A fluorodeoxyglucose avid mediastinal parathyroid adenoma masquerading as metastatic bladder cancer

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Received 6 March 2012; received in revised form 12 April 2012; accepted 19 April 2012

Abstract

A 64-year old male with a prior medical history of bladder transitional cell carcinoma treated with a cystoprostatectomy and adjuvant platinum-based chemotherapy 10 years earlier underwent a surveillance positron emission tomography (PET) scan that revealed a metabolically active 2-cm nodule in the superior mediastinum, anterior to the origin of the innominate artery. The lesion was removed due to concerns of metastatic disease using a cervical mediastinoscope. Final pathology revealed an ectopic mediastinal parathyroid adenoma. The combination of the rare presentation, uncommon surgical approach and pathology makes this case unique.

Keywords: Parathyroid adenoma • Ectopic • Cervical mediastinoscopy

INTRODUCTION

The use of positron emission tomography (PET) scanning for the detection and localization of hyper-functioning parathyroid adenomas is not widely practised. Cervical mediastinoscopy has been reported in the resection of hyper-functioning parathyroid adenomas, but its role in the removing mediastinal parathyroid adenomas anterior to the arch vessels is not commonly described. We present the case of an asymptomatic 64-year old male who underwent the resection of an ectopic anterior mediastinal parathyroid gland using the cervical mediastinoscope. The combination of all of these relatively rare occurrences makes this case report unique.

CASE

The patient is a 64-year old male who had undergone a cystoprostatectomy 10 years earlier for transitional cell carcinoma of the bladder. At the time of this resection, he had known stage IV disease due to metastatic involvement of the prostate, liver and pelvis. He underwent adjuvant platinum-based chemotherapy and eventually was thought to have a stable disease. He recently underwent an 18F-fluorodeoxyglucose (FDG) PET scan as part of his surveillance, which demonstrated a 2-cm metabolically active nodule in the superior mediastinum, anterior to the origin of the innominate artery (Fig. 1).

From a symptomatic standpoint, he provided a history of neo-bladder calculi 2 years earlier. Stones were composed of magnesium ammonium phosphate and calcium apatite. He denied any additional renal, gastrointestinal, musculoskeletal, psychiatric or endocrine symptoms. He appeared mildly cachectic, but his physical examination was otherwise unremarkable. His serum laboratory values demonstrated mild hyper-calcemia with serum calcium of 10.6 mg/dl (8.4–10.2 mg/dl) and a phosphate of 2.4 mg/dl (2.6–4.5 mg/dl). No serum parathyroid hormone level was obtained.

The excision of his presumed metastasis was approached using the cervical mediastinoscope. Following the identification of the strap muscles, the superior mediastinum was entered using blunt dissection, maintaining a course anterior to the innominate artery and vein. This area was then entered with the cervical mediastinoscope to a shallow depth. A dark blue-grey mass that grossly resembled an intact lymph node was mobilized with blunt dissection. Careful attention was made to avoiding injuring the innominate vessels and maintaining an intact capsule of the presumed lymph node. The patient had no postoperative issues and was discharged home the same day. Pathologic review revealed that the presumed lymph node was, in fact, a 2.0 × 1.5 × 0.5-cm parathyroid adenoma with normal central parathyroid tissue and mild nuclear atypia at periphery (Fig. 1).

Since his operation, his residual parathyroid glands have maintained calcium homeostasis. Laboratory values at 6 months revealed a total calcium level of 8.7 mg/dl (8.5–10.5 mg/dl), ionized calcium level of 5.1 mg/dl (4.8–5.4 mg/dl), intact parathyroid hormone level of 74.8 pg/ml (8.7–77.1 pg/ml) and spot urinary calcium of 3.6 mg/dl. He did not report any symptoms of hyper-calcemia or hypo-calcemia. Prior to his delayed follow-up, he developed nephrolithiasis, but these renal stones were 100% bile acid and not consistent with hyper-parathyroidism. In retrospect, we hypothesized that he was mildly symptomatic prior to
his parathyroid adenoma removal, and that his PET scan avidity was likely secondary to the peripheral atypia noted on pathology.

DISCUSSION

Ectopic parathyroid adenomas are identified in ~4–20% of patients with primary hyper-parathyroidism [1]. The incidence of ectopic mediastinal parathyroid glands that require surgical resection is reported to be up to 30% [1]. In the mediastinum, 60–80% of ectopic parathyroid adenomas are found to reside in the thymus or anterior mediastinum, while the remaining 40–20% are located in the middle and posterior mediastinum in variable proportions [1].

A similar case of an incidental ectopic mediastinal parathyroid adenoma has been reported by Iyer et al. [2]. In their report, they presented a 64-year old woman with a mediastinal mass on staging computed tomography (CT) for malignant melanoma with bilateral renal calculi and mild hyper-calcemia. Histopathology upon excision of the mediastinal mass confirmed a parathyroid adenoma. Their patient was different from the patient presented in our report in that, a PET scan and cervical mediastinoscopy was not utilized.

Preoperative localization of parathyroid adenomas is critically important to the surgical management of ectopic mediastinal parathyroid glands. Several diagnostic localization methods exist and range from ultrasound, magnetic resonance imaging, CT, sestamibi scanning and PET scanning in the preoperative setting and gamma probe and intraoperative parathyroid hormone assays intraoperatively [1, 3]. The role of PET scans in identifying malignant disease is well established, but its use in the localization of ectopic mediastinal parathyroid adenomas has yet to be widely utilized [4]. For parathyroid adenomas and hyper-plasia, the use of $^{11}$C-methionine PET has been described. However, it is mostly recommended in cases of recurrent primary hyper-parathyroidism, and secondary or tertiary hyper-parathyroidism, if ultrasound and other conventional imaging modalities are inconclusive or negative [3].

Similar to our minimally invasive approach, Sukumar et al. described three patients who underwent successful video-assisted thoracic resection of paratrachea and aortopulmonary window adenomas and enlarged lymph node. They concluded that video-assisted thoracic surgery provided an excellent visualization of middle and posterior mediastinum while avoiding morbidity of a thoracotomy [5]. Video-assisted cervical mediastinoscopy have also been described in the removal of the ectopic mediastinal parathyroid gland [2]. However, the approach used in this case is different because the mediastinoscope was passed anterior to the innominate artery and vein. This approach is similar, but certainly less involved compared with a transcervical-extended mediastinal lymphadenectomy or an extended cervical mediastinoscopy, but on the right side. Another aspect distinguishing this approach from the aforementioned approaches was that a course anterior to the innominate vein rather than immediately anterior to the artery was maintained throughout the operation. This course anterior to all of the vessels facilitated the excision and reduced risk of vascular injury.

Each major component of this case report: (i) the identification of a parathyroid adenoma by PET scan in the context of a prior history of malignancy and (ii) the modified use of cervical mediastinoscopy to retrieve the lesion are all relatively rare individual features to the presentation of ectopic mediastinal parathyroid gland. Even in patients with a history of malignancy, the finding of hyper-calcemia, particularly in the absence of bony metastasis, may warrant a work up to assess for primary hyper-parathyroidism. The combined management of patients with ectopic parathyroid adenomas by thoracic and endocrine surgeons may lead to better overall care and to the institution of innovative minimally invasive techniques in the surgical care of these difficult cases.

Conflict of interest: none declared.

REFERENCES