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Case Report

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Hyperfunctioning Parathyroid Giant Adenoma

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ABSTRACT

Purpose: The objective of this paper is to report the management and treatment of a 47-year-old patient admitted with multiple problems including asthenia, nausea and bradycardia, and was diagnosed with a giant parathyroid adenoma.
Case report: A 47-year-old man was admitted to the Department of General Surgery for acute and worsening asthenia, nausea and bradycardia. Blood tests showed hypercalcemia, hypophosporemia, very high serum parathormone level, so that he was diagnosed with primary hyperparathyroidism. Cervical ultrasonography and scintigraphy with technetium 99 mTc Methoxyisobutylisonitrile (99 mTc-MIBI) showed the presence of positive nodule at the isthmus of the thyroid gland. The patient underwent neck exploration. Intra-operative iPTH essay was measured. A giant parathyroid adenoma was identified and excised, with no macroscopic signs of malignancy.
Discussion and conclusion: Hyper functioning parathyroid giant adenoma can present with typical symptoms of hypercalcemic crisis: ECG alterations, kidney failure, emotional lability, confusion, delirium, psychosis, asthenia, epilepsy. Elective treatment is the excission. The surgical technique contemplates neck exploration and to ensure the finding of the adenoma, previously identified with imaging tests. It is necessary to measure intra-operative iPTH assay.

KEYWORDS: Parathyroid giant adenoma; Nausea; Bradycardia.

INTRODUCTION

Primary hyperparathyroidism (PHPT) is an endocrine disease characterized by hypersecretion of PTH. It is particularly common in postmenopausal women and its prevalence is estimated to be 1 to 4 per 1000 people in the general population and 21 per 1000 in postmenopausal women.[1] It can be caused by a single parathyroid adenoma (80% of the cases), by multiple adenomas (5%), parathyroid cancer (1%) or parathyroid hyperplasia (14%). PHPT is associated to hypercalcemia, hypophosphoremia, hypercalciuria and hyperphosphaturia.

The clinical pattern is characterized by bone disease, recurrent nephrolithiasis, peptic ulcer disease, and neurological or psychiatric disorders, but in the last decade these symptoms are rarely encountered, with the majority of patients being diagnosed while asymptomatic.[2] The diagnosis is made due to blood tests showing hypercalcemia, hypersecretion of PTH and hypercalciuria.

These tests should be followed by non-invasive imaging techniques, such as Ultrasonography (USG), 99 mTc methoxy isobutyl nitrile (MIBI) parathyroid scintigraphy, and Magnetic Resonance (MR), which are commonly used for the identification of enlarged parathyroid glands. Unfortunately, all these techniques have a low rate of sensitivity to justify the

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application of any single imaging modality for routine use before surgical neck exploration.[3]

Surgical strategy consists of identification and en-bloc excision of the parathyroid adenoma, associated with intraoperative iPTH assey, for evaluating the real success of the treatment.

The objective of this paper is to report the management and treatment of a 47-year-old patient admitted at first aid for asthenia, nausea and bradycardia, and was diagnosed with a giant parathyroid adenoma.

CASE REPORT

A 47-year-old man was admitted in our department for acute and worsening asthenia and nausea. He described the beginning of his symptoms for the past one month, when, due to the appearance of asthenia, muscular weakness, productive cough and nausea, he was prescribed a therapy with cortisone and antibiotics. Therapy did not bring benefits, but the symptoms got worse, with appearance of acute bradycardia (38 bpm), so that the patient went to the first aid department. His medical history revealed asymptomatic gallbladder stones. His habitus was obese (body mass index 31 kg/m^2), physical examination revealed blood pressure of 140/90 mm Hg, cholesterol was 230 mg/dL and no particular semeiological finding. Blood tests showed hypercalcemia, hypophosporemia, very high serum parathormone level (Table 1), so that he was diagnosed of primary hyperparathyroidism.

	Values at the entrance
BMI	31 kg/m^2
Blood Pressure	140/90 mmHg
Cholesterol	230 mg/dL
Serum Calcium	14,9 µg/dL
Serum Phosporum	1,7 µg/dL
Serum iPTH	538,0 pg/mL

Table 1: Baseline characteristics of the patients treated with peritoneal drainage.

Cervical ultrasonography showed the presence of a hypoechoic nodule, measuring 40x25x20 mm, at the isthmus of the thyroid gland, that deepened in the jugular. Scintigraphy with technetium 99 mTc Methoxyisobutylisonitrile (99 mTc-MIBI) (Figure 1) revealed an uptake at the isthmus of the thyroid gland, described as an adenomatous hypercellular mass. The patient underwent neck exploration. A giant parathyroid adenoma was identified and excised at the isthmus (Figure 2). The nodule was capsulated and had no macroscopic signs of malignancy (no local invasion, no lymphadenopathy). Three normal parathyroids were also identified.

Pre-operative and intra-operative iPTH assay were measured (Table 2). Post-operative serum iPTH was measured 7 days-after-surgery (iPTH=10,4 pg/mL) (Table 2)

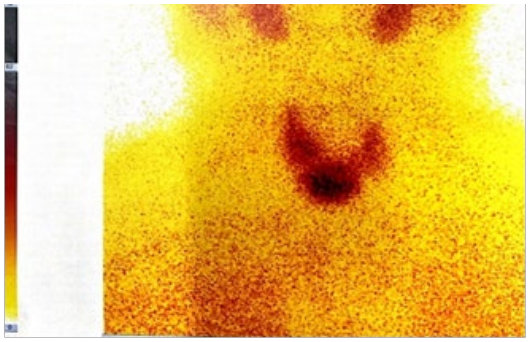

Figure 1: Uptaking adenomatous hypercellular mass, Neck Scintigraphy with technetium 99 mTc Methoxyisobutylisonitrile (99 mTc-MIBI).

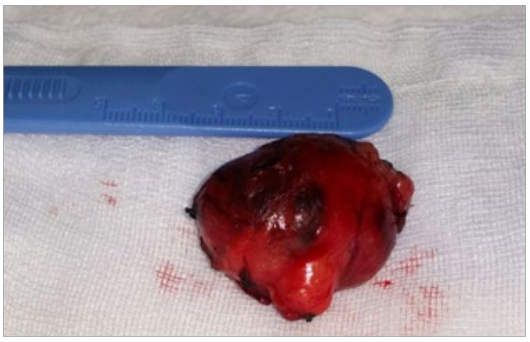

Figure 2: Parathyroid giant adenoma, anatomical specimen.

	Pre-operative	Intra-operative	Post-operative
iPTH (vn=4,6-58,1 pg/mL)	381,0 pg/mL	20,0 pg/mL	10,4 pg/mL

Table 2: Sample volume summary and treatment outcome.

Histology revealed a parathyroid adenoma, without any pathological features associated with malignancy (Figures 3 and 4). Post-operatively serum calcium was monitored during hospitalization. Level of serum calcium are shown in Table 3. Despite the serum calcium levels being higher than normal levels (Figure 5), patient referred non-severe symptoms of hypocalcemia (labial and upper limbs paresthesia), so that he was treated with calcium carbonate tablets (2 tablets per day for one week).

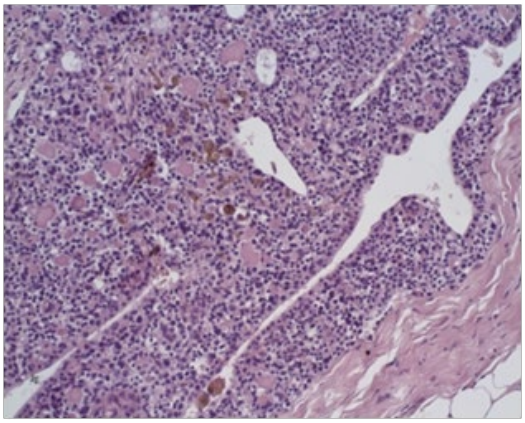

Figure 3: Histopathology of parathyroid giant adenoma, cells and capsula, Hematoxylin and eosin (HE) staining (original magnification x 20).

After one week of hospitalization, the serum calcium levels had stabilized and the patient did not refer any symptoms,

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so we decided to discharge him home. At one week after-discharge blood tests, the values were normal (iPTH. serum calcium, serum phosphate, calciuria, phosphaturia). (Table 3).

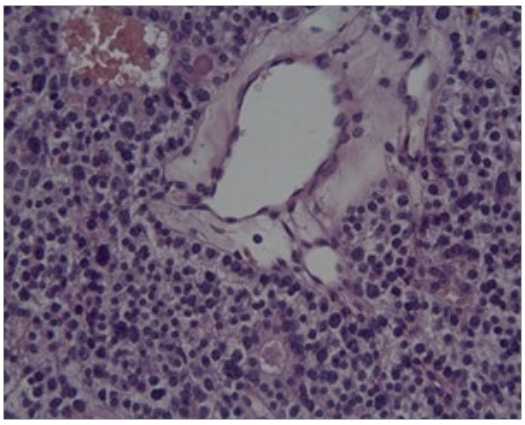

Figure 4: Histopathology of parathyroid giant adenoma, Hematoxylin and eosin (HE) staining (original magnification x 40).

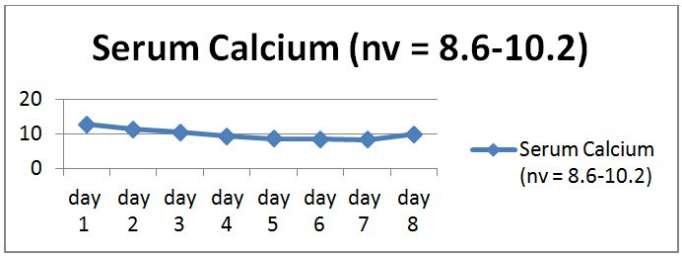

Figure 5: serum calcium levels being higher than normal levels.

iPTH (4,6-58,1 pg/mL)	10,4 pg/mL
Serum Calcium (8,6-10,2 mg/dL)	8,5 mg/dL
Serum phosphate (2,7-4,5 mg/dL)	4,0 mg/dL
Calciuria (100-300 mg/24h)	170 mg/24h
Phosphaturia (400-1000 mg/24h)	630 mg/24h

Table 3: Concentrations of TNF, diagnosis and survival in patients treated with peritoneal drainage.

DISCUSSION AND CONCLUSION

The case report we reported, describes the diagnosis and management of a patient with hyperfunctioning parathyroid giant adenoma. It is particularly interesting to underline how rapidly the symptoms developed (nausea, asthenia, muscular pain, bradycardia), so that the patient made and access to first aid, as typically of hypercalcemic crisis.[4] In the literature it is described how patients affected by hyperparathyroidism present their symptoms suddenly, after being completely asymptomatic for months or years.[5] The most dangerous consequences of hyperfunctioning parathyroid adenomas affect the heart system, particularly the cardiac conductance, leading to ECG alterations such as Short QT Syndrome (SQTS), T-wave flattening, till the heart block.[6] Taylor, et al. describe about a patient who was diagnosed of hyperparathyroidism after the admission at the hospital for heart block and acute kidney failure.[6]

Many authors associate serious hypercalcemia (serum calcium >12 mg/dl) to symptoms such as emotional lability, confusion, delirium, psychosis and coma. Neuromuscolar system can also be affected leading to severe asthenia of skeletal muscles. Epilepsy is rare. Kidneys are often affected, so that hypercalciuria with nephrolithiasis is common. More rarely, prolonged or severe hypercalcemia can produce acute renal failure and reversible or irreversible renal damage due to nephrocalcinosis. Even peptic ulcer and pancreatitis may be associated with hyperparathyroidism, but the relationship between these conditions and hypercalcemia remains unclear.[7]

Elective treatment of hyperfunctioning parathyroid adenomas is excision. The surgical technique contemplates neck exploration and investigation of all four parathyroid glands to ensure the finding of the adenoma, previously identified with imaging tests. This approach is confirmed to produce an immediate decrease of iPTH and calcemia, regression of the symptoms and well-being of the patient.[8] Particularly Neagoe, et al. report about the management of three patients affected by giant adenoma, describing the characteristics of the adenoma as an radiologically positive mass of the dimensions more than 40 mm diameter and describing how these adenomas were excised.[9]

Some authors instead propose the endoscopic technique as an elective treatment,[10] but we retain this technique untimely as it does not allow the surgeon to have a perfect view of the surgical area due to anatomic peculiarity of the neck, and in any case it is necessary to have more scientific studies to consider this technique as a valid alternative to open surgery.

Most of the current literature indicates the necessity of intra-operative iPTH essay measurement, as it allows the surgeon to know if the excision of the adenoma was the right treatment, and also avoids removing the parathyroid unnecessarily.[11]

One more interesting feature about giant adenoma management is related to the post-surgical management. These patients, in fact, can show symptoms of hypocalcemia syndrome, beside the levels of serum calcium are higher than normal values, so that they temporary need additional calcium intake. These symptoms could be caused by an altered balance of serum calcium that the patient got due to the presence of the adenoma.

In conclusion, there is one last consideration which could be considered. This is the possible connection between primary hyperparathyroidism and metabolic syndrome, as reported in the study of Mendoza.[12] We are still skeptical about this connection as only one research study mentions this connections, thus more studies are necessary.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interests.

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ETHICAL APPROVAL WAS GIVEN

Ethical approval was requested and obtained from the "Second University of Naples" ethical committee.

AUTHOR CONTRIBUTION

All authors contributed significantly to the present research and reviewed the entire manuscript.

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