

Geriatric primary hyper-parathyroidism

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Introduction

The primary hyper-parathyroidism is one of most complex and attractive chapters in endocrine surgery.

The PTH always maintains the rate of blood calcium by his biological effect on bone, kidney's tubules and small intestine. Changes on ionized calcium rate, by negative feed back, produce rapid adjustments of PTH levels (1).

This event quickly causes a calcium increase in the tubules and in osteoclast activity and successively plays on gastrointestinal reuptake of calcium and D vitamin. The synergic action of PTH, D-vitamin and calcitonin total calcium rate balances. Occurring morphologic and citologic disorders on parathyroid biological design, PTH level is increased and calcium-phosphorus balance is modified (2).

The primary hyperparathyroidism interests the population with 1:1000 ratio and can be sporadic or associated with polyendocrine forms. It is the most common among endocrine disorders, after diabetes mellitus and goiter.

Clinical evidence goes from no symptomatic to symptomatic and multiple organ forms. Osteopenia, osteoporosis, renal lithiasis, anorexia, nausea, peptic ulcer, polydipsia, renal failure, hypertension, rhythm's disorders, itching are the most frequent symptoms.

Diagnosis can be obtained by serology. Increments of ionized blood calcium and serum PTH level are ordinary signs of primary hyperparathyroidism. Diagnostic instruments (echography, SESTAMIBI scintigraphy) are key to detect site of adenoma. The

surgical treatment must be performed early because the drug control is very difficult and it causes serious consequences reducing reserve life.

Materials and methods

We considered 78 patients affected by HPP; they underwent follow-up within 3 years. *A cluster*: 52 patients (66.5%) age <60 y.o.; *B cluster*: 26 patients (33,5%) age >60 y.o.

A cluster: M:F - 1:3

Associated symptoms:

- Kidney 21cases (81.7%);
- Bone 12 cases (48.6%);
- Intestine 2 cases (8.1%);
- PNS 4 cases (28.2%);
- Systemic: Itching 3 cases (11%).

Hystological clusters:

- Single adenoma 20 cases (81%);
- Double adenoma 1 case (4.2%);
- Diffuse hyperplasia 3 cases (11.4%);
- Carcinoma 1 case;
- MEN 1 case (5.4%)

B cluster: M:F - 1:4.

Associated symptoms:

- Kidney 37 cases (71.7%);

- Bone 35 cases (68.6%);
- Intestine 5 cases (10.1%);
- PNS 14 cases (28.2%);
- Systemic: (itching) 8 cases (15%).

Histological clusters:

- Single adenoma 43 cases (83%);
- Double adenoma 4 cases (8.2%);
- Diffuse hyperplasia 4 cases (8.2%);
- Carcinoma 0;
- MEN 0.

Results

There are any important differences between elders and adults except for the associated degenerative cronical diseases and metabolic disorders in the seniority. Intraoperative mortality was 0 without complications. The postoperative days was 3 in the cluster A and 4 in cluster B. Recovery was 93% in both.

Discussion

Preoperative diagnostic instruments are improved than in the past years and for this reason they make the surgery more safe. However today, as literature refers, in the 5.8% of the patients the lesion at the first surgical approach is yet unknown (*chirurgie blanche*) (3).

This event is related to variability in parathyroid glands' site and number; they born from III and IV branchial pouch and, during their embryological migration, they migrate to the anterior mediastinum in depth (P3) and the posterior mediastinum (P4) making discovery very difficult (4).

Are we sure to obtain the recovery when parathyroid gland was been removed? In single adenoma the surgical recovery was successful performed in all cases while in multiple lesion it was performed in only 3.2% of cases for perseverance of pathologic tissue.

For this reason it must know, since preoperative time, if lesion is single or multiple. Since introperative time we could know the rate of PTH rate; in fact, sudden reduction of PTH level ten minutes after lesion removal it verifies (1, 5).

If this event doesn't occur after 10 minutes, the surgeon must be extended the surgical field to the neck and the mediastinum to detect other pathologic tissue (2, 6). Our operative staff uses scintigraphy with probe by previous injection of ^{99}Tc MIBI (370 MBq), 18 hours before surgery.

This method consents to remove whit minimal invasive surgery and, if possible, local anaesthesia.

During the follow up is very important to check the electrolytic homeostasis.

After parathyroidectomy in 12.5% we noted hypocalcaemia which in 4.4% was symptomatic. In this case it must be done a calcium metabolism monitoring to obtain a new optimal balance between bone reuptake and parathyroid function. In mild hypocalcaemia the oral calcium administration is enough.

Iatrogenic hypercalcaemia opposes to functional development of remaining tissue and, moreover, it can cause irreversible renal injuries.

In more serious cases administration of 10% gluconate calcium (2 mg/Kg for two minutes) is necessary. Perseverance of hypocalcaemia suggests continuing the administration per os (50 mg/Kg/die in four administrations) until suspension or reduction in few weeks; with calcium, administration of D vitamin metabolites is helpful (7, 8).

One of most common reasons of hypocalcaemia is "hungry bone syndrome" due to sudden calcium reabsorption by skeleton. This event is more evident in long time hyperparathyroidism. Sudden block of parathyroid function causes any bone re-uptake and any osteoblastic reactivity; for this reason, low calcium level without hyperphosphatury can persists for few weeks. In all patients with osteolytic injuries, to prevent this complication, it must perform a preoperative bone tomo-densitometry and eventually administrate alpha OH-cholecalciferole (9, 10).

Hypocalcaemia is also due to inadequate residue parathyroid function by ischemic injury or delay in reaction of residual tissue function; in these cases hypoparathyroidism is temporary and it occurs especially in single adenoma. In parathyroid hyperplasia is more frequent to see an irreversible hypothyroidism caused by insufficient PTH production. Only replacement in the harm of parathyroid tissue obtained by criopreservation resolves this malfunction (11).

Another reason of hypocalcaemia can be a skeletal-intestinal PTH-resistance related to D vitamin deficit, intestinal malabsorption or renal failure.

Another important value to consider is magnesium level. Hypomagnesaemia induces hypocalcaemia because is in opposition to PTH secretion and production. Therapy consists of 25% sulphate magnesium administration (0.2 ml/kg in 4 doses until 40 mmol).

Monitoring of magnesaemia must consider that magnesium blood levels doesn't entirely reflect total body amount; for that is important to check the urinary secretion.

Is moreover necessary to evaluate phosphoraemia: if an increased level of blood phosphorus occurs, it can be related to malfunction of residual glands. Obviously postoperative PTH level must be monitored to show an irreversible hypoparathyroidism condition.

In many cases, especially in familiar or in polyendocrine forms, as main factor, we could consider the disease relapse. Sporadic and familiar forms, for its relation with a specific oncogene, PRAD1, were studied. PRAD1, also known as D1 cyclin, seems to influence cell cycle. Moreover, some sporadic and polyendocrine forms present another genetic disorder such as missing of oncosuppressors genes on various sites: 6q (30%), hp (27%), 15q (35%), ip (30%) h1q (38%).

In these cases, after the surgical removal, genetic disorder persists and it is possible that relapse can occur.

If clinical and serological follow up is altered, after a relative wellness period, it must think to relapse.

Some authors say that surgical revision should be required only in patients that have calcaemia level >11 mg/dl, renal lithiasis, fractures, peptic ulcer, hypertension, neuromuscular disorders (12).

Instead, in our opinion, reintervention is the best choose because the clinical signs could be mild at the beginning, but they could develop into more serious problems.

About target organs, monitoring of skeletal remineralization should be an important goal. This is effectuated by evaluation of vertebral Bone Mineral Density (BDM). In our study preoperative testes

shown values within a range which runs from 0.719 g/cm² (A) to 0.849 g/cm² (B).

Any evident correspondence was demonstrated between osteocalcin levels and BDM values, but there was a correlation with start of disease. Moreover we noted that remineralization started since six months after surgery, more rapidly in adults than seniors. About kidney the goal is to detect renal failure, renal lithiasis or urinary tract infections (13).

Acute pancreatitis has a postoperative incidence of 0-9% (14). To prevent this complication is useful to effectuate profilaxis and pancreatic enzymes monitoring.

About digestive tract disease by hypersecretion, endoscopy shown, within few weeks, recovery in 92% of cases. At last, in all patients, was evident an improvement of moodiness and neurological disorders.

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