Case Report

Extension of a multinodular goitre into the parapharyngeal space—a case report of a rare pathology

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Abstract: The parapharyngeal space (PPS) is a complex, inverted pyramid-shaped potential space within the head and neck region. Lesions of the PPS often arise from pre-existing structures, and form only a small proportion of all head and neck masses. Parapharyngeal lesions have highly variable presentations depending on their location within the PPS. The surrounding muscles, mandible, and salivary glands also make it increasingly difficult to identify and characterise parapharyngeal lesions through physical examination. The thyroid gland is located within the anterior triangle of the neck, in close proximity to the upper trachea and larynx. Extension of an enlarged thyroid most commonly occurs inferiorly, into either the anterior or posterior mediastinum. Thyroid goitres frequently present with compressive symptoms, such as obstructive sleep apnoea (OSA), hoarseness, pain, cranial nerve defects, dyspnoea, and dysphagia. Herein we present a rare case of a multinodular goitre (MNG) extending into the PPS, presenting as a parapharyngeal mass. This case study outlines the appropriate investigations and surgical management of patients with this rare pathology. This case also illustrates the anatomical basis for retropharyngeal and parapharyngeal extension of an enlarged thyroid gland, and the subsequent importance of including MNG in the differential diagnosis of a parapharyngeal mass, despite its rarity.

Keywords: Parapharyngeal space (PPS); multinodular goitre (MNG); thyroid; surgical resection; case report

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Introduction

The parapharyngeal space (PPS) is a complex anatomical region in the neck. As an inverted pyramid, the skull base forms the floor and the greater cornu of the hyoid bone forms the apex (1,2). Masses of the PPS are rare, accounting for only 0.5% of all head and neck neoplasms (3,4). Most are benign and salivary in origin (1,2). Thyroid tissue extending into the PPS is even less frequent, making this subtype exceptionally rare. Herein we describe the clinical presentation, management, and histological features of a multinodular goitre (MNG) within the PPS. We present the following article in accordance with the CARE reporting checklist (available at https://www.theajo.com/article/view/10.21037/ajo-22-18/rc).

Case presentation

A 35-year-old male presented with a three-year history of a painless, slowly enlarging, right-sided oropharyngeal mass, and a "hot potato" voice. No dysphagia, odynophagia or B-type symptoms were present. His past-medical history included worsening obstructive sleep apnoea (OSA), for which he had a tonsillectomy in 2014. There was no personal or family history of thyroid disease or malignancy. He was a current smoker (12 pack-years). On examination, a large mass was visible in the oropharynx, extending from the right tonsillar fossa towards the midline, with an audible stertor. Palpation revealed a non-tender, smooth, firm mass with palpable level IIA/B lymph nodes on the ipsilateral side. Flexible endoscopy revealed intact vocal fold

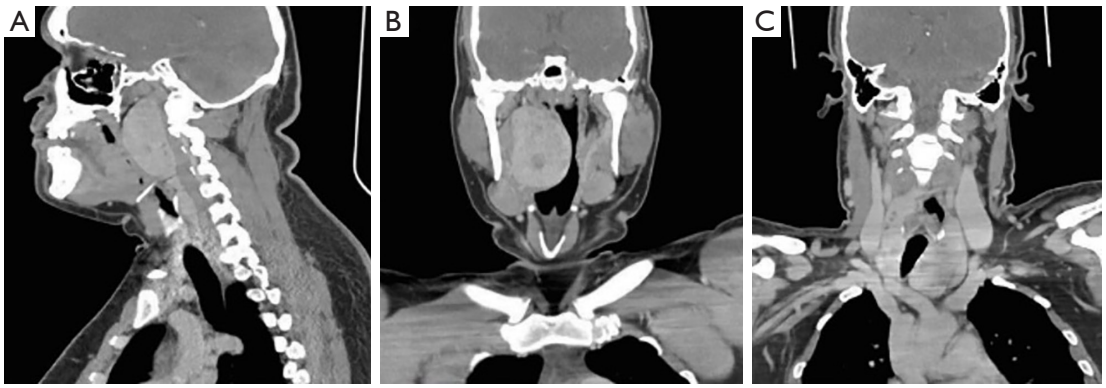

Figure 1 CT of the head and neck region. (A) Sagittal CT section demonstrating a mass anterior to the right styloid and carotid sheath, abutting the right internal carotid artery at the level of the maxilla. (B,C) Coronal CT sections demonstrating parapharyngeal mass extending from C1 to C3/4 with extension from the right thyroid gland to the level of the epiglottis. CT, computed tomography.

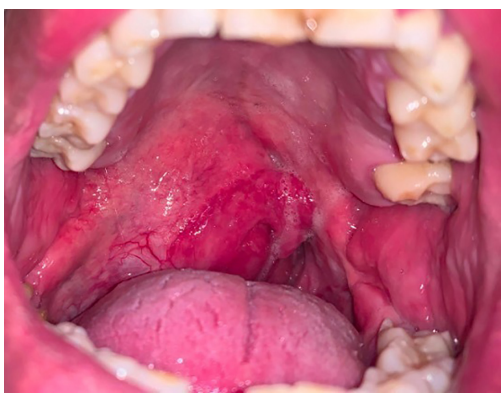

Figure 2 Large oropharyngeal mass, extending from the right tonsillar fossa to the contralateral side, causing airway narrowing and obstruction.

movement and no further abnormalities.

The patient was clinically and biochemically euthyroid (Thyroid-Stimulating Hormone 0.44 mIU/L). All other blood investigations were unremarkable. Computed tomography (CT) and magnetic resonance imaging (MRI) identified a 6 cm × 4 cm × 7.5 cm heterogeneous mass in the right PPS, causing lateral deviation of the pterygoid muscles and posterior deviation of the prevertebral muscles (*Figure 1*). The left PPS was unremarkable. The mass was anterior to the right styloid and carotid sheath and abutted the right internal carotid artery at the level of the maxilla. It also extended inferiorly from C1 to C3/4. Radiology review did not suggest this mass could be thyroid in origin.

Ultrasound-guided fine-needle aspiration cytology was non-diagnostic. A transoral incisional biopsy was performed in theatre which confirmed thyroid tissue and a working diagnosis of ectopic thyroid tissue was made (*Figure 2*). A right hemithyroidectomy, parapharyngeal mass, submandibular gland, and Level IIA super selective neck dissection was performed using a transcervical approach. An awake fibreoptic nasotracheal intubation was undertaken to secure the airway. Adequate exposure revealed superior extension of the right hemi-thyroid and continuity with the parapharyngeal mass (*Figure 3*).

Macroscopically, the hemi-thyroid measured 11 cm × 3.5 cm × 2.2 cm, had a nodular outer surface and weighed 32 g. Incision revealed visible colloid and grey-brown nodules. In contrast, the parapharyngeal mass measured 6.0 cm × 4.0 cm × 3.0 cm and weighed 34 g. The cut surface demonstrated grey oedematous and haemorrhagic nodules, with areas of fibrosis. Histopathological assessment of both specimens identified benign thyroid tissue with nodular hyperplasia and no evidence of malignancy. Histopathological analysis of the excised submandibular gland and lymph nodes were unremarkable. A final diagnosis of MNG in the PPS was made. The post-operative recovery period was uneventful. The patient was discharged shortly thereafter and remained biochemically euthyroid on follow-up. The patient no longer has OSA. All procedures performed in this study were in accordance with the ethical standards of the Helsinki Declaration (as revised in 2013). Informed consent was obtained from the patient for publication in accordance with Health and Disability Ethics Committee (HDEC) regulations. A copy of the written consent is available for review by the editorial office of this journal.

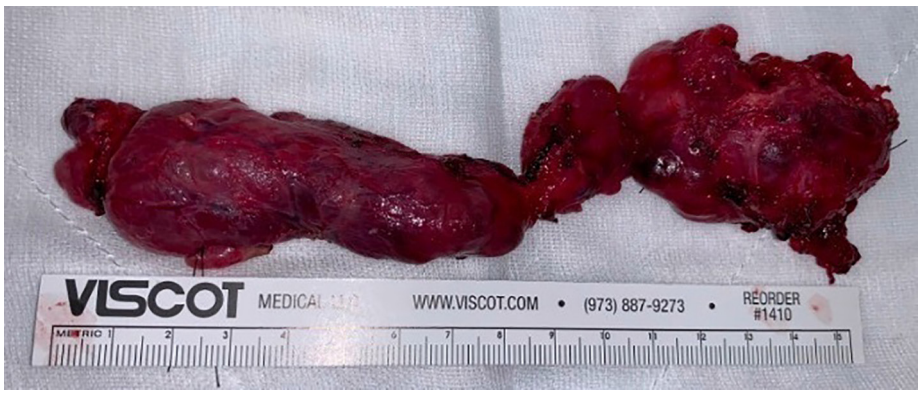

Figure 3 Excised oropharyngeal specimen demonstrating continuity of thyroid tissue with the parapharyngeal mass.

Discussion

To our knowledge, this is the first reported case in the literature of a MNG with extension into the PPS. This case demonstrates the diagnostic difficulty of assessing a mass in the PPS and our management in a euthymic patient.

The tensor-vascular-styloid fascia forms a thick fascial plane that divides the PPS into the prestyloid and poststyloid space (1,3-5). Prestyloid lesions are almost always salivary in origin, while poststyloid lesions are most commonly neurogenic. Primary tumours (benign or malignant) are the most common pathology found in the PPS, followed by metastatic disease, tumours extending from adjacent sites and lymphoproliferative disease (1,2,4).

PPS lesions have highly variable presentations depending on their location within the PPS. The surrounding muscles, mandible and salivary glands make it increasingly difficult to identify and characterise tumours through physical examination (1,5-7). As a result, PPS lesions commonly present orally as smooth submucosal masses causing displacement of the tonsils, soft palate and/or lateral pharyngeal wall, as seen in our patient (6,8). Symptom onset is typically associated with progressive enlargement of the mass or associated complications such as dyspnoea, dysphagia, OSA, hoarseness, or cranial-nerve defects (5,7-9). The anatomical complexity of the PSS often makes confirmation of pre-operative diagnosis difficult, thus, radiological imaging is essential (6).

It is well known that enlarged thyroid glands may extend outside of the usual boundaries of the thyroid bed (6). Caudal extension is most common, expanding inferiorly into either the anterior or posterior mediastinum. In contrast, cranial extension, or lateral extension into either side of the pharynx is less common (5). To our knowledge, this is only the 6th recorded case in the literature identifying parapharyngeal extension of an enlarged thyroid, and the first of a MNG (4,6,8,9).

Although rare, extension of an enlarged thyroid gland into the PPS is possible due to the fascial anatomy of the neck (5,6). The PPS is continuous with the retrovisceral space, which starts at the skull base and ends at the level of T2–T6. The retrovisceral space is divided into the retropharyngeal space and retroesophageal space at the level of the pharynx and cervical oesophagus, respectively. The retrovisceral space has a ventral projection at the level of the thyroid cartilage, called the visceral compartment. The visceral compartment spans either side of the cervical oesophagus and is divided inferiorly by a fold of fascia into anterior (pretracheal) and posterior (retroesophageal) spaces (6). This fascial fold creates a complex yet continuous shared space containing the thyroid gland, parathyroid glands, trachea, and larynx, and explains the anatomical basis for retropharyngeal and parapharyngeal extension of an enlarged thyroid into the PPS (5,6). Therefore, despite their rarity, surgeons and radiologists should be aware of this important differential when assessing a PPS mass.

Conclusions

Herein we describe the rare occurrence of an MNG extending into the PPS. This case study explains the anatomical basis of a goitrous extension into the PPS and emphasises the importance of including MNG in the differential diagnosis of a parapharyngeal mass.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at https://www.theajo.com/article/view/10.21037/ajo-22-18/rc

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://www.theajo.com/article/view/10.21037/ajo-22-18/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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