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Research article

# Unusual presentation of papillary thyroid carcinoma nasopharyngeal metastasis: case report

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## Abstract

**Background:** Papillary thyroid carcinoma (PTC) is the most common thyroid carcinoma, at 80% of diagnoses. As it is characterized by gradual, indolent growth, its prognosis is generally good. Metastases are mainly limited to regional lymph nodes, and rarely reach other head and neck structures. **Case report:** A 65-year-old Burmese woman, who had been diagnosed with PTC of the left thyroid lobe in 1997 and underwent a left thyroidectomy in Myanmar, presented with a right nasopharyngeal mass. A biopsy indicated papillary adenocarcinoma, and was strongly positive for CK7, TTF1 and thyroglobulin stain. Her serum thyroglobulin and anti-thyroglobulin levels were also elevated. **Conclusion:** A few patients with PTC suffer hematogenous metastasis to lung, bone, liver, or brain. However, metastases to head and neck structures are very rare, and are proposed to occur through lymphatic spreading.

**Keywords:** Nasopharyngeal metastasis, Papillary thyroid carcinoma

## Introduction

Papillary thyroid carcinoma (PTC) is the most common subtype of all thyroid carcinomas, followed by follicular, poorly differentiated and Hürthle cell subtypes[1–4]. It is an indolent tumor characterized by gradual growth and therefore has a favorable prognosis[5,6]. Although PTC metastases are mainly limited to regional lymph nodes (LNs), 10%–15% of patients eventually present with distant metastasis via hematogenous spreading, of which 65–70% settle in the lungs, bone, brain, or liver[7].

Apart from the cervical LNs, few cases of regional head and neck PTC metastasis have been reported; but some have been found at the parapharyngeal space (PPS)[8–11], paranasal sinus[12], nasal cavity[7], hypopharynx, or larynx[13–15]. Rouviere described upward lymphatic spread of this tumor via the lateral retropharyngeal nodes[11]. However, to our knowledge, no case of metastatic PTC presenting with a nasopharyngeal mass had been reported. Here, we reported a rare case of metastatic PTC presented as a naso-pharyngeal mass, which was difficult to distinguish from primary nasopharyngeal carcinoma.

The patient also had synchronous bilateral lung and pleural metastases. Her cancer was successfully diagnosed using immune-histochemistry (IHC). We also addressed the



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radiologic characteristics of metastatic nasopharyngeal masses and the impact of this clinical manifestation on the management of PTC.

**Case Report**

In July 2018, a 65-year-old Burmese woman presented with epistaxis and stuffed nose in the right nasal cavity of 3 months' duration at the otolaryngology department of a hospital in Thailand. Her underlying diseases were hypertension and ischemic heart disease. She had a history of PTC in her left thyroid lobe, which was diagnosed in 1997, and treated with a left thyroidectomy in Myanmar. She received no further treatment and was followed up in a hospital in Myanmar.

Physical examination and nasal endoscope showed a large exophytic mass obstructing the right side of her nasopharynx. The cervical LNs were not enlarged. The rest of physical examination was unremarkable. Post-contrast-enhanced CT scan of the neck revealed a 3.0×4.3×4.8-cm mass at the right side of nasopharynx with irregular nasopharyngeal mucosa extending into the right PPS, and involving her prevertebral space, right paravertebral space, right pterygoid muscle and right parotid space (Figure 1). Her right internal carotid artery was partially encased by the mass. An enlarged right lateral retropharyngeal node with central necrosis and extracapsular extension was adjacent to and blended with the mass, which made ascertaining whether the mass was a distant metastasis, or a direct extension of the enlarged LN difficult.

A few enlarged level-II LNs were seen on both sides of the neck, with the largest one (1.2 cm in longest axial dimension) on right. The left level-VI LN, as the first sentinel node for thyroid carcinoma metastasis before spreading to lateral level-II–V compartments, was about 1 cm in size. A thyroid gland ultrasound showed an irregular hypoechoic nodule at inferior-most area of the left thyroid bed, measuring about 0.8×0.9×0.7-cm; it was suspected to be a recurrent tumor (Figure 2). A bone scan revealed only increased tracer uptake at the lower right lateral skull, possible mastoiditis. Contrast-enhanced chest CT showed suspicious lung lesions and pleural metastasis (Figure 3).

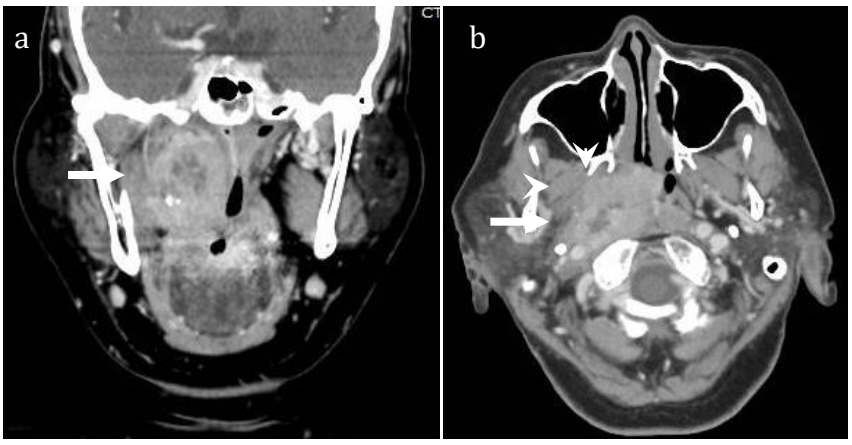


**Figure: 1** Coronal (a) and axial view (b) of contrast-enhanced neck CT scan showed a large right lateral retropharyngeal lymph node with central necrosis (arrow) blended with right nasopharyngeal mass (arrowhead)

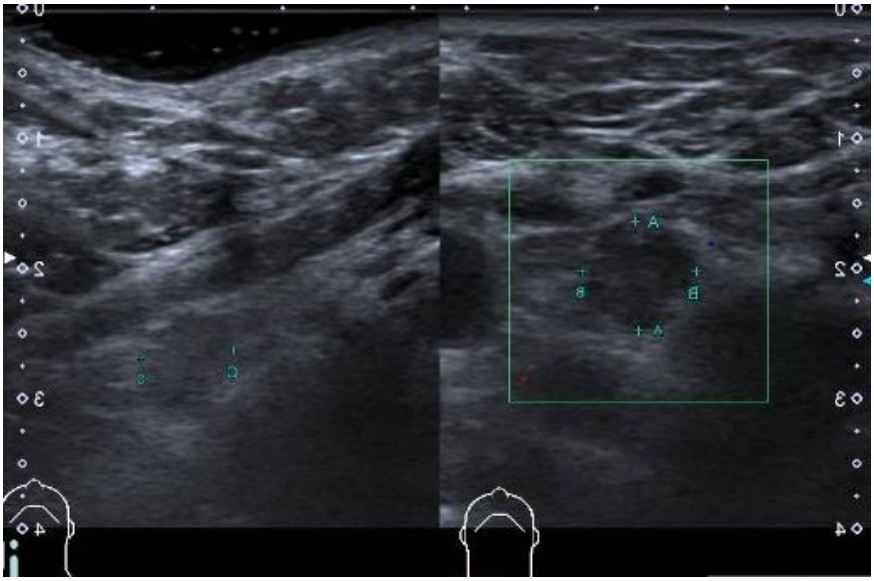

**Figure: 2** Ultrasound shows an irregular hypoechoic nodule (lymph node) at the inferior most area of the left thyroid bed, about 0.8×0.9×0.7 cm, which was suspected to be a recurrent tumor

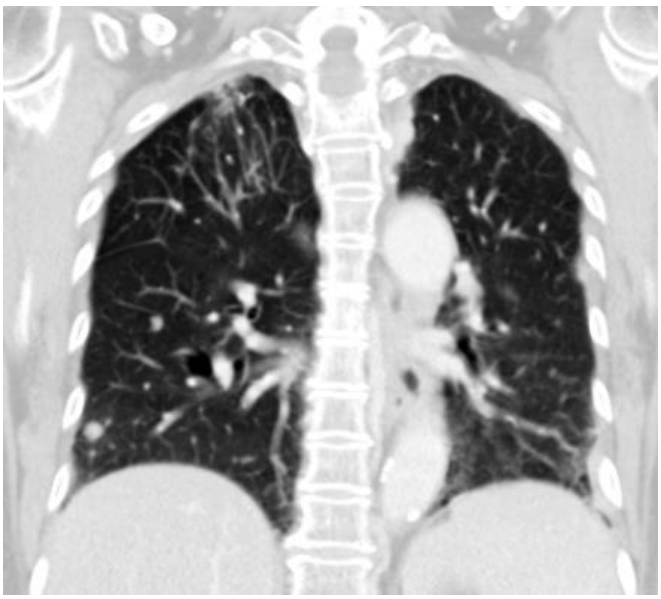

**Figure: 3** Multiple lung and pleural metastasis seen on contrast-enhanced CT chest scan

A biopsy of the nasopharyngeal mass indicated papillary adenocarcinoma. The specimen's mitotic count was 6/10 high power field (HPF). IHC testing showed strong CK7, TTF1, and thyroglobulin stains (Figure 4) but the specimen was negative for CK20, CDX2, villin and mucin. The left level-VI LN was also biopsied because of high suspicion of recurrent thyroid carcinoma; it revealed papillary adenocarcinoma as well.

Serum thyroglobulin and anti-thyroglobulin levels were both elevated at 180 ng/mL (normal: <70 ng/mL) and 297 ng/mL (normal: < 115 ng/mL), respectively.

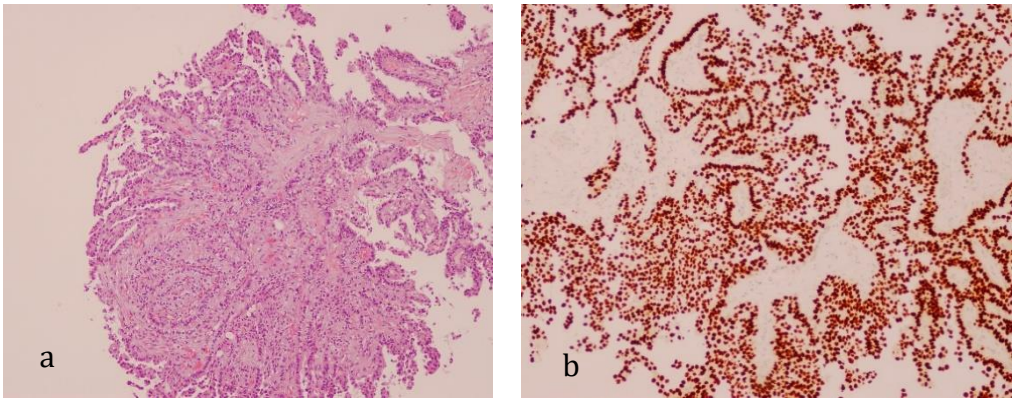


**Figure: 4** (a) Papillary configuration of tumor cells (H&E stain). (b) Strong immunohistochemical stain for thyroglobulin.

The patient underwent a complete thyroidectomy and LN dissection in April 2019. Pathological examination of the left level-VI LN specimen showed papillary adenocarcinoma. A postoperative total body iodine-131 ($^{131}$I) scan showed radiotracer uptake at the middle and right of the thyroid bed, which was the thyroid remnant. Faint radiotracer uptake was also seen at the large nasopharyngeal mass, but not at the multiple nodules scattered in both lungs (up to 1.3 cm; Figure 5).

Nuclear radiologist was consulted about the finding of total body iodine-131. Hypothesis to explain about faint radiotracer uptake at large nasopharyngeal mass and no uptake at multiple pulmonary nodule may be the remnant of normal thyroid tissue that totally uptake I-131 or dedifferentiation of metastatic papillary thyroid cancer.

Whether the total body $^{131}$I had shown thyroid remnant or residual de-differentiated PTC was unclear. Systemic treatment, such as tyrosine kinase inhibitor (TKI) therapy, was planned as the next step of treatment. Unfortunately, the patient was lost to follow-up.

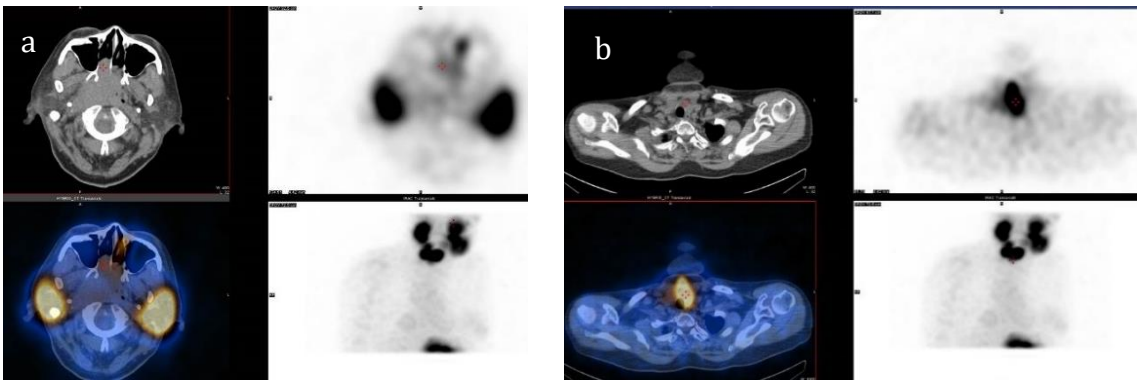


**Figure: 5** (a) Postoperative total body $^{131}$I scan shows faint radiotracer uptake at the large nasopharyngeal mass. (b) Stronger uptake at the middle and right thyroid bed, which was the thyroid remnant.

## Discussion

Although lymphatic spreading occurs in PTC, metastases to head and neck structures and outer cervical LNs, such as the PPS[8–11], paranasal sinus[12], nasal cavity[7], hypopharynx, and larynx[13,14] are rare. Parapharygeal LN metastasis is apparently reported more frequently than others. According to the Sueyoshi Moritani study, 22 out of 433 surgical patients with PTC treated from 2006 to 2013 at Kusatsu General Hospital had LN metastasis in the PPS[11]. All patients had involved jugular nodes before or at the time of PPS metastasis was detected. Parapharyngeal metastasis may extend to nearby submucosal structures which appearing to have intact mucosa, such as in one report on parapharngeal and hypopharygeal metastasis[15]; whereas metastases directly to the paranasal sinus, nasal cavity, hypopharynx, larynx or nasopharynx with broken mucosal lining are very rarely reported. The mechanism of metastasis was described by Rouviere, who showed that one-fifth of patients had lymphatic pathways that directly related the posterior part of the thyroid lobe which drained into the parapharyngeal and retropharyngeal spaces. An anatomical dehiscence behind the fascia of the superior constrictor muscle allows the parapharyngeal and retropharyngeal spaces to communicate freely with each other, so the retropharyngeal nodes might involve the jugular node before or at the time of PPS metastasis[11]. As another proposed mechanism, Nakamura et al. suggested that that nitric oxide (NO) might affect metastasis of PTC via VEGF-D induction, which has been associated with tumor lymphangiogenesis[16]. The exact mechanism of rare-site PTC metastasis of PTC is unknown, despite many hypotheses. In this patient, the right nasopharyngeal mass blended with the large necrotic right lateral retropharyngeal LN, and discerning whether its origin was a distant metastasis or a local invasion from the pathologic right lateral retropharyngeal LN was difficult.

This patient presented with epistaxis and stuffed nose in her right nasal cavity. Nasal endoscopy showed a large exophytic mass obstructing the right nasopharynx. At first, we assumed that the mass was a primary nasopharyngeal carcinoma, which is the most common diagnosis among Southeastern Asian patients who present with nasopharyngeal masses. The pathology report showed papillary adenocarcinoma. The differential diagnosis was thyroid like low-grade primary nasopharyngeal papillary adenocarcinoma (TL-LGNPPA), which constitutes <5% of all nasopharyngeal carcinoma cases[17], or metastatic PTC, which is extremely rare. Morphologically distinguishing these tumors is difficult because they both have papillary architecture, ground-glass nuclei, and nuclear grooves with invasive growth pattern. However, IHC analysis yields different results. Reportedly, TL-LGNPPA are TTF-1-positive and thyroglobulin-negative[17,18], whereas metastatic PTC is positive for both TTF-1, and thyroglobulin. Because of the positive thyroglobulin expression, and elevated serum thyroglobulin and anti-thyroglobulin levels, we diagnosed metastatic PTC.

Effective treatment of metastatic PTC is surgical total thyroidectomy followed by $^{131}$I ablation. The patient underwent a complete thyroidectomy. Post-operative radioactive $^{131}$I ablation was performed, but we saw no uptake at metastatic sites in this patient. Systemic therapy, such as TKI, was planned in case of ineffective conventional treatment.

In conclusion, although a few patients with PTC suffer hematogenous metastasis to lungs, bone, liver, or brain, metastases to the head and neck structures are very rare. Lymphatic spreading is a proposed mechanism.

## Conclusion

Hematogenous metastasis to lungs, bone, liver, and brain of papillary thyroid carcinoma is found in minority of patients. Head and neck structures metastasis represents a very rare condition. The proposed mechanism could be due to lymphatic spreading. In our case, nasopharyngeal metastasis represents a very rare condition.


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