

Locally advanced asymptomatic papillary thyroid cancer presenting with retropharyngeal lymph node metastasis symptoms

Roostam Kholmatov¹, Obinwanne Emejulu¹, Fadi Murad¹, Rizwan Aslam², Emad Kandil¹

¹Department of Surgery, ²Department of Otolaryngology, Tulane University School of Medicine, New Orleans, LA, USA

Correspondence to: Emad Kandil, MD, MBA, FACS, FACE. Division of Endocrine and Oncological Surgery, Department of Surgery, Tulane University School of Medicine, 1430 Tulane Ave, New Orleans, LA 70122, USA. Email: ekandil@tulane.edu.

Abstract: Papillary thyroid cancer (PTC) rarely metastasizes to the retropharyngeal lymph nodes. Managing patients with locally advanced primary PTC and metastasis located in distant anatomical areas is challenging. Herein, we report a 56-year-old patient with locally advanced asymptomatic PTC, who presented with obstructive airway symptoms due to the metastatic retropharyngeal lymph node. The patient underwent simultaneous total thyroidectomy, central lymph node dissection, *en bloc* resection of strap muscle and left laryngeal nerve via cervical approach and transoral resection of the metastatic retropharyngeal lymph node. Metastatic PTC should be included in the differential diagnosis of a retropharyngeal masses. Simultaneous total thyroidectomy of the primary thyroid cancer via a cervical approach and transoral resection of an isolated retropharyngeal metastasis is safe and feasible.

Keywords: Papillary thyroid cancer (PTC); retropharyngeal lymph node metastasis; clinical presentation; diagnosis; surgery

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Introduction

Papillary thyroid cancer (PTC) is the most common type of thyroid cancers. Patients with PTC are usually asymptomatic. However locally advanced thyroid carcinoma can manifest with dysphagia, dyspnea, and dysphonia because of involvement of esophagus, trachea and recurrent laryngeal nerve (1). It primarily metastasizes through the lymphatic system to the first echelon—central compartment (level VI) lymph nodes then to the lateral (levels II, III, IV, and V) neck compartments (2). PTC metastasis to the retropharyngeal space is rare with only a few reported cases (*Table S1*) (4,6-9).

The surgical approach for metastatic retropharyngeal lymph node can be challenging. There are several approaches for excision of retropharyngeal masses, including, transcervical, transmandibular and transoral.

In this article, we report a patient with locally advanced asymptomatic PTC, who presented with obstructive airway

symptoms due to a metastatic retropharyngeal lymph node.

Case presentation

A 56-year-old female presented to the primary care provider with snoring, obstructive sleep apnea and dyspnea. On physical exam, a mass was noted on the posterior oropharyngeal wall. Computed tomography (CT) scan revealed an enhancing low density 2.1 cm × 1.3 cm mass, associated with asymmetrical soft tissue thickening in the left posterior pharynx just above the upper epiglottis (*Figures 1-4*). There was also a suspicious, low density 1.6 cm left thyroid nodule, with calcification (*Figures 3,4*). No other pathological lymphadenopathy, and no salivary glands pathology were reported.

After that the patient was referred to our clinic for evaluation of a posterior pharyngeal wall mass and an incidental left thyroid nodule. Physical examination revealed

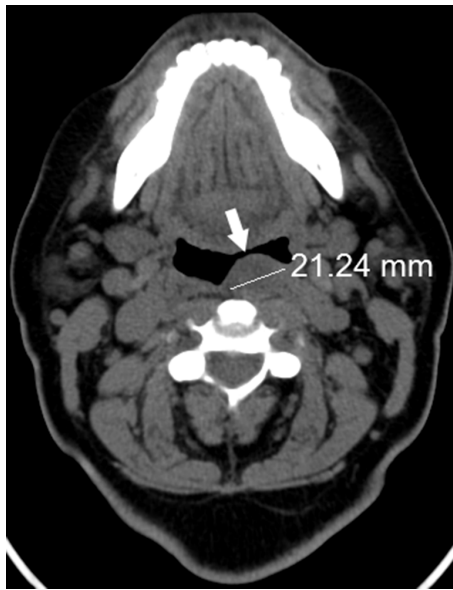


Figure 1 Non-contrast enhanced CT scan (axial view) white arrow showing a bulging 2.1 cm retropharyngeal mass in the oropharynx.



Figure 3 Contrast enhanced CT scan (sagittal view) white arrow showing the retropharyngeal mass and the enlarged left thyroid lobe with substernal extension (black arrow).



Figure 2 Contrast enhanced CT scan (axial view) white arrow showing the retropharyngeal lymph node surrounded by low density area.



Figure 4 CT scan (frontal view) showing the left retropharyngeal mass (white arrow) and the left thyroid nodule with calcifications (black arrow).

a bulging firm mass of the posterior oropharynx. Neck was supple, with palpable, mobile, non-tender 2 cm left thyroid nodule. Trachea was midline and no palpable cervical lymphadenopathy was noted. Flexible laryngoscopy showed a posterior pharyngeal wall mass at the hypopharynx-

nasopharynx junction. Both vocal cords were mobile bilaterally.

Thyroid US revealed a left thyroid nodule $5.4 \times 3.7 \times 2.4 \text{ cm}^3$ with calcification and minimal vascularity, the mass appeared to invade the strap muscle (*Figures 5,6*). No discrete nodules were noted in the right thyroid lobe. Ultrasound-guided fine needle aspiration (FNA) of the left thyroid nodule was

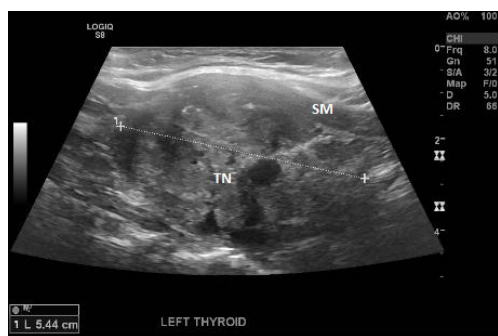


Figure 5 Ultrasonographic image (sagittal view) showing a 5.44 cm heterogeneous nodule in the left thyroid lobe invading the strap muscle. SM, strap muscle; TN, thyroid nodule.

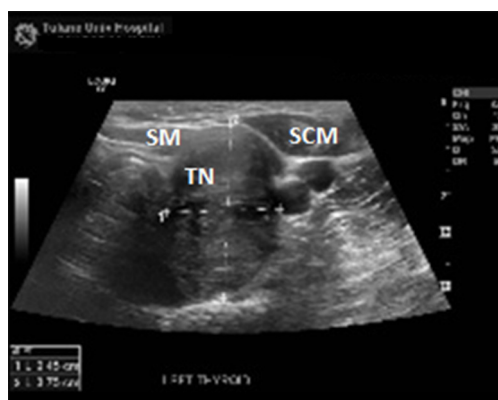


Figure 6 Ultrasonographic image (transverse view) showing 3.7 cm × 2.4 cm heterogeneous nodule in the left thyroid lobe invading strap muscle. SM, strap muscle; TN, thyroid nodule; SCM, sternocleidomastoid muscle.

positive for PTC.

We decided to perform simultaneous transoral excision of the retropharyngeal mass, and total thyroidectomy via the transcervical approach. First, the parapharyngeal mass was excised through a transoral 1.5 cm vertical incision over the mass and the cystic-appearing firm lymph node was dissected circumferentially safely. Then cervical incision was performed. We identified that the strap muscle was invaded by the left thyroid mass. The left recurrent laryngeal nerve was completely encased by the mass. We performed total thyroidectomy with *en bloc* resection of the strap muscles and *en bloc* resection of the left recurrent laryngeal nerve with central lymph node dissection (level IV).

Histopathology of the left thyroid lobe revealed a 2.5 cm × 2.0 cm papillary carcinoma, classic type,

stage pT4aN1aM0, BRAF^{V600E} mutant, and the left retropharyngeal lymph node was also positive for metastatic PTC. There was extrathyroidal extension present but the surgical margins were uninvolved by carcinoma. Nine of the twelve lymph nodes of the left central compartment were positive for metastatic PTC.

Postoperative period was uneventful except for hoarseness. Her voice was strong subjectively and objectively. The patient received radioactive iodine postoperatively and continued to show no evidence of recurrence after 2 years of follow-up.

Discussion

Papillary thyroid carcinoma is the most common and fortunately the least aggressive type of thyroid cancers. It usually grows slowly and has a favorable prognosis (14). However, PTC can be locally aggressive, and directly invading the nearby tissues. PTC most commonly metastasizes into the central compartment (level VI) lymph nodes, then the lateral (levels II, III, IV, and V) compartment nodes (2). Metastasis of PTC to the retropharyngeal lymph nodes (RPLN) is very rare and few cases are reported in the literature (*Table S1*).

There are three possible scenarios to identify metastatic PTC to the retropharyngeal lymph nodes. In the first scenario, initially a RPLN mass is detected and there is no evidence of a primary thyroid neoplasm (6). After removing the RPLN and getting a histologic confirmation of metastatic PTC, an occult primary thyroid carcinoma is identified 1 to 6 months later (3,5,10,11,13). Probably this occurs due to a lymphatic pathway, described by Rouviere, connecting the posterior surface of the thyroid gland to the retropharyngeal lymphatic system (15). In the second scenario, recurrence of PTC can present with retropharyngeal lymph node metastasis (4,6-9). It is proposed that the lymphatic flow direction could become retrogradely after total thyroidectomy and neck dissection, leading to the RPLN metastasis (6). In the third scenario, both the primary thyroid tumor and the RPLN metastasis are diagnosed at the same time (3,6,9,12). Our case fits into the third scenario.

Recurrent cases of retropharyngeal PTC metastasis in most cases are clinically asymptomatic, whereas initial metastasis can manifest with various symptoms like swelling of the tonsils, snoring, fullness sensation in the throat, neck mass, or temporomandibular joint syndrome (3-13). In our case, the patient had both primary thyroid cancer

and retropharyngeal metastasis. Despite the extensive local invasion, the primary thyroid cancer was asymptomatic and was found incidentally on CT scan as a benign thyroid nodule. Whereas the metastatic retropharyngeal lymph node manifested with obstructive symptoms: snoring, obstructive sleep apnea, and dyspnea. Our patient also had the BRAF mutation, which probably contributed to the aggressiveness of the cancer with the local invasion and the retropharyngeal lymph node metastasis.

Patients presented with recurrent disease in RPLN can be diagnosed with either CT or magnetic resonance imaging (MRI) (3-8,11-13). In our case, the physical exam and the flexible laryngoscopy were able to detect the retropharyngeal mass.

Transcervical ultrasound is not reliable in detecting retropharyngeal lymph nodes, although it is useful in revealing thyroid nodules and cervical lymphadenopathy. High serum thyroglobulin levels in recurrent cases of RPLN metastasis can also direct the clinician towards the diagnosis of metastatic PTC. FNA of the RPLN can be done either transcervically or transorally under CT or US guidance (3,4,6,7,12). However, FNA is not always accurate: non-diagnostic samples or even benign cytology has been reported with a proven metastatic disease (3). Our patient had both, a thyroid nodule and a RPLN, and we only biopsied the thyroid nodule because it was easily accessible. In cases of recurrent RPLN metastasis, FNA can be done transorally under US-guidance (4). In most cases of initial RPLN metastasis, histologic diagnosis is only established after resection of the mass. In our case, both the primary PTC and the retropharyngeal lymph node metastasis were diagnosed preoperatively.

PTC is a differentiated thyroid cancer with good prognosis. Excision of the primary tumor and neck dissection of the metastases provides a long-term disease-free and overall survival benefit (16-18). The ATA 2015 guidelines lack the nodal size threshold and the surgical management recommendations for retropharyngeal lymph node metastasis (18). This is because RPLN metastasis of PTC is very rare.

RPLN can be surgically excised via transcervical, transmandibular or transoral approaches (3-13). The transcervical approach provides a wide exposure of the retropharyngeal space, but the morbidity of such an extensive approach is rarely justified in the treatment of a metastatic differentiated thyroid cancer. This approach can cause injuries to the major vascular structures, lower cranial nerves, and the sympathetic chain. The transmandibular

approach allows a significant exposure but can cause complications like pharyngocutaneous salivary fistula, poor healing of an osteotomy, damage to the teeth, and temporomandibular joint dysfunction.

The transoral approach is less invasive and allows adequate access for the excision of an isolated metastatic RPLN from an oncological point and avoids the potential morbidity of other approaches (7). Well-differentiated thyroid cancer LN metastasis doesn't require excision with wide margins.

Goepfert *et al.* 2015 proposed transoral robot-assisted surgical excision of an isolated retropharyngeal thyroid metastasis. They report that robot-assisted approach offers a safe and effective dissection through the improved visualization and the dexterity in a small working space. Limitations of the transoral robotic approach are the cost, the availability of the machine, the need for extra training, and the loss of tactile feedback (4).

Our case is unique because the patient had both locally advanced primary tumor and an isolated RPLN metastasis. Because those lesions were in distant different anatomical regions, the retropharyngeal mass located high in the oropharynx and the primary thyroid tumor located in the lower neck with substernal extension, we performed simultaneous transoral and transcervical approaches for their excision. We believe that trying to access both lesions from single cervical approach would have done more harm than benefit in this case, by unnecessarily extending the surgical trauma by a very long incision, and risking injury to vital blood vessels and nerves.

The presence of BRAF^{V600E} mutation is associated with a significantly higher risk of recurrence than BRAF wild-type tumors. Our patient had a BRAF^{V600E} mutation and it probably contributed to the local aggressiveness of the primary tumor and the unusual retropharyngeal metastasis.

Conclusions

The possibility of metastasis from a papillary thyroid carcinoma in the differential diagnosis of lymph node swelling in the retropharyngeal space should be considered. Simultaneous transoral and transcervical approaches to the metastatic retropharyngeal lymph nodes and the primary differentiated thyroid tumors are feasible and safe.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: The authors were not able to reach the patient for the consent. However, none of the images used in the manuscript can be used to identify the patient.

References

- Wein RO. Management of the locally aggressive thyroid carcinoma. *Am J Otolaryngol* 2005;26:186-92.
- Wada N, Duh QY, Sugino K, et al. Lymph node metastasis from 259 papillary thyroid microcarcinomas: frequency, pattern of occurrence and recurrence, and optimal strategy for neck dissection. *Ann Surg* 2003;237:399-407.
- Lombardi D, Nicolai P, Antonelli AR, et al. Parapharyngeal lymph node metastasis: an unusual presentation of papillary thyroid carcinoma. *Head Neck* 2004;26:190-6.
- Shellenberger T, Fornage B, Ginsberg L, et al. Transoral resection of thyroid cancer metastasis to lateral retropharyngeal nodes. *Head Neck* 2007;29:258-66.
- Aygenç E, Kaymakci M, Karaca C, et al. Papillary thyroid carcinoma metastasis to the parapharyngeal space. *Eur Arch Otorhinolaryngol* 2002;259:322-4.
- Kainuma K, Kitoh R, Yoshimura H, et al. The first report of bilateral retropharyngeal lymph node metastasis from papillary thyroid carcinoma and review of the literature. *Acta Otolaryngol* 2011;131:1341-8.
- Goepfert RP, Liu C, Ryan WR. Trans-oral robotic surgery and surgeon-performed trans-oral ultrasound for intraoperative location and excision of an isolated retropharyngeal lymph node metastasis of papillary thyroid carcinoma. *Am J Otolaryngol* 2015;36:710-4.
- Otsuki N, Nishikawa T, Iwae S, et al. Retropharyngeal node metastasis from papillary thyroid carcinoma. *Head Neck* 2007;29:508-11.
- Le TD, Cohen JI. Transoral approach to removal of the retropharyngeal lymph nodes in well-differentiated thyroid cancer. *Laryngoscope* 2007;117:1155-8.
- Sirotnak JJ, Loree TR, Penetrante R. Papillary carcinoma of the thyroid metastatic to the parapharyngeal space. *Ear Nose Throat J* 1997;76:342-4.
- Horvath M, Plas H, Termote JL, et al. Thyroid-related papillary carcinoma presenting as a cystic lesion in the parapharyngeal space. *Rofo* 1991;155:373-4.
- Ferrario F, Roselli R, Macchi A. Occult thyroid carcinoma presenting as a parapharyngeal mass. *J Laryngol Otol* 1995;109:1204-6.
- DiLeo MD, Baker KB, Deschler DG, et al. Metastatic Papillary Thyroid Carcinoma Presenting as a Retropharyngeal Mass. *Am J Otolaryngol* 1998;19:404-6.
- Fridman M, Savva N, Krasko O, et al. Initial presentation and late results of treatment of post-Chernobyl papillary thyroid carcinoma in children and adolescents of Belarus. *J Clin Endocrinol Metab* 2014;99:2932-41.
- Rouviere H, Tobias MJ. Anatomy of the human lymphatic system: a compendium translated from the original (French). Ann Arbor, Michigan: Edwards Bros. Inc., 1938:318.
- Beierwaltes WH, Nishiyama RH, Thompson NW, et al. Survival time and "cure" in papillary and follicular thyroid carcinoma with distant metastases: statistics following University of Michigan therapy. *J Nucl Med* 1982;23:561-8.
- Bernier MO, Leenhardt L, Hoang C, et al. Survival and therapeutic modalities in patients with bone metastases of differentiated thyroid carcinomas. *J Clin Endocrinol Metab* 2001;86:1568-73.
- Haugen BR, Alexander EK, Bible KC, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid* 2016;26:1-133.

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Table S1 A review of the literature of retropharyngeal and parapharyngeal metastasis from differentiated thyroid cancer

Author	Cases	Age, sex	Presenting symptoms/ how was detected	Physical exam/laryngoscopy	RP or PP	Preoperative workup	Surgical approach; surgery	Identification of RP/PP LN metastasis	Previous/following surgeries, previous RAI Rx of the primary cancer	Stage	Postoperative RAI treatment
Lombardi <i>et al.</i> 2004 (3)	#1	40 M	Swelling of the left tonsil for 2 months	Mild displacement of the left tonsillar fossa and nasopharyngeal wall	PP	CT, MRI left PP mass, hypodense and cystic, FNA: non-diagnostic	Transcervical excision of PP mass	Initial	TT w/o ND 3 weeks after removing RP mass	pT2aN1aM0	Yes
	#2	52 F	Asymptomatic. PP mass detected on physical exam	Soft mass 6 cm between the angle of mandible and ant border of the sternocleidomastoid muscle; endoscopy: displacement of the left pharyngeal wall	PP	CT and MRI PP mass, cystic; frozen sections: PTC	Transcervical excision of PP mass + TT + bilateral SND (levels 2–4, 6)	Concurrent	None	pT4bN1aM0	Yes
Shellenberger <i>et al.</i> 2007 (4)	#1	46 F	Asymptomatic. RP mass detected on CT, had high TG	NA	RP	CT: isolated 2 cm right lateral RPLN	Transoral excision of RPLN	Recurrent	23 months earlier TT + right SND (levels 2–5); RAI Rx 2x	NA	Yes
	#2	36 M	Asymptomatic. PR mass detected on MRI	NA	RP	MRI: left level 5, bilateral paratracheal, superior mediastinal and left RPLN, US-FNA of jugular node: + cancer	Transoral excision of left RPLN + transcervical bilateral neck, paratracheal and mediastinal dissection	Recurrent	13 months earlier TT with CLND and left MRND; 2 nd left ND	NA	No
	#3	56 F	Asymptomatic. RP mass detected on US, had elevated TG	Normal	RP	CT: recurrence in the left lateral neck, bilateral paratracheal, and left RPLN; US-FNA of RPLN: PTC	Transoral excision of the left RPLN + transcervical bilateral paratracheal, superior mediastinal and left neck dissection	Recurrent	18 years earlier TT; two ND; RAI Rx	NA	No
Aygenç <i>et al.</i> 2002 (5)	#1	47 M	Intraoral, painless mass x4 months, snoring and fullness sensation in the throat	Left submucosal mass with marked medial displacement of the tonsillar fossa. No thyroid pathology	PP	MRI: non-vascular neoplasm, no thyroid pathology. Occult primary tumor detected 3 months after surgery: scintigraphy showed: left thyroid nodule; FNA: PTC	Transcervical resection of PP mass	Initial	TT with MRND 3 months after surgery	NA	NA
	#2	13 F	Asymptomatic. PP mass detected on MRI	NA	PP	MRI: multiple lymphadenopathy on right neck and PP mass 3 cm	Transcervical, excision of PP mass + MRND	Recurrent	2 years earlier TT; RIA Rx	NA	NA
Kainuma <i>et al.</i> 2011 (6)	#1	68 M	Asymptomatic. RP mass detected on CT and MRI	Normal	RP	CT and MRI: bilateral RPLN	Transcervical approach: resection of bilateral RPLN + bilateral SND (levels 1–2)	Recurrent	1 year earlier TT + right SND (levels 2–6); left SND (levels 3–4). RAI Rx 3x	pT4N1aM0	Yes
	#2	62 F	Asymptomatic. RP mass detected on CT and MRI	Normal	RP	CT and MRI well-enhanced right cervical LNs and left RPLN	Transcervical approach, resection of left RPLN; left SND (level 1) + right SND (levels 2–5)	Recurrent	27 years earlier subtotal thyroidectomy; TT + right SND (levels 2, 4, 5); left SND (levels 2–3); RAI Rx 6x	NA	Yes
	#3	47 M	Right neck mass for 12 months	No thyroid nodule	RP	US: 15 mm in right thyroid lobe; FNA: susp PTC; CT and MRI: right cervical LN met and left RPLN	Transcervical resection of right RPLN + TT + right MRND (levels 1–6)	Concurrent	None	pT1N1bM0	NA
Goepfert <i>et al.</i> 2015 (7)	1	64 F	Asymptomatic. RP mass detected on MRI, had TG elevation	NA.	RP	US: negative; MRI: isolated 2.6 cm left RP mass, PET-CT: hypermetabolic left RPLN and hypermetabolic lung nodule. CT-guided FNA: positive for PTC	Transoral robotic surgery: excision of left RPLN	Recurrent	2 years earlier TT left CLND and lateral ND; RAI Rx	pT3N1b	Yes
Otsuki <i>et al.</i> 2007 (8)	5	Mean age 63 (40–84) All F	Throat symptoms*, neck pain*, dysphagia*; 2 were asymptomatic	Displacement of the tonsillar fossa, soft palate, and/or nasopharyngeal wall**	RP	PP mass detected on CT or MRI	Transcervical resection of RPLN	Recurrent	Average 174 months (5 months to 30 years) earlier Subtotal or TT + MND**; MND***	NA	Yes (3)**
Le <i>et al.</i> 2007 (9)	6	NA	NA	NA	RP	NA	Transoral resection of metastatic RPLN + concomitant other thyroid surgeries in some cases	4 Recurrent 2 Concurrent	Previous thyroid surgeries are NA; RAI Rx (4 recurrent)	NA	NA
Sirotnak <i>et al.</i> 1997 (10)	1	53 F	Right-sided headaches, temporomandibular joint syndrome	Firm, mobile, submucosal 2 cm x 2 cm mass lateral and superior to the tonsillar fossa	PP	X-ray: calcification in PPS; thyroid scan: cold nodule in the right thyroid lobe	Transoral excision of the mass	Initial	TT + right MND afterwards	NA	No
Horvath <i>et al.</i> 1991 (11)	1	55 F	Sensation of mass in her left throat for 3 years	Elevation of the left oropharyngeal wall	PP	CT left parapharyngeal mass, fluid density with thick wall	unknown approach, excision of mass	Initial	TT afterwards	NA	NA
Ferrario <i>et al.</i> 1995 (12)	1	47 M	Snoring for 3 years	Right tonsil enlargement	PP	MRI 4 cm right tonsil mass; US, CT confirmed the lesion + small right thyroid nodule, R LAD; FNA of mass: PTC	Transcervical excision of PP mass + TT + right ND	Concurrent	None	pT2aN1aM0	Yes
DiLeo <i>et al.</i> 1998 (13)	1	65 M	Severe obstructive sleep apnea	Fullness of the right palate and lateral pharyngeal wall	RP	MRI: RP mass, polysomnography	Transcervical excision	Initial	TT subsequently	NA	Yes
Our case	1	56 F	Obstructive sleep apnea, snoring, dyspnea	Bulging firm mass of posterior pharynx; palpable 2 cm left thyroid nodule	RP	CT 2.1 cm left RP mass, 1.6 cm left thyroid nodule; US: left thyroid nodule 5.4 cm; FNA: PTC	Transoral excision or RPLN + trans-cervical TT + CLND	Concurrent	None	pT4aN1aM0	Yes

RP, retropharyngeal; PP, parapharyngeal; RAI, radioiodine; Rx, treatment; M, male; F, female; CT, computed tomography; MRI, magnetic resonance imaging; FNA, fine needle aspiration; US, ultrasound; TT, total thyroidectomy; ND, neck dissection; PTC, papillary thyroid carcinoma; SND, selective neck dissection; TG, thyroglobulin; RPLN, retropharyngeal lymph node; NA, not available; CLND, central lymph node dissection; MRND, modified radical neck dissection; PET, positron emission tomography; MND, modified neck dissection. *, means 1 out of 5 patients had that symptom; **, 3 out of 5 patients had that sign; ***, 2 out of 5 patients had.