius capitis, and longissimus capitis

Figure 3 Axial, contrast-enhanced CT scan, at the level of the floor of the mouth, shows a fat-density, ovoid and slightly lobulated mass (arrows) in the poststyloid parapharyngeal space. Note the lack of enhancement of the mass and its proximity to the left internal carotid artery (small arrow).

Figure 4 Axial, T1-weighted MRI, at the level of the base of C2, shows the high signal intensity of the mass (arrows), equivalent to that of fat (F). The left vertebral artery (small arrow) is surrounded on three sides by the mass.

muscles were transected to expose the mass where it extended into the foramen transversarium of C1 and C2 (Fig. 6). The transverse processes of C1 and C2 were drilled away which allowed complete dissection of the tumor from the vertebral artery in the foramen transversarium (Fig. 7).

The pathologists described the specimen as adipose tissue with multiple benign nodes and diagnosed the mass as a lipoma. Postoperatively, the patient had significant musculoskeletal pain in the surgical area for several months, which responded to physical therapy. He is now free of disease and functional deficits 30 months after surgery.

DISCUSSION

A literature search was performed using "All Medline files" from 1966 to the present. When search subject headings lipoma and pharyngeal neoplasm were combined, 61 articles were found. When limited to the English language, 34 articles remained. Of these 34 articles only six contained cases of a parapharyngeal space lipoma.^{1,3-5,7,8} A second liter-

Figure 5 Drawing of the parapharyngeal space lipoma with extension of the lipoma into the foramen transversarium at the level of the first and second cervical vertebra. The lipoma is encasing the vertebral artery. The dotted line represents the skin incision used.

ature search performed using skull base neoplasm as the subject heading and surgery as the subheading and limited to the English language identified 194 manuscripts. The titles of these manuscripts

Figure 6 The surgical approach included transecting the attachment of the sternocleidomastoid (SCM) to the mastoid and reflecting the muscle anteriorly and inferiorly, with preservation of the spinal accessory nerve. In addition, the superior attachments of the trapezius, splenius capitis, and the longissimus capitis muscles were transected to expose the mass as it extended into the foramen transversarium of C1 and C2.

Figure 7 The transverse processes of C1 and C2 were drilled away, allowing complete dissection of the tumor from the vertebral artery in the foramen transversarium.

were read to identify articles that described surgical approaches to the skull base.

Overall, there appears to be only eight cases of a lipoma in the parapharyngeal space reported in the medical literature (Table 1). Common approaches to the parapharyngeal space include transcervical, transmandibular, transparotid-cervical, transoral, and transcervicomaxillary.^{1,2,6,7,9-11} Most parapharyngeal space tumors are benign and pain is highly suggestive of malignancy.^{1,2,5} We suspect that our patient's pain was related to stretching of the C1 nerve fibers. This conjecture is supported by the observation that when the patient turned his head to the right, the pain increased dramatically. Once the lipoma was removed, these symptoms resolved.

The parapharyngeal space mass described in this case report was unusual because it extended so far superiorly along the course of the vertebral artery. Most masses of the parapharyngeal space can be removed without extensive exposure of the skull base. At our institution, most such masses have been removed through a transcervical approach.¹ At other institutions, the transparotid-cervical approach has been used most frequently to remove these lesions.⁶ When masses of the parapharyngeal space extend to the skull base, additional exposure needs to be considered. Some authors believe that the stan-

Table 1 Summary of Lipomas of the Parapharyngeal Space Reported in the Literature

Reference	Finding
Som et al ⁵	Two of 104 cases of PPS (parapharyngeal space) tumors were pathologically confirmed as lipomas. No further information given.
Pensak et al ⁷	Two of 123 cases of PPS tumors were pathologically confirmed as lipomas. No further information given.
Elango ³	55-year-old Chinese woman with an asymptomatic mass in right side of oral cavity. The mass was removed through a transcervical approach.
Abdullah et al ⁴	60-year-old man with a PPS lipoma causing obstructive sleep apnea. The patient refused surgery and was treated successfully with CPAP (continuous positive airway pressure).
Higashi et al ⁸	61-year-old man complained of a lump in throat. In a second operation 3 months after the initial surgery, the vagus nerve, sympathetic chain, and phrenic nerve were all sacrificed. No information about surgical approach.
Carrau et al ²	An axial CT scan of a large PPS and retropharyngeal space lipoma is shown. No further information given.

dard transcervical approach does not permit adequate exposure and control of the upper neck and skull base vessels.¹⁰ A transcervical-transmandibular approach, which provides excellent exposure of the skull base, has been advocated for parapharyngeal space masses with skull base extension.¹⁰ The transcervical-transmandibular approach, however, has the disadvantage of requiring a lip-slitting incision and mandibulotomy.

The surgical approach described here provided complete exposure of adjacent neural and vascular structures and was associated with no permanent morbidity. By transecting the attachment of the SCM muscle from the mastoid and reflecting it inferiorly, the spinal accessory nerve and its innervation of the SCM and trapezius muscles

could be preserved. The extension of the transcervical approach to include transection of the SCM, trapezius, levator scapulae, and splenius capitis muscles is rarely required to remove masses of the parapharyngeal space. Consequently, this approach has not been discussed in several major works published on the surgical management of these masses.^{1,2,6,7} Sasaki et al¹² provide an excellent discussion of the surgical anatomy of the vertebral artery at the skull base. Our modification to the transcervical approach to the parapharyngeal space includes an approach to the skull base which is similar to that described by this group. We believe that this approach is useful for any lesions involving the region around the foramen transversarium of C1 and C2.

CONCLUSION

Many surgeons believe that a transcervical technique is the procedure of choice for a tumor in the poststyloid parapharyngeal space.^{1-3,7} Our modification of this approach includes a posterior extension with exposure of the vertebral artery at the level of the first and second cervical vertebra. This modification allowed complete removal of a unique parapharyngeal space mass and complete resolution of the patient's debilitating symptoms. This is the ninth parapharyngeal space lipoma to be reported and, to our knowledge, the only one to have caused significant preoperative pain, a symptom usually restricted to malignant lesions.

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Commentary

The authors add to the existing literature a ninth case of benign lipoma of the parapharyngeal space and describe a modification to the standard transcervical approach. The surgical exposure is extended posteriorly by transecting the attachment of the sternocleidomastoid muscle from the mastoid and reflecting the muscle inferiorly while preserving the spinal accessory nerve. The superior attachments of the trapezius, levator scapulae, and splenius capitis muscles are also transected. To achieve total resection, the foramina transversarium of C1 and C2 were opened and the vertebral artery was mobilized. In the current era of skull base surgery, this type of approach seems almost ordinary. However, this approach demonstrates a complete comfort with both neck and spine dissection, an elegant fusion of head and neck surgery and neurosurgery that was anything but commonplace a decade ago. Nothing more need be said.

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