

ABSTRACT

Objectives: Describe a rare case of a parapharyngeal second branchial cleft cyst. Discuss the radiologic findings, the differential diagnosis of parapharyngeal space lesions, and surgical approaches.

Case: A 26yo female presented with dysphagia, neck pain, and aural fullness responsive to antibiotics. On physical examination, she had tender fullness posterior to the right angle of mandible and medial deviation of the right tonsil. Contrast-enhanced MRI revealed a 5-cm peripherally-enhancing lesion in the right parapharyngeal space, displacing the carotid posteriorly and styloid process anteriorly. CT-guided biopsy returned as bland squamous cyst.

Results: The patient underwent transfacial/transparotid approach to the right parapharyngeal space. The cyst was removed in its entirety and final pathology returned as branchial cleft cyst. The patient did well postoperatively with all cranial nerves intact.

Conclusions: The parapharyngeal space is a highly unusual location for a branchial cleft cyst. The differential diagnosis of a cystic mass in the parapharyngeal space includes cystic schwannomas and salivary gland tumors. MRI can help to distinguish between these lesions. These masses are generally excised via submandibular, transparotid/transfacial approach, or via mandibulotomy. An unusual case of a parapharyngeal branchial cleft cyst is described, as well as the imaging characteristics and surgical approaches to this lesion.

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INTRODUCTION

Branchial cleft cysts are relatively common neck masses in adults. Most frequently, these cysts arise from second branchial cleft and arise anterior to the sternocleidomastoid muscle at the mandibular angle. However, they may occur anywhere from the tonsillar fossa to the supraclavicular region. Very rarely, branchial cleft cysts may occur in the parapharyngeal space. Most commonly, symptoms include dysphagia and discomfort.¹

The parapharyngeal space takes the shape of an inverted pyramid which connects to the retropharyngeal, submandibular, and masticator spaces. It is bordered superiorly by the skull base, anteriorly by the pterygomandibular raphe and pterygoid fascia, posteriorly by the cervical vertebrae and prevertebral muscles, medially by the pharynx, and laterally by the mandibular ramus. The styloid process divides the space into pre- and post-styloid spaces with consistent anatomic structures found within each space.²

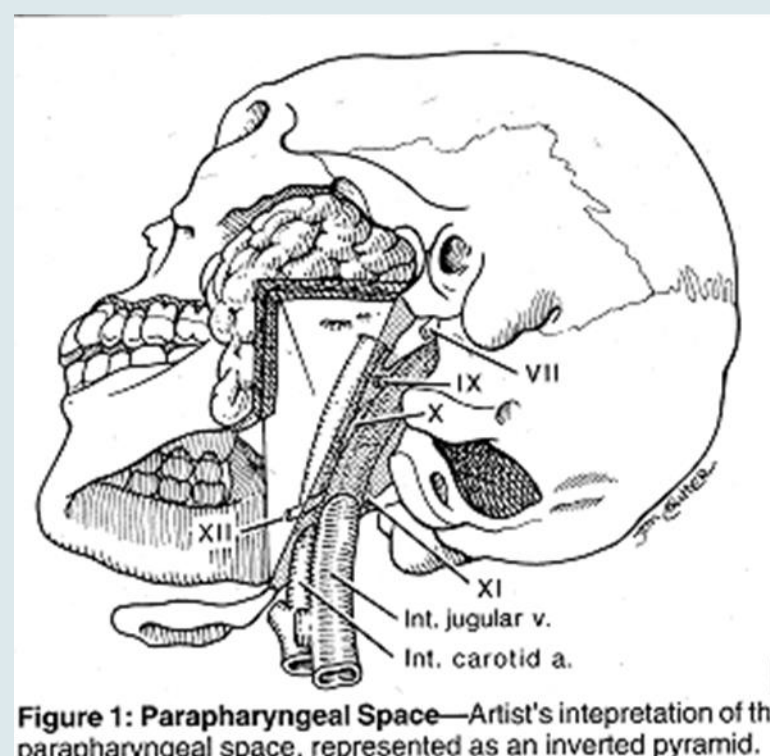


Figure 1: Parapharyngeal Space—Arlier's interpretation of the parapharyngeal space, represented as an inverted pyramid.

| Pre-styloid | Post-styloid |
|--|---|
| Minor salivary glands Internal maxillary artery V3 | CN IX, X, XI, XII Carotid Jugular vein Cervical sympathetic chain Glomus bodies |

Table 1. Structures found within pre- and post-styloid spaces

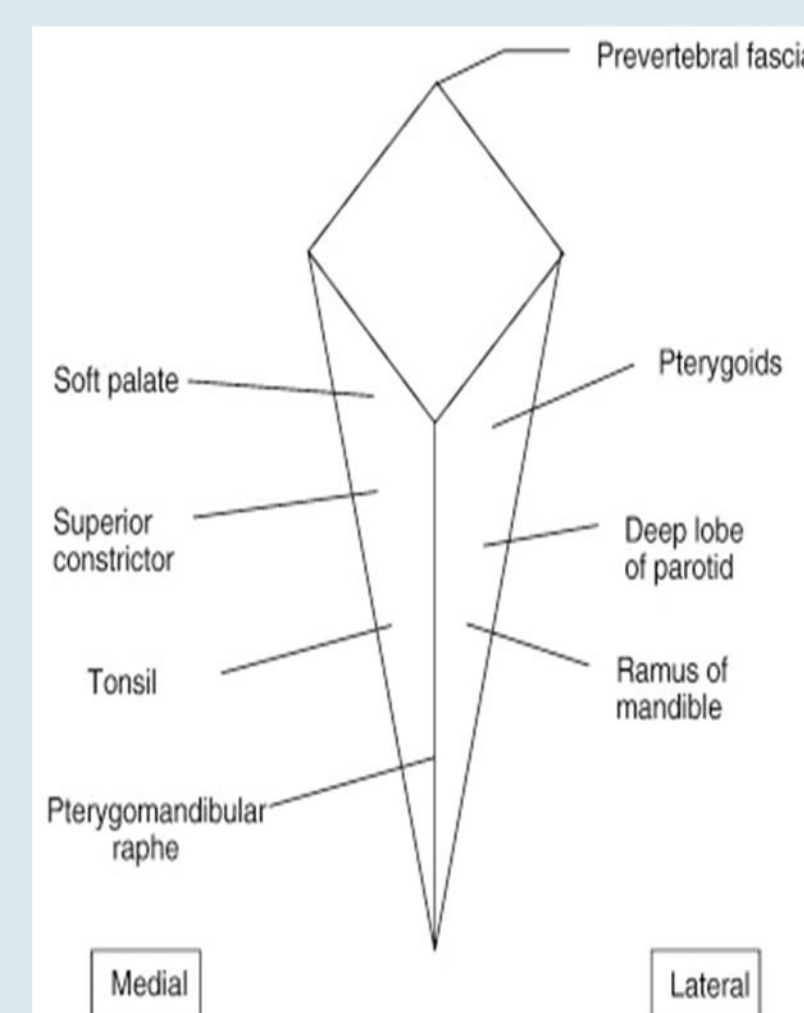


Figure 2. Graphic interpretation of borders of parapharyngeal space

CASE

A 26yo female presented with dysphagia, neck pain, and aural fullness responsive to antibiotics. On physical examination, she had tender fullness posterior to the right angle of mandible and medial deviation of the right tonsil. Contrast-enhanced MRI revealed a 5-cm peripherally-enhancing lesion in the right parapharyngeal space, displacing the carotid posteriorly and styloid process anteriorly. CT-guided biopsy returned as bland squamous cyst.

RESULTS

The patient underwent transfacial/transparotid approach to the right parapharyngeal space. The cystic mass was closely involved with the main trunk and lower division of the facial nerve, requiring complete dissection of the nerve and superior mobilization of the nerve and parotid to access the mass. The cyst had fascial attachments to the skull base medial to the stylomastoid foramen. The cyst was removed in its entirety and final pathology returned as branchial cleft cyst. The patient did well postoperatively with all cranial nerves intact.

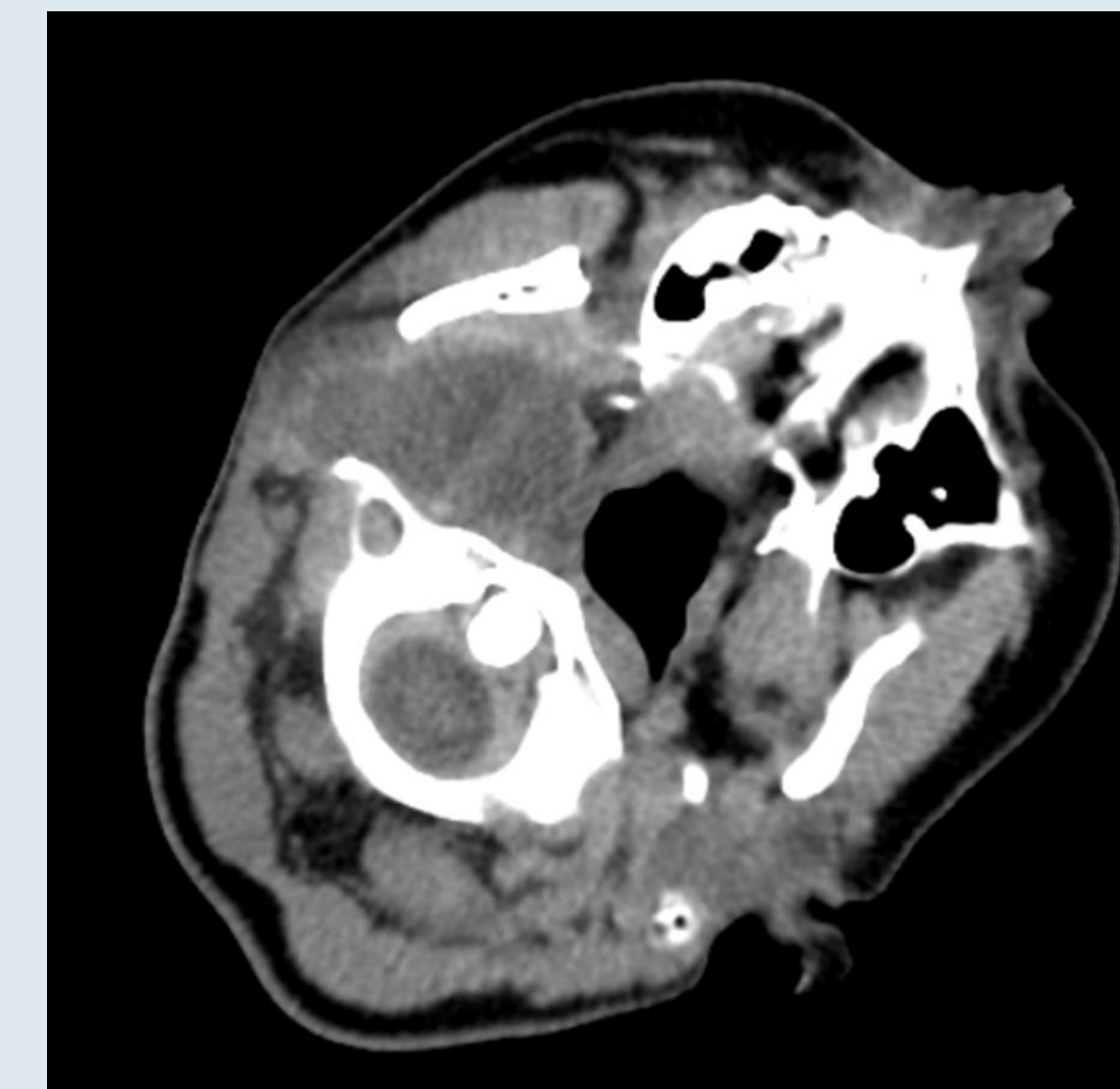


Figure 3. Noncontrast axial image demonstrating right parapharyngeal space mass.

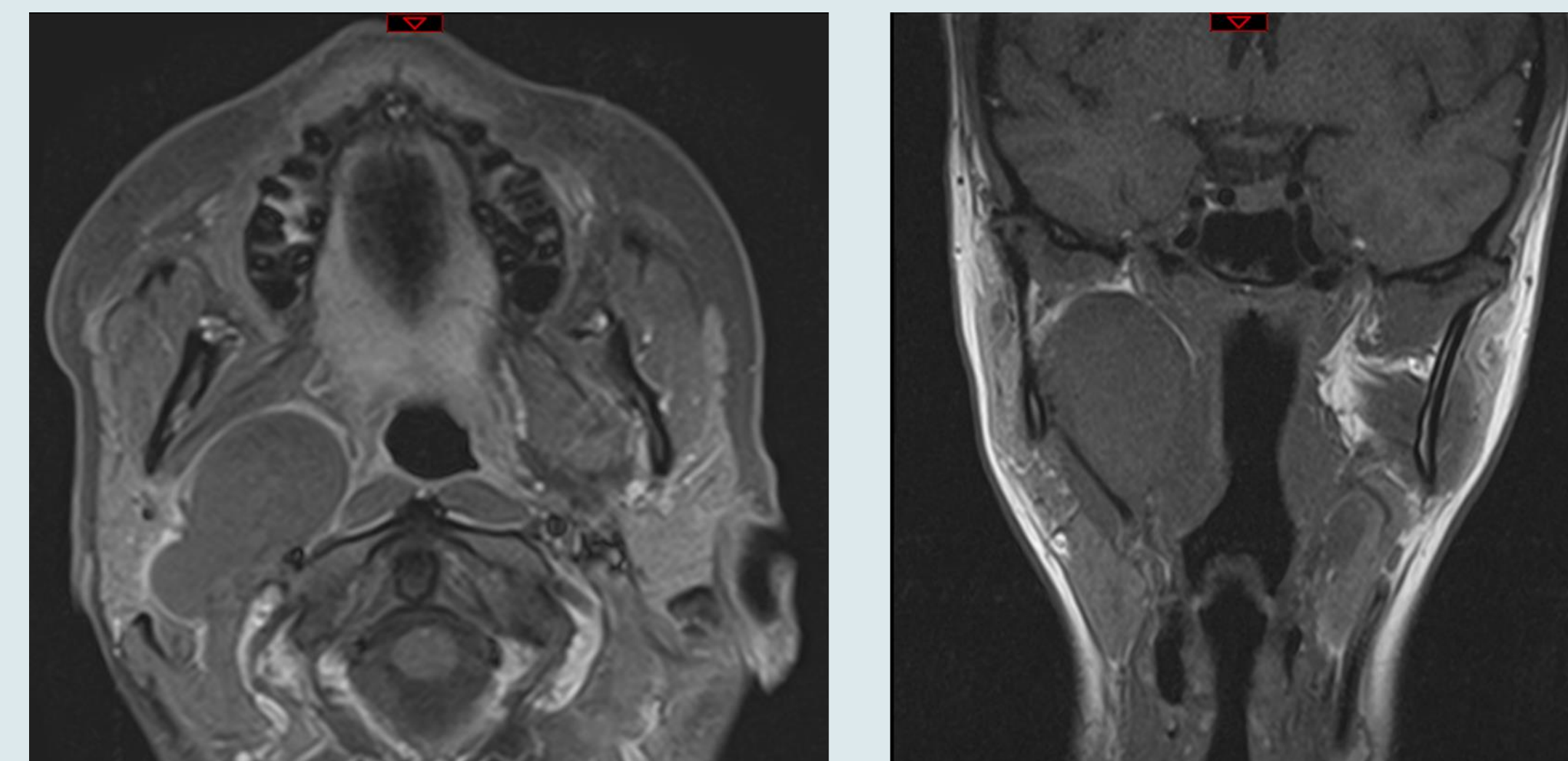


Figure 4a and 4b. Axial and coronal contrast enhanced T1 weighted MRI images revealing a non-enhancing cystic lesion in the right parapharyngeal space.

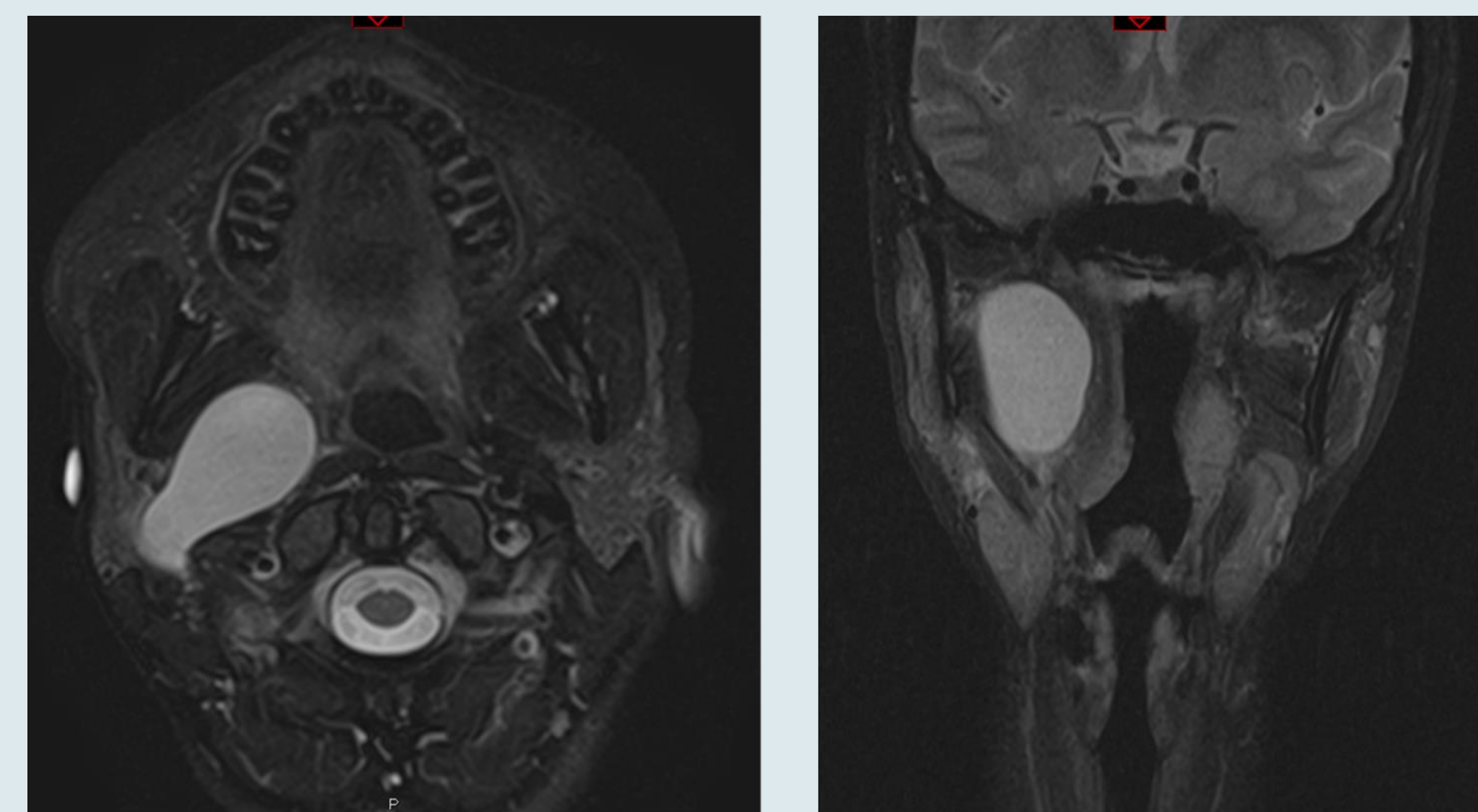


Figure 4c and 4d. Axial and coronal T2 weighted MRI images demonstrating a large, hyperintense cystic mass in the right parapharyngeal space.

DISCUSSION

The parapharyngeal space (PPS) is a highly unusual location for a branchial cleft cyst. Cysts of this region expand towards the least resistant tissue planes, and can protrude submucosally into the oropharynx and extend superiorly towards the skull base. The differential diagnosis of a cystic mass in the parapharyngeal space includes cystic schwannomas and salivary gland tumors.¹

MRI can help to distinguish between these lesions. MRI is superior to CT in its ability to delineate the soft tissue characteristics of PPS masses as it can differentiate between tumor and muscle, and has greater resolution in defining the great vessels and their relationship to the mass. Often, the diagnosis can be made on the basis of characteristic MRI findings. The loss of fat planes between mass and parotid is suggestive of a parotid lesion. In the post-styloid space, paragangliomas have been described as having a "salt-and-pepper" appearance on MRI because of numerous flow voids within the lesion and have irregular enlargement of the involved skull base foramina. Schwannomas show greater enhancement on T2-weighted images, enhance with gadolinium, lack flow voids, and have smooth enlargement of foramina.^{3,4}

On CT scan, PPS branchial cleft cysts present as low-density, well-demarcated cystic unilocular masses with a thin wall and without septations. On T1WI MRI, cyst content appears similar to CSF and may be hyperintense. Cyst content is hyperintense on T2. There is no enhancement of the cyst with contrast.¹

PPS masses are generally excised via transoral, transcervical, transparotid/transfacial approach, or via mandibulotomy. The transoral approach is generally best suited for the removal of small, benign neoplasms that originate in the prestyloid parapharyngeal space and present as an oropharyngeal mass. This approach is limited by its minimal exposure but may be combined with an external approach to mobilize lesions with a large oropharyngeal component.^{5,6}

The transcervical approach is one of the most commonly used for lesions of the poststyloid parapharyngeal space. This approach may involve removal of the submandibular gland for improved exposure. For tumors arising from the deep lobe of the parotid, the transcervical approach can be combined with a transparotid approach by extending the incision superiorly. The facial nerve is identified and dissected as superficial parotidectomy is performed, providing access to a deep lobe tumor or other lesions of the PPS. The transcervical approach may be combined with mandibulotomy with large or vascular tumors, or when improved access to the skull base is needed. Mandibulotomy may be lateral or anterior (midline), and tracheostomy may be required for airway management in the immediate postoperative period.^{5,6}

REFERENCES

- Nagornaya N, Bhatia R. Imaging for Parapharyngeal Space Masses, Second Branchial Cleft Cyst. Encyclopedia of Otolaryngology, Head and Neck Surgery pp 1247-1248.
- Oliver E, Gillette M. Deep space Neck Infections. Cummings Otolaryngology Head and Neck Surgery, 5th ed.
- Weber A, Siciliano A. CT and MR Imaging Evaluation of Neck Infections with Clinical Correlations. Radiologic Clinics of North America Sept 2000; Volume 38, Issue 5
- Som PM, Curtin HD. Lesions of the parapharyngeal space. Role of MR imaging. Otolaryngol Clin North Am. 1995 Jun. 28(3):515-42
- Prasad SC, Piccirillo E, Chovanec M, et al. Lateral skull base approaches in the management of benign parapharyngeal space tumors. Auris Nasus Larynx. 2014 Sep 27.
- Olsen KD. Tumors and surgery of the parapharyngeal space. Laryngoscope. 1994 May. 104 (5 Pt 2 Suppl 63):1-28