CASE REPORT

Transoral Surgical Approach for Retropharyngeal Node Involvement in I-131-Negative 18-fluoro-2-deoxyglucose Positron Emission Tomography–Positive Recurrent Thyroid Cancer

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ABSTRACT

Transoral pharyngotomy is a viable minimally invasive approach for resection of metastatic thyroid cancer in retropharyngeal lymph nodes in highly select patients. A few authors have already reported on its safe application with excellent outcomes. We herein describe a case where the technique is assisted with the Omniguide CO₂ laser system to safely access and remove a metastatic node in the retropharyngeal space of a 24 year-old Caucasian woman. Furthermore, her disease was I-131-negative and positron emission tomography–positive, demonstrating the technique is still feasible in this dedifferentiated cancer state.

KEYWORDS: Retropharyngeal, thyroid cancer, transoral, lymph node, minimally invasive surgery

Retropharyngeal node involvement by papillary thyroid cancer (PTC) has been previously described. Although uncommon at initial presentation, retropharyngeal involvement appears to be increased in patients with prior neck dissection or extensive regional disease.¹ Conventional open ap-

proaches to disease in this space have historically evolved to allow safe monobloc resection of mucosal squamous cell carcinomas in conjunction with parapharyngeal/retropharyngeal disease. The classic transcervical access has been combined with transparotid and/or transmandibular modifications to

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enhance exposure and augment safety. Nonetheless, these open approaches have considerable associated morbidity such as visible scar, possible cranial neuropathy with resultant motor weakness, and potential problems with jaw healing and/or function. Because PTC metastatic deposits in the retropharyngeal space are frequently well encapsulated and without extranodal infiltration, they may lend themselves to direct transoral delivery by blunt dissection. This transoral pharyngotomy approach to metastatic retropharyngeal nodes has proven successful in select patients with thyroid cancer. Several authors have already reported on the technique and shown it to be safe, rapidly feasible, minimally invasive, and with excellent functional outcomes.²⁻⁴ In this article, we describe a case where the technique is assisted with the Omniguide CO₂ laser system (Omniguide, Cambridge, MA) to safely access and remove a metastatic node in the retropharyngeal space in a 24-year-old Caucasian woman. Furthermore, her disease was I-131-negative, but 18-fluoro-2-deoxyglucose (FDG) positron emission tomography (PET)-positive, implicating dedifferentiated histology and more

aggressive biology further urging definitive surgery. A preoperative magnetic resonance imaging (MRI) scan showed a well-circumscribed retropharyngeal node corresponding to the area of PET-avid disease. Our case illustrates the safe and rapid application of this technique while sparing the patient the morbidity of a classic transcervical approach. In addition, our patient had I-131-negative, but PET-positive disease, illustrating the feasibility of this technique even in this clinical context. Our procedure was assisted with the Omniguide flexible CO₂ delivery system, which facilitated a dry operative field and easy three-dimensional dissection of facial planes for added precision at the skull base, although we do not necessarily mandate Omniguide for this indication.

CASE REPORT

The patient was a 24-year-old Caucasian woman with a history of well-differentiated PTC. She had previously undergone total thyroidectomy and right neck dissection to address metastatic nodal disease.

Figure 1 Positron emission tomography (PET)/computed tomography showing intense PET activity in the right para/retropharyngeal space.

She was also treated with adjuvant I-131 postoperatively. In follow-up, elevated thyroglobulin levels were noted but without associated I-131 uptake. A PET scan showed right-sided retropharyngeal activity at the skull base (Fig. 1). MRI scan correlated a discreet submucosal soft tissue mass to the PET-avid site (Fig. 2A, B). The mass was medial to the internal carotid artery and well circumscribed with no radiographic indication of extranodal extension. MRI scan also demonstrated possible left-sided jugular nodal disease. The right soft tissue mass at the skull base was interrogated with a fine needle biopsy under ultrasound guidance, which confirmed metastatic PTC at this site. Given her young age, expressed concern for aesthetics, associated morbidities of standard open surgery, and favorable anatomy, a transoral approach to her disease was offered and selected by the patient. We also obtained her consent for conversion to an open transcervical approach if and as needed to enhance exposure and safety. General anesthesia was induced, and the patient was intubated nasotracheally through her left nares. She was ventilated with room air to diminish a chance of airway fire. A Crowe-Davis retractor was positioned between the tongue and upper incisor teeth to facilitate access and provide necessary exposure of the pharynx. A soft red rubber

catheter through the right nares allowed for soft palate retraction as needed. The right-sided mass presented with a subtle fullness in the area immediately posterior and superior to the right tonsil and was nonpulsatile on finger palpation. A standard tonsillectomy was performed first to allow easier access and exposure.

The posterolateral pharyngeal mucosa was incised down to the constrictor muscle. Using the super pulse setting on 10 W, the superior constrictor muscle was carefully dissected with the CO₂ laser-equipped dissector hand piece. We found the CO₂ laser allowed precision in cutting and coagulation of tissues down to the capsule of the mass in the retropharyngeal skull base. Gentle blunt dissection allowed for capsular separation from the investing fascia until the carotid artery was identified deep to the mass. Using careful peanut dissection, a plane was created between the mass and the carotid artery. This technique allowed mobilization of the mass along its deep aspect. A curved Allis clamp was placed on the mass to allow medial traction for optimal retraction and separation from the carotid artery (Fig. 3A to E). Remaining attachments were released using a right-angle dissector, guarded bipolar cautery, and tenotomy scissors. The right retropharyngeal mass was freed and delivered transorally in less

Figure 2 (A, B) Magnetic resonance imaging scan axial and coronal views showing enhancing discreet mass in the lateral retropharyngeal space and medial to the carotid artery.

Figure 3 (A) Tumor in situ deep to the pharyngeal constrictor muscle. (B) The muscle reflected laterally to expose further. (C) The medial aspect of the mass dissected free. (D) The lateral aspect of the mass in close relation to the carotid artery. (E) The lateral aspect of the mass dissected off the carotid fascia.

than 30 minutes (Fig. 4). Blood loss was negligible. The wound was irrigated with antibiotic-impregnated solution and hemostasis confirmed. The incision was closed with simple interrupted 3-0 vicryl suture. An uncomplicated selective left neck dissection of levels II to V was subsequently completed by

extending the prior total thyroidectomy and right neck dissection scar, allowing for a symmetric low-collared well-concealed scar. The patient's blood loss was estimated to be less than 100 mL for the entire operative period. The patient was successfully reversed from anesthesia and extubated.

Figure 4 Excised mass.

Postoperatively, the patient recovered without any complications and was discharged on postoperative day 3, which is a typical length of hospital stay following neck dissection at our hospital. She had typical post-tonsillectomy-type pharyngeal discomfort. Her diet was advanced to a soft diet prior to discharge home. During her first postoperative follow-up visit, she had a favorable low cervical scar, healing pharynx, with no sign of trismus, neuropathy, or infection. Final pathology confirmed metastatic PTC in the excised right retropharyngeal node measuring 3.3 cm in size with no extracapsular extension (Fig. 5). None of the 50 lymph nodes

Figure 5 Hematoxylin and eosin–stained tumor at 40 $\times$. Neoplastic papillae are lined by multiple layers of large ovoid cells. The cells display the characteristic cytological features of papillary carcinoma, with clear or Orphan Annie–eyed nuclei, and occasional grooves.

removed from the left neck harbored metastatic disease. The tonsillar specimen showed benign follicular lymphoid hyperplasia.

DISCUSSION

Here we present a successful transoral approach to retropharyngeal metastasis in PTC. Several authors have safely performed similar surgeries.^{2–4} Shellenberger et al reported the MD Anderson Cancer Center experience with this technique in three consecutive patients over 3 years.² Le and Cohen report their surgical technique applied to six patients over an 8-year period at Oregon Health and Science University.³ Laccourreye et al report on a single case abroad.⁴ As retropharyngeal nodal metastasis is commonly associated with recurrent disease in the setting of prior neck dissection, it is important to consider this possibility during patient follow-up visits. Otsuki et al reported on five patients with metastatic retropharyngeal node involvement of thyroid papillary carcinoma and suggested that neck dissection and/or metastatic cervical lymph nodes might alter the direction of lymphatic drainage to the retrograde fashion, resulting in the unusual metastasis to the retropharyngeal lymph nodes.¹

An elevated thyroglobulin level after total thyroidectomy for differentiated thyroid cancer is often associated with disease recurrence. One dilemma facing clinicians treating patients with thyroid cancer is the evaluation of post-thyroidectomy patients with rising serum thyroglobulin levels and indeterminate neck ultrasonography. I-131 scan and cross-sectional imaging are commonly used to localize occult metastases in these patients.⁵ Localizing disease when I-131 scan is negative and/or cross-sectional imaging is equivocal remains challenging and may delay treatment. Moreover, loss of iodine concentrating ability has been shown to be associated with more aggressive histology and worse prognosis.⁶ FDG-PET may facilitate detection of I-131 nonavid recurrent disease and is an invaluable

complementary diagnostic tool in this context.⁷⁻⁹ The patient at the center of this discussion provides such an example to the added positive predictive value of PET with an I-131-negative scan when recurrent disease is suspected.

Select patients with well-defined lesions involving the retropharyngeal nodes may benefit from a transoral surgical approach. The transoral approach provides a limited field of access and as such is inappropriate for larger, ill-defined, and/or vascular tumors. Extensive and potentially life-threatening hemorrhage with poor control is perhaps the greatest potential risk of this minimally invasive strategy. Patients require careful preoperative radiographic evaluation for appropriate selection. A detailed preoperative discussion should always include the potential need for immediate conversion to a standard transcervical approach for the safe execution of the operation, and this must be included in the informed consent. Attention to the structures and careful control of bleeding for optimal exposure are essential to the success of this procedure. Preoperative sonography and intraoperative navigation has been used by some authors to enhance safety.

This case demonstrates the successful application of this minimally invasive technique to eradicate I-131-negative, PET-positive recurrence detected in the right retropharyngeal space in a carefully selected young woman, avoiding the standard transcervical approach in a previously dissected field with added risks. Her left neck dissection was completed through a symmetrical extension of her old total thyroidectomy, right neck dissection scar with overall favorable oncologic, functional, and esthetic outcomes. Awareness of the technique to access retropharyngeal lymph

nodes in carefully selected patients is important. This case may be the first to report safe application to eradicate I-131-negative, PET-positive metastatic disease in this space.

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