Online publication ahead of print, AJMHS Vol 56, 2021

Recurrent Primary Hyperparathyroidism – A Case Report
The Importance of Examination Before and During Surgery

Adela Haxhiraj*, Besa Hyka, Helena Drabo, Ina Kollozi, Sara Zavalani, Violeta Hoxha

[1] Department of Endocrinology, University Hospital Centre "Mother Teresa", Tirana, Albania

Abstract

Background: Primary hyperparathyroidism, in 85% of the cases generates from solitary parathyroid adenoma. The selected treatment is surgery on the gland after imaging evaluation (scintigraphy with Sestamibi). But in about 11% of cases hyperstimulation is noticed by more than one adenoma and imaging examination which reaches a sensitivity of 75% and specificity of 78% in the case of solitary adenomas, fails to assess the full involvement of all glands noticing only the dominant nodule.

Case report: The case we present is that of a man, 51 years old who presents with complaints of muscle pain and physical weakness. During laboratory tests results hypercalcemia and PTH 197 pg/ml (8 – 76). On additional examinations hyperfixation is observed on the right upper parathyroid on scintigraphy with Sestamibi. Based on these data, the patient underwent right parathyroidectomy. Postoperative biopsy confirms the diagnosis of parathyroid adenoma. The patient continues treatment with Calcium to avoid transient postoperative hypoparathyroidism. Three months after the surgery, during the follow-up, there is an increase of the level of PTH (71.54 pg / ml for a normal range of 15 - 65 pg / ml) after an initial post-op decrease. The patient continues to be in follow up to assess the origin of recurrent hyperparathyroidism leaving open the possibility of multiple adenomas.

Conclusion: Preoperative evaluation for the initial localization of the lesion is a necessary

Address for correspondence: Adela Haxhiraj*, Department of Endocrinology, University Hospital Centre "Mother Teresa", Tirana, Albania. E-mail: adelahaxhiraj@gmail.com

diagnostic step but not the final one in identifying the entire disease. For a successful and long-term treatment, is advised an intraoperative evaluation and regular postoperative follow-ups of the patient.

Keywords: primary hyperparathyroidism, recurrence, PTH, scintigraphy, parathyroidectomy

INTRODUCTION

Primary hyperparathyroidism is a slow-growing but high-risk endocrine pathology resulting in multiple organ damage, mainly the kidneys and bones. It is mostly characterized by increased levels of Parathormone (PTH) and hypercalcemia, but there are non-classical forms of the disease where biochemical parameters vary and as a result its diagnosis becomes more difficult and the risk of complications increases (1).

Over 80% of primary hyperparathyroidism comes from parathyroid gland adenomas. The incidence is highest in the fifth and sixth decade of life. Women are three times more at risk than men. There are two rare forms such as glandular hyperplasia, parathyroid carcinoma or ectopic PTH which make up a smaller percentage.

The treatment of choice in parathyroid nodular pathologies is surgical removal of the gland after imaging evaluation (ultrasound, scanner or magnetic resonance and 99Tc-Sestamibi scintigraphy). But in about 11% of cases the hyperstimulation is noticed by more than one adenoma and the imaging fails to assess the full involvement of all glands noticing only the dominant nodule (2,3).

Therefore, intraoperative assessment of PTH levels is recommended to localize the in-situ lesion and depending on this, the most appropriate surgical method is then selected. In the case of solitary or multiple adenomas, minimally invasive parathyroidectomy (MIP) is preferred under local anaesthesia with intraoperative monitoring of PTH before and after the removal of the parathyroid gland. If within 2-10 min of the removal of the gland, the PTH level falls more than 50% of the normal range, the removal of adenoma is considered safe. If the PTH level does not decrease more than 50% and / or remains above normal, the surgery is continued and if necessary, a full neck examination is performed to look for other over productive glands (4).

Post-operative recurrences can occur in up to 5% of patients over a 10-year period (5).

Through intraoperative assessment methods, the probability of a successful intervention increases and the risk for pathological residual tissue and recurrent hyperparathyroidism decreases. The case that we present is that of a patient intervened for parathyroid adenoma and for a short postoperative period, the biological levels of the parathyroid turn out to be altered, suggesting for recurrence of the pathology.

CASE REPORT

The patient, male 51 years old, presented to the physician with complaints: muscle pain and physical weakness. Objectively the patient's condition was good. No pathological data. The neck was free, without pathology of thyroid and parathyroid glands. The patient underwent laboratory examinations. Everything resulted within normal range, except by high level of total calcaemic blood level (over 10mg/dl). Based on hypercalcemia, the patient was checked for levels of vitamin D3 and PTH. The hormone of the

parathyroid glands was 197 pg/ml, for a normal range of 8 - 76 pg / ml. Neck ultrasound revealed a suspicious formation in the upper pole of the right thyroid lobe. For this reason, the patient performed scintigraphy with Sestamibi. The examination revealed hyperfixation in the right upper parathyroid, suggestive for parathyroid adenoma (Figure 1).

Osteoporosis was observed in bone densitometry (Figure 2).

Meanwhile, the patient also performed Magnetic Resonance Imaging of the neck with intravenous contrast where a hyperintense nodule is described in T2 near the thyroid isthmus, measuring 12x11 mm. Based on these data, the patient underwent right parathyroidectomy. Postoperative biopsy confirmed the diagnosis of parathyroid adenoma. The patient was treated with Calcium and vitamin D3 to avoid transient postoperative hypoparathyroidism. The last inpatient PTH was

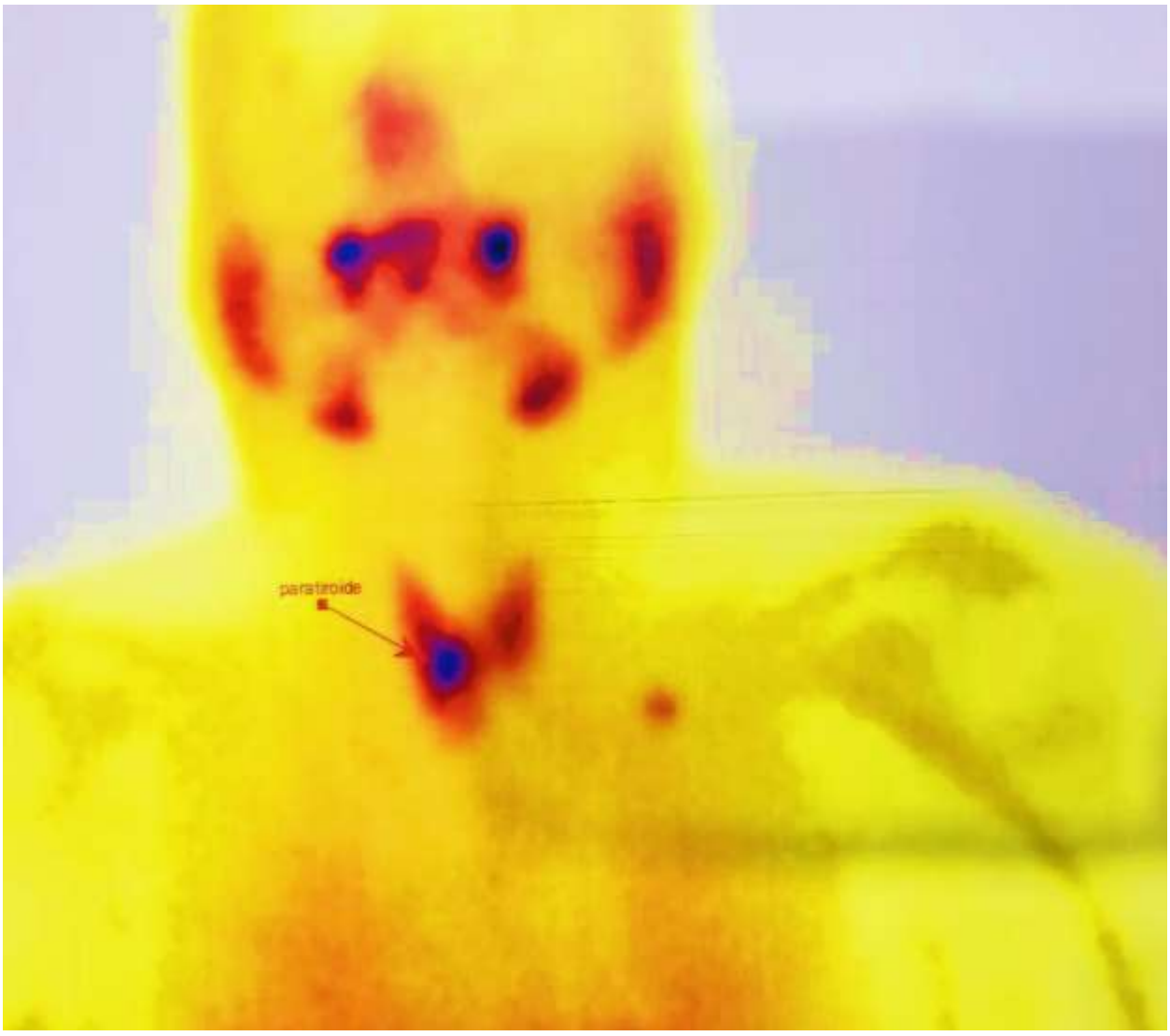

Figure 1. Scintigraphy with Sestamib

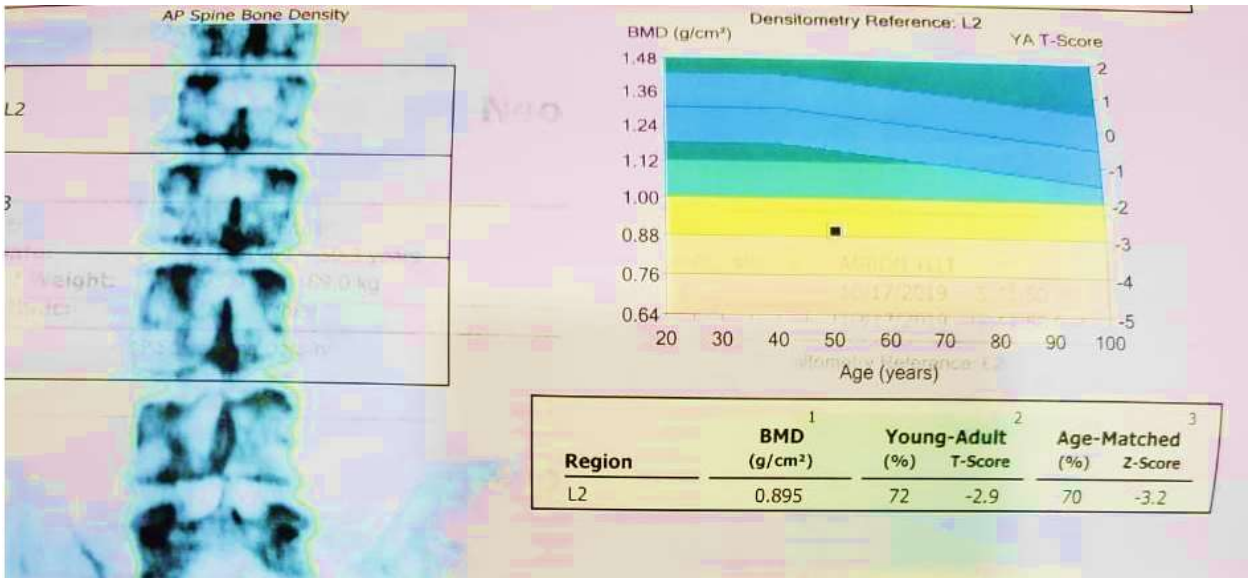

Figure 2. Bone densitometry

3.62 pg / ml. Three months after the intervention, in the next follow up, there was an increase of PTH (71.54 pg / ml for a normal range of 15 - 65 pg / ml) after an initial decrease post-op, calcemia (total and ionized) at the upper limit of range and phosphorus to the minimum range, as presented in the table below.

Table 1. Laboratory findings 3 months after intervention

	Values	**Normal Range**
Total Calcium	9.96 mg/dl	8.6-10 mg/dl
Ionised Calcium	1.25 mg/dl	1.13-1.32 mg/dl
Phosphorus	3.1 mg/dl	2.6-4.5 mg/dl
Vitamin D3	19.9 ng/ml	30-70 ng/ml
PTH	71.54 pg/ml	15-65 pg/ml

Clinically the patient was calm, with no subjective concerns. He continues to be in follow up to assess the origin of recurrent hyperparathyroidism leaving open the possibility of multiple adenomas.

DISCUSSION

Parathyroid adenoma is one of the most common pathologies of the gland. It constitutes the main cause of hyperparathyroidism. Meanwhile multiple adenomas cover only 4-5% of cases (6). The average age of diagnosis is 50-60 years. In most cases, patients are asymptomatic or with non-specific symptoms and often hypercalcemia is accidentally detected in routine blood tests. Even in our case, the patient, 51 years old, had no specific clinic. In the initial laboratory blood check, the high level of calcium suggested further biochemical and imaging exploration. Ultrasound

evaluation of the neck has a sensitivity of up to 80% in detecting parathyroid adenomas. They are visualized, mostly, as hypoechoic nodules at the upper or lower poles of the thyroid lobes. The image is amplified by CT or MRI of the neck which have a sensitivity of 75 and 85% respectively for the parathyroid glands (7). Sestamibi scintigraphy, combined with SPECT (Single photon emission computed tomography), is the 'gold standard' imaging examination in the diagnosis of parathyroid pathologies. Scintigraphy with 99Tc-Sestamibi utilizes the selective affinity of adenoma cells and has a sensitivity of up to 90%. Large solitary adenomas (over 1.8 cm) are more easily identified during examination (8). In our case, the ultrasound showed a suspicious formation (1.2 cm), which was also confirmed by magnetic resonance. But the diagnosis was not clarified until the lesion was localized by scintigraphy. Thanks to the complete imaging evaluation, a specific surgical intervention was performed: selective parathyroidectomy, with the condition that the function of other glands was preserved. But the sensitivity of all imaging methods fails on multiple parathyroid pathologies, compared to solitary adenomas. In such cases, ultrasound has a sensitivity of up to 16% and scintigraphy up to 78% (9). For this reason, preoperative evaluation in the case of multiple pathologies is more difficult and not always successful. Identifying a dominant nodule in imaging methods reduces the chance of finding a secondary lesion with less affinity for radioactive material. For this reason, today intraoperative evaluation of parathyroid glands is proposed by measuring PTH in situ (10). In the presented case, selective surgery was performed based on preoperative evaluation. In such cases, the risk for primary hyperparathyroidism is high. Our patient, in a period of less than 6 months after surgery came with high PTH, while in the postoperative period PTH levels were reduced below normal. This suggests there is still presence of pathological tissue in the parathyroid. Since preoperative scintigraphy with Sestamibi did not identify another focus, a second examination is recommended to correlate with the post-intervention PTH hormone level and the best therapeutic solution for the patient.

In conclusion, cases of involvement of more than one gland in primary hyperparathyroidism and low specificity of scintigraphy with Sestamibi, make intraoperative evaluation of PTH and close follow-up of post-parathyroidectomy patients important in order to avoid the risk of recurrence or the presence of hyper functional residual tissue.

Acknowledgements: The completion of this work could not have been made possible without the help and assistance of the colleagues of the Department of Endocrinology, Imaging and Surgery in the University Hospital Centre "Mother Tereza", Tirana.

Conflict of Interest Disclosure: The authors declare that they have no conflict of interest.

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