CASE REPORT
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A Case of Cervical Retrotracheal Metastatic Papillary Thyroid Carcinoma Diagnosed by Endobronchial Ultrasonography with Transbronchial Needle Aspiration

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A 61-year-old woman who underwent total thyroidectomy for papillary thyroid carcinoma (PTC) five years previously referred for a cervical retrotracheal mass. The mass had intense fluorodeoxyglucose (FDG) uptake on positron emission tomography-computed tomography (PET-CT), and was thus thought to be malignant. Transcutaneous ultrasonography with fine needle aspiration (FNA) was not feasible, so we tried endobronchial ultrasonography (EBUS) with transbronchial needle aspiration (TBNA) to obtain a cytology specimen. After surgery, the mass was confirmed to be a metastatic lymph node from the previous PTC, confirming the TBNA results. Although the utility of EBUS-TBNA for evaluating mediastinal metastasis has been reported in a number of studies, few reports have addressed its utility in the cervical region. Here we report this unusual case of metastatic lymph node of PTC that recurred in the cervical retrotracheal area. It was found to exhibit esophageal muscular invasion, and was accurately diagnosed on EBUS-TBNA.

Key Words: Papillary thyroid carcinoma, EBUS-TBNA, Metastatic lymph node

Introduction

Cervical lymph node metastases of well-differentiated thyroid carcinoma occur in 30% to 90% of cases, and aerodigestive tract invasion is seen between 7% and 16% of the time.[1)] The tumor invades by direct extension of the primary and by extension of metastatic lymph nodes in the cervical compartment.

Ultrasonography (US) is an excellent tool for evaluation of patients with PTC and metastatic lymph nodes.[2)] Furthermore US is easily combined with fine needle aspiration (FNA), which provides additional histopathologic information. However, it is difficult to access the retrotracheal area using US because of the deep location and surrounding structures. As a result, US-guided FNA of the cervical retrotracheal lymph nodes is not easy. In contrast, endobronchial ultrasonography with transbronchial needle aspiration (EBUS-TBNA) can be useful in diagnosing cervical retrotracheal lymph node metastasis. EBUS-TBNA has recently been introduced and is a rapidly developing diagnostic tool.[3)] It is an accurate technique for the evaluation mediastinal metastatic disease and offers imaging of the airway with parabronchial structures during bronchoscopic procedures.[4,5)] However the role of this procedure in the diagnosis of cervical dis-

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eases is less clear. Herein we report our experiences with EBUS-TBNA as a useful diagnostic tool in accessing the cervical retrotracheal area.

Case Report

A 61-year-old woman was referred for evaluation of a cervical retrotracheal mass. The patient had undergone total thyroidectomy with central compartment neck dissection for bilateral PTC five years previously at another hospital. Paratracheal and pretracheal lymph nodes removed during that surgery were found to contain PTC, therefore the patient underwent radioactive iodine therapy. During a recent follow-up visit the patient was found to have a high level of serum thyroglobulin (Tg). She underwent a PET-CT scan that demonstrated abnormal FDG hypermetabolic activity in a retrotracheal mass at the level of the upper esophageal inlet (Fig. 1A), which suggested the possibility of malignancy. She was subsequently referred to our ENT clinic.

On physical exam, the patient had right vocal cord paralysis, which was assumed to be from her previous operation. Laboratory evaluation showed a stimulated serum Tg level of 14.33 ng/mL. A Contrast-enhanced CT scan showed a 1.4×1 cm sized enhancing mass with central low density in the cervical retrotracheal area. The mass was seen adjacent to the upper esophageal inlet. There were no other associated abnormal findings (Fig. 1B).

US is usually the initial step in evaluation of cervical lymph nodes, but it was impossible to access the lesion in this way. The patient was scheduled for additional evaluations including bronchoscopy and esophagoscopy. Esophagoscopic evaluation revealed no lesion in the upper esophagus and bronchoscopy showed a round protruding mass covered with intact bronchial mucosa at the posterior tracheal wall 2 cm distal to the cricoid cartilage (Fig. 2A).

EBUS-TBNA was conducted under conscious sedation in order to obtain a cytologic specimen. EBUS showed a hypoechoic mass in the posterior wall of the

Fig. 1. PET-CT and CT scan of retrotracheal mass. (A) PET-CT scan showed fluorodeoxyglucose uptake in the retrotracheal mass (arrow). (B) CT scan showed well-circumscribed enhancing mass (white arrow) with central low density adjacent to the esophagus (black arrow). The mass was compressing the trachea anteriorly.

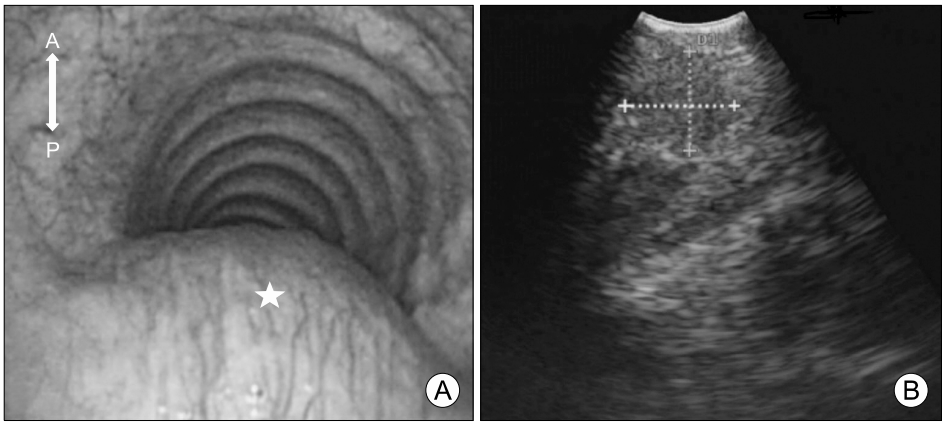

Fig. 2. EBUS images. (A) A large mass (star) was visualized protruding into the posterior trachea wall in endobronchial view (A: anterior, P: posterior). (B) In EBUS image, 1×1 cm retrotracheal mass with a hypoechogenic appearance was seen.

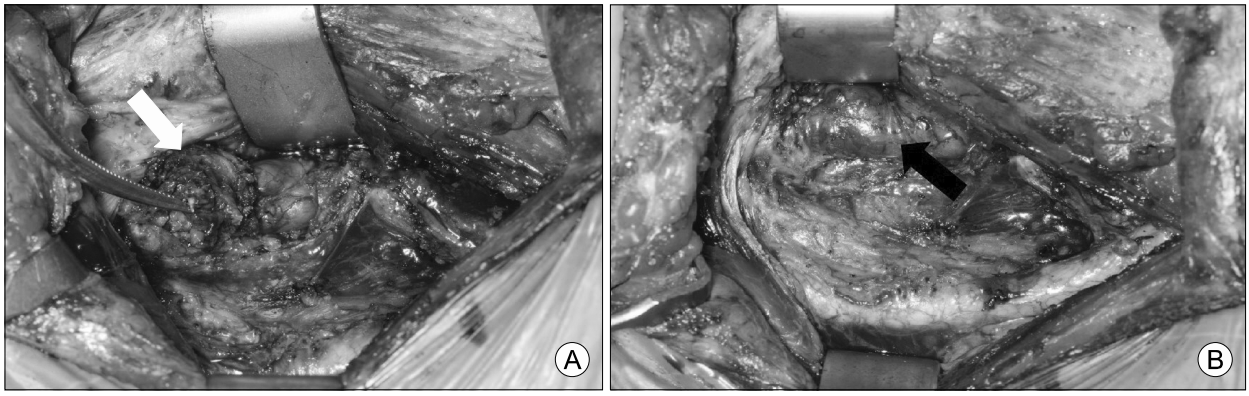

Fig. 3. Intraoperative view. (A) The mass (white arrow) was found to be grossly adherent to the trachea anteriorly and to the esophagus laterally. (B) The inner esophageal mucosa (black arrow) was intact after the mass was removed.

trachea adjacent to the esophagus that looked similar to a metastatic lymph node (Fig. 2B). The cytology report suggested metastatic lymph node (LN). The patient underwent resection of the retrotracheal lymph node. An anterior midline neck incision was made through the previous neck incision line, and a back door procedure, between the medial border of the sternocleidomastoid muscle and lateral to the strap muscle, was performed. The lymph node was found to be grossly adherent to the trachea anteriorly and adherent to the esophagus laterally (Fig. 3). We were able to locate the mass readily because the esophageal feeding tube placement enabled easy identification of the esophagus.

The mass enveloped the recurrent laryngeal nerve near the cricothyroid joint and was unable to be separated from the nerve. The invaded nerve was therefore cut from the mass. Also, the mass was firmly attached to the esophageal muscle. However, there was no definite infiltration in the esophageal inner mucosa. The tracheal wall also remained intact. The tumor was removed together with the tumor-infiltrated esophageal muscular layer, yielding a specimen approximately 2.0×1.7×1.5 cm in size. Remnant paratracheal LNs were also resected. The patient tolerated the procedure well and there were no complications.

Histology showed that the tumor was a metastatic LN of the previously diagnosed PTC. This finding corresponded to our pre-operative diagnosis rendered that was based on EBUS-TBNA. The resected paratracheal LNs were all negative for malignancy.

Discussion

Well-differentiated thyroid carcinoma commonly metastasizes to regional lymph nodes. The ipsilateral central and lateral cervical compartments are the most common sites of nodal involvement.[6,7] Well-differentiated thyroid carcinoma infrequently invades the aerodigestive tract including the trachea, esophagus and endolarynx, with an incidence of less than 4%.[8-10]

US is the primary modality used to examine metastatic cervical lymph nodes and adjacent structures because it enables differentiation between benign and malignant lymph nodes and helps in distinguishing abnormal structures. It is important for the surgeon to know the status and extent of neck node involvement and other specific findings prior to surgery. Therefore preoperative US to assess for central and lateral cervical compartment involvement in patients who presented with thyroid carcinoma is important.

Although US is the gold standard for imaging cervical lymph nodes, it is not useful in detecting abnormalities in the retrotracheal area because the trachea acts as a barrier.

For this reason, biopsy of cervical retrotracheal lymph nodes guided by transcutaneous US is difficult because the retrotracheal area is located deep, bounded anteriorly by the trachea, posteriorly by the spine, and inferiorly by the aortic arch and is surrounded by major structures, such as the thyroid glands, esophagus and great vessels. In this patient, we wanted to evaluate the cervical retrotracheal mass,

but since access was impossible by general transcutaneous US, we used EBUS-TBNA.

EBUS-TBNA is a relatively new and safe method, consisting of a flexible bronchoscope equipped with ultrasonography at the distal end that allows real-time needle aspiration of the target lesion. EBUS was first introduced in 1992 by Hurter,[11] and its utility as a minimally invasive and safe procedure in mediastinal lymph node evaluation has been described in several studies.[4,5] For mediastinal nodes, it has high sensitivity (range, 92.3% to 96.4%) and diagnostic accuracy (range, 97.1% to 98.9%)[12,13] such that it is generally used as a primary diagnostic modality in the diagnosis of mediastinal lymph node metastasis that requires tissue confirmation.[5,14] Furthermore, EBUS-TBNA procedures can be performed in the outpatient setting, under local or conscious anesthesia.[3] It gives real time visual feedback of proper needle placement, enabling biopsy of even small nodes or nodes in difficult locations.[15] Previously, the role of this procedure in the cervical area was not clear, but our case clearly demonstrates the benefit of EBUS in the cervical retrotracheal area. Thus, in the evaluation of a patient with papillary thyroid carcinoma and metastatic adenopathy, EBUS-TBNA is an excellent and safe tool to obtain histological nodal tissue for examination if transcutaneous needle biopsy is not feasible due to the location of the metastatic nodes.

In this patient we encountered esophageal muscular invasion of PTC during surgery. Malignancy was highly considered preoperatively in EBUS-TBNA, and marked invasion of esophagus was also thought to be malignancy during the operation. Therefore, esophageal muscular structures were removed with a sufficient margin. Esophageal invasion of PTC rarely occurs, but the most common route is direct extension from the primary tumor and the second most common route is involvement by tumor-containing paratracheal nodal metastasis. Most cases occur in association with tracheal invasion because involvement of paratracheal lymph nodes can lead to invasion of the esophagus as well as the trachea in the tracheoesophageal groove.[16]

Esophageal invasion of PTC is rare, while intraluminal invasion of PTC into the esophagus is even more so. Most esophageal invasion by PTC involves only the outer muscular layer because of the relative resistance of the esophageal mucosa to invasion.[17] This patient's metastatic lymph node appeared only to have invaded the esophageal muscular structure, and did not involve the esophageal mucosa. Therefore, if surgery is performed in a patient with PTC that has invaded the esophageal musculature, a conservative approach of peeling or shaving excision is recommended.[17,18] This is because the aim of treating locally invasive thyroid carcinoma is to improve local control and preserve the functions of adjacent structures without the morbidity of radical resection.

We have encountered PTC recurrence in the retrotracheal area five years after. It is highly likely that the metastatic paratracheal lymph node in the tracheoesophageal groove grew and subsequently invaded the esophageal muscle. Consequently, this patient presented with cervical retrotracheal mass. Although US is the gold standard for assessing thyroid masses and adjacent lymph nodes, its use was limited in the evaluation of the retrotracheal cervical lymph node in this case because of inability to penetrate the tracheal ring. EBUS-TBNA was a very helpful alternative in obtaining both cytology and US findings. We therefore recommend that EBUS- TBNA be considered as a diagnostic tool when transcutaneous US-FNA is not feasible, such as in cases with involvement of the cervical retrotracheal area.

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