

Mediastinal parathyroid adenoma: a case report

C. DI COSIMO, A. METERE, C. CHIESA, G. DI ROCCO, F. TRULLI*, A. PACIARONI*, S. BATTAGLIA*, A. REDLER, G. FIERRO**, L. GIACOMELLI

Department of Surgical Sciences, "Sapienza" University, Rome (Italy)

*Department of Clinical Sciences, "Sapienza" University, Rome (Italy)

**Department of Cardiovascular, Respiratory, Nephrological and Geriatric Sciences, "Sapienza" University, Rome (Italy)

Abstract. – Ectopic parathyroid adenomas represent a diagnostic challenge, since they are quite rare in clinical practice. We present a case of a 61 years old man with symptomatic hypercalcemia due to an ectopic parathyroid adenoma in the upper-anterior mediastinum that was not localized by the scintigraphy. Ultrasonography identified a nodule on the left upper-superior lobe of the thyroid gland, consistent with a parathyroid adenoma; scintigraphy showed two focuses of abnormal tracer uptake, one on the left upper-superior lobe of the gland and the other on the right inferior lobe of the gland. Patient underwent surgery to remove the adenoma on the left side, but postoperatively PTH and serum calcium level were still elevated. CT scan showed a mass of 27 x 22 mm in the upper anterior mediastinum, in front of the right emissoma of D2. The final surgery allowed us to remove the adenoma with a laterocervical approach. The histopathology was consistent with parathyroid adenoma.

Key Words:

Ectopic parathyroid adenoma, Mediastinum, Hypercalcemia.

Introduction

Primary hyperparathyroidism is commonly caused by either a parathyroid adenoma or parathyroid hyperplasia. The embryological origin of parathyroid glands is the endoderm of the third and fourth pharyngeal pouches. From there, these glands migrate to their usual position behind the thyroid gland. It is well known that parathyroid glands can be found in aberrant locations, mainly in the thyroid parenchyma or in the mediastinum¹. Ectopic locations are related to the migratory pathways of embryologic parathyroid

tissue to the adult positions. Primary hyperparathyroidism due to ectopic parathyroid adenomas can pose diagnostic and management challenges, especially when imaging studies have localized lesions to different sites²; localization is highly important to guide surgery, and to reduce morbidity and rate of recurrent hyperparathyroidism³. The presence of ectopic lesions should be evaluated based on an understanding of the developmental mechanisms of parathyroid glands and the frequency with which ectopic lesions have been found in specific locations. Some accurate preoperative imaging studies, even if expensive, are recommended in order to minimize the frequency with which ectopic lesions are missed during clinical care and maximize their accurate localization^{4,5}.

Presentation of the Case

We present the case of a 61 years old male patient who, during a Day Hospital for chronic alcohol abuse, presented hypercalcemia. The patient has history of hypertension, COPD, ischemic heart disease, partial hearing loss and hepatic steatosis. He had intact PTH of 206.7 pg/mL with hypercalcemia (14 mg/dL) and hypercalciuria; thyroid hormones were normal. Neck US showed a normal thyroid gland and a mass on the left superior lobe (4.6 x 3.4 mm pattern II). A technetium-99m pertechnetate methoxy-isobutyl-isonitrite (^{99m}Tc MIBI) scan revealed two focus of abnormal tracer uptake in the superior left lobe and inferior right lobe of the thyroid gland. An additional US of the right thyroid lobe didn't confirm the double localization. Spinal radiographs with vertebral morphometry measurements showed that D6, D7 and D8 were wedge-shaped. He was diagnosed with primary hyperparathyroidism.

Treatment

The patient underwent monolateral cervical exploration to remove the left adenoma. It proved to be a lymph node, histologically normal. His post-operative PTH and ionized serum calcium remained elevated. The patient underwent CT that showed a mass in the upper-anterior mediastinum (27 × 22 mm) below the right lobe of the thyroid gland, in front of D2 (Figure 1); the mass showed contrast uptake and was fluid with an intralesional solid part. He underwent a second surgery, with lateral cervicotomic approach (Figure 2); the mass was removed (Figure 3) and the histological evaluation confirmed the diagnosis of parathyroid adenoma, described the invasiveness of the mass toward the fibrous capsule and the presence of parathyroid cells in the paratumoral tissue. An additional histological examination confirmed the presence of a thick fibrous capsule surrounding the tumor, the capsule was infiltrated. Patient presented tracheitis and dysphagia due to the two surgeries that had occurred both within a month; we suggested the use of inhalatory steroids instead of oral administration, as it is well known that the inhalatory steroids are not able to modify the concentrations of the endogenous corticosteroids, androgens and of their metabolites, with respect to steroids orally administered⁶. At the last follow-up, the patient resulted free of all symptoms and PTH and ionized serum calcium has remained normal within the observation period.

Discussion

The peculiarity of the case is in the fact that imaging (scintigraphy and US) were not consistent in the precise preoperative localization and



Figure 2. Lateral cervicotomic approach to remove the mass.

that only CT scan after the first surgery showed it. If there are two dissenting exams it is appropriate to use a superior technique to avoid reoperations. Imaging is mandatory before reoperation, and scintigraphy results should be confirmed with a second imaging technique (usually US for a neck focus, CT or MRI for a mediastinal focus)⁷⁻⁸. We experienced a case of hyperparathyroidism in which both the scintigraphy and the US indicated the wrong localization of the adenoma, leading to a first neck exploration that was inconclusive. CT scan finally allowed us to locate the mass and to have it removed through a lateral approach; surgery was performed in the Thoracic Surgery Department. It is important to consider the possibility of an additional localization of the adenoma in order to achieve the right diagnosis and avoid inappropriate treatments⁹. This case emphasizes the fact that sometimes further preoperative imaging screening, even if more expensive, are necessary to avoid surgical mistakes, as in other diseases¹⁰.



Figure 1. CT scan showing the mass in front of D2.

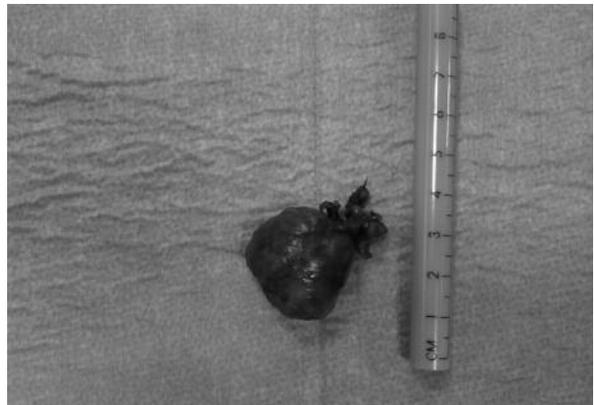


Figure 3. The mass removed during the second surgery.

References

- 1) OKUDA I, NAKAJIMA Y, MIURA D, MARUNO H, KOHNO T, HIRATA K. Diagnostic localization of ectopic parathyroid lesions: developmental consideration. *Jpn J Radiol* 2010; 28: 707-713.
- 2) MARZOUKI HZ, CHAVANNES M, TAMILIA M, HIER MP, BLACK MJ, LEVENTAL M, PAYNE RJ. Location of parathyroid adenomas: 7-year experience. *J Otolaryngol Head Neck Surg* 2010; 39: 551-554.
- 3) ZERIZER I, PARSĀI A, WIN Z, AL-NAHHAS A. Anatomical and functional localization of ectopic parathyroid adenomas: 6-year institutional experience. *Nucl Med Commun* 2011; 32: 496-502.
- 4) TARDIN L, PRATS E, ANDRÉS A, RAZOLA P, DEUS J, GASTAMINZA R, SANTAPAU A, PARRA A, BANZO J. Ectopic parathyroid adenoma: Scintigraphic detection and radioguided surgery. *Rev Esp Med Nucl* 2011; 30: 19-23.
- 5) CHE KADIR S, MUSTAFFA BE, GHAZALI Z, HASAN Z, IMISAIRI AH, MUSTAFA S. Mediastinal parathyroid adenoma: diagnostic and management challenges. *Singapore Med J* 2011; 52: e70-74.
- 6) MAZZARINO M, ROSSI F, GIACOMELLI L, BOTRÈ F. Effect of the systemic versus inhalatory administration of synthetic glucocorticoids on the urinary steroid profile as studied by gas chromatography-mass spectrometry. *Anal Chim Acta* 2006; 55: 30-36.
- 7) POWELL AC, ALEXANDER HR, CHANG R, MARX SJ, SKARULIS M, PINGPANK JF, BARTLETT DL, HUGHES M, WEINSTEIN LS, SIMONDS WF, COLLINS MF, SHAWKER T, CHEN CC, REYNOLDS J, COCHRAN C, STEINBERG SM, LIBUTTI SK. Reoperation for parathyroid adenoma: a contemporary experience. *Surgery* 2009; 146: 1144-1155.
- 8) HINDIÉ E, UGUR O, FUSTER D, O'DOHERTY M, GRASSETTO G, UREÑA P, KETTLE A, GULEC SA, PONS F, RUBELLO D; PARATHYROID TASK GROUP OF THE EANM. 2009 EANM parathyroid guidelines. *Eur J Nucl Med Mol Imaging* 2009; 36: 1201-1216.
- 9) Cakmak H, Tokat AO, Karasu S, Özkan M. Giant mediastinal parathyroid adenoma. *Tuberk Toraks* 2011; 59: 263-265.
- 10) PEDICONI F, CATALANO C, VENDITTI F, ERCOLANI M, CAROTENUTO L, PADULA S, MORICONI E, ROSELLI A, GIACOMELLI L, KIRCHIN MA, PASSARIELLO R. Color-Coded automated signal intensity curves for detection and characterization of breast lesion. *Investigative Radiology* 2005; 40: 448-457.