Transoral Carbon Dioxide Laser Excision of an Ectopic Parathyroid Adenoma from the Hypopharynx

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Introduction

The embryology of the parathyroid glands has been well described. The superior parathyroid glands develop from the fourth branchial pouch and descend with the lateral thyroid gland. The inferior parathyroid glands develop from the third branchial pouch along with the thymus. The superior parathyroid gland is typically more consistent in its final location adjacent to the thyroid gland near the cricothyroid joint. Parathyroid tissue has been found at the pyriform sinus in laryngectomy specimens and in a patient with globus.1,2 An undescended parathyroid adenoma located along the pharyngeal wall is a rare finding and presents a source of operative failure.3,4 We describe a case of primary hyperparathyroidism due to a parathyroid adenoma located submucosally in the pyriform sinus that was successfully treated by transoral excision using a flexible fiber carbon dioxide laser. This case met exemption criteria by the University of South Florida Institutional Review Board.

Case Presentation

A 40-year-old male presented with primary hyperparathyroidism with elevated preoperative calcium and intact parathyroid hormone levels. He then underwent unsuccessful neck exploration for what appeared to be an undescended hyperactive parathyroid gland on Tc99m sestamibi scan. Intraoperative nuclear mapping was used but was not helpful in localizing the adenoma. Follow-up single-photon emission computed tomography/computed tomography (SPECT/CT) located the tumor in the right pyriform sinus (Figure 1). He was then referred to our institution for further management. Indirect laryngoscopy showed a bulge in the right pyriform sinus corresponding to the imaging finding (Figure 2).

On return to the operating room, direct laryngoscopy confirmed a submucosal bulge at the apex of the right pyriform sinus. The patient was then placed into suspension and an operating microscope was used for enhanced visualization. A flexible carbon dioxide fiber laser (OmniGuide, Inc, Cambridge, Massachusetts) was used to incise the mucosa
of the pyriform apex revealing the mass. After removal of the 1.4 cm mass with the laser, the mucosa was reapproximated endoscopically with simple interrupted 3-0 synthetic absorbable polyglactin 910 sutures. Frozen section analysis and final pathology confirmed parathyroid adenoma. Postoperative parathyroid hormone levels returned to normal. After observation in the hospital indicated no sign of pharyngeal perforation, the patient was discharged home on postoperative day 2. The remainder of his recovery was uneventful.

Discussion

Ectopic parathyroid gland adenomas impose diagnostic and surgical challenges and are a source of failed neck exploration and repeat operations for primary hyperparathyroidism. Undescended glands must be considered when an adenoma is not found in its typical ectopic locations. They also represent a surgical challenge because they may not be amenable to removal through a standard low cervical incision site. The alternative would be to make a separate incision higher in the neck. The pyriform sinus is an exceedingly rare location for an ectopic parathyroid gland. Thus, only a handful of cases have been reported to date. A prior case of an undescended parathyroid adenoma excised using an endoscopic laser technique was described in 1988 by Stojadinovic et al.\textsuperscript{5} We also successfully excised an ectopic parathyroid adenoma with transoral carbon dioxide laser from the pyriform sinus. We agree that a transcervical approach would be difficult secondary to the extent of dissection that would be required.

Reoperative cases benefit from preoperative localization studies. There are various methods of scintigraphy. Planar images are the simplest and represent a 2-dimensional image of radiotracer activity. SPECT is a useful tool to localize parathyroid adenomas in that it provides 3-dimensional information. SPECT/CT adds the anatomic information of the CT scan to more accurately characterize and localize the adenoma. Also, Tc99m nuclear mapping may be used. This technique is based on a preoperative injection of the radiotracer to assist in intraoperative detection of the radiotracer that has accumulated in the ectopic gland. This case demonstrates the utility of SPECT/CT imaging in difficult parathyroid cases with ectopic glands. The localization information obtained allowed for transoral resection of the adenoma with the aid of the carbon dioxide fiber laser, avoiding a second and potentially morbid open neck exploration.

In conclusion, ectopic parathyroid adenomas often increase the duration of surgical exploration and can be a source of operative failure. In such cases, it may be possible to localize the rare case of ectopic parathyroid tissue adjacent to the pharyngeal mucosa with preoperative SPECT/CT and direct or indirect laryngoscopy.

Author Contributions

Ryan S. Jackson, conception, design, acquisition, analysis, and interpretation of data; drafting the article and revising it critically for important intellectual content; final approval of the version to be published. James T. May IV, conception, design, acquisition, analysis, and interpretation of data; drafting the article and revising it critically for important intellectual content; final approval of the version to be published. James Norman, conception and design, revising article critically for important intellectual content, final approval of the version to be published. Tapan A. Padhya, conception and design, revising article critically for important intellectual content, final approval of the version to be published.

Disclosures

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