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Parathyroidectomia: treatment of secondary hyperparathyroidism. Causes and prophylaxis of disease relapse

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Background. The growing number of haemodialysis patients and the increasing their life expectancy within the past few years have resulted in a rise of long-term haemodialysis-associated complications.

The aim of the paper is to present a case study of a successful surgical treatment of secondary hyperthyroidism and assess the causes of the disease.

Materials and methods. A 63-year-old male patient had been on haemodialysis for 18 years; he had undergone parathyroidectomy for secondary hyperparathyroidism 10 years ago. The relapse of the disease was suspected when the patient developed the onset of pruritus and muscle pain. The following tests were performed: biochemical markers of plasma calcium and parathyroid hormone, thyroid ultrasound examination, parathyroid gland 99 mTc MIBI scintigraphy, single photon emission computed tomography of the neck and mediastinum.

Results. Elevated calcium (2.73 mmol/l serum) and parathyroid hormone (1352 pg/ml blood plasma) levels were found. Ultrasound examination, 99 mTc MIBI scintigraphy and SPECT revealed parathyroid adenoma of the left inferior thyroid section. The patient underwent surgery in 2011. Remnants of the previously resected parathyroid gland were removed, and an accessory parathyroid gland was found within the thymus; this gland was removed, and partial autotransplantation was performed. The level of the parathyroid hormone decreased to 24 pg/ml during the day after surgery. The histological examination of the removed tissues was performed.

Conclusions. Accessory parathyroid glands are usually found within the thymus; therefore, any type of surgical treatment of secondary hyperparathyroidism should include thymectomy.

Key words: parathyroid glands, secondary hyperparathyroidism, haemodialysis, parathyroidectomy

INTRODUCTION

The number of patients suffering from end-stage renal insufficiency is increasing (1), as is also the number of haemodialysis (HD) patients (2, 3). The Lithuanian Association of Nephrology, Dialysis and Transplantation data show that 1385 patients were receiving HD in 2010. Patients suffering from terminal renal insufficiency frequently develop secondary hyperparathyroidism; this condition, according to various authors, is diagnosed for 67–90% of dialysis patients and depends on dialysis type and duration. The treatment of secondary hyperparathyroidism is problematic (4). Hypocalcaemia causes parathyroid hyperplasia and an increased secretion of parathyroid hormone, directly causing osteolysis. Osteolysis results in hypercalcaemia, hyperphos-

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phataemia and deposit formation in tissues, blood vessels and skin (5, 6).

Commonly, the treatment of secondary hyperparathyroidism is medication-based (90–95% of cases) (7). The aim of the treatment is to maintain normal calcium, phosphorus and parathyroid hormone serum levels (8, 9). Surgical intervention is necessary in case the symptoms of hyperparathyroidism become severe or complications develop (7). The objective of this article is to present a case of a successful surgical treatment of a patient who had been on dialysis for 18 years and suffered from the relapse of secondary hyperparathyroidism.

MATERIALS AND METHODS

A 63-year-old male was consulted at the Vilnius University Hospital Santariškiu Clinics Consultation Polyclinic; he complained of severe pruritus, muscular weakness and pain, all these symptoms having manifested after haemodialysis. A relapse of secondary hyperparathyroidism was suspected. The diagnosis of glomerulonephritis had been stated for the patient 25 years ago; he underwent the removal of the right kidney because of renal cancer in 1991, and a series of haemodialysis twice a week had been started two years later (in 1993). Subtotal parathyroid gland resection without removing part of the left inferior gland and thymus was performed in 2001 because of secondary hyperparathyroidism. Treatment with calcium carbonate (up to 1.5 g/d) and alphacalcidole (1 g/d) was administered. The symptoms experienced previously (pruritus, muscle weakness and pain) developed again in two years. The symptoms worsened during the last few years. A retroperitoneal tumour was removed in 2007; histological examination revealed phaeochromocytoma.

Blood biochemistry tests. The serum levels of alkaline phosphatase, phosphorus, total calcium, potassium, sodium, urea and creatinine and parathyroid hormone blood plasma levels were assessed.

Other tests. Thyroid ultrasound examination, parathyroid 99 mTc MIBI scintigraphy with neck and mediastinum single photon emission computed tomography (SPECT) were performed.

RESULTS

Blood tests (25 03 2011): alkaline phosphatase 233 U/l, phosphorus 2.48 mmol/l, total calcium 2.73 mmol/l, potassium 6.2 mmol/l, sodium 136 mmol/l, urea 20.57 mmol/l, creatinine 982 μmol/l, parathyroid hormone 1352 pg/ml. Thyroid ultrasound revealed a solid, hypoechogenic, rough-edged 27 × 12 mm node at the left thyroid lobe inferior edge. A fine needle aspiration biopsy was taken and revealed a parathyroid adenoma. Parathyroid 99 mTc MIBI scintigraphy and mediastinum SPECT showed a parathyroid adenoma at the left thyroid inferior section (Fig. 1). A relapse of parathyroid adenoma was diagnosed. The patient underwent surgery on 30 March 2011.

Operation. Transversal neck incision and the removal of the postoperative scar tissue were performed. The left sternocleidomastoid muscle was retracted laterally and the anterior neck muscle medially. The lateral surface of the left thyroid gland lobe with the left recurrent laryngeal nerve were mobilized. The adenoma of a previously resected inferior parathyroid gland was localized and removed; the diameter of the tu-

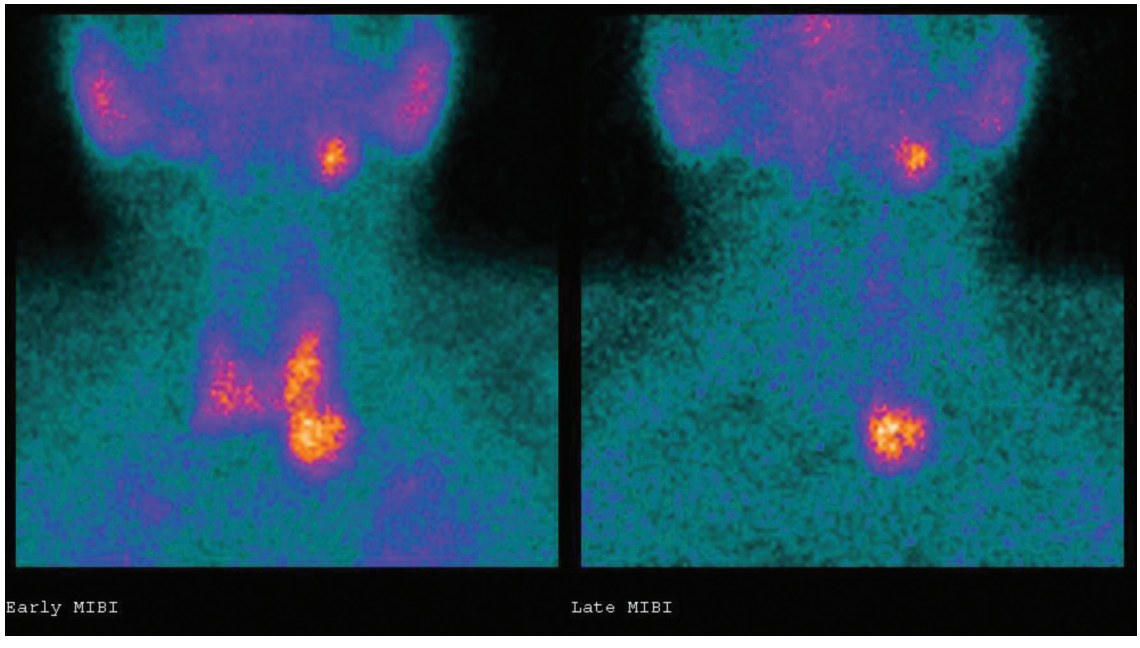

Fig. 1. Increased radionuclide accumulation focus in the left lower lobe area

Fig. 2. Accessory (fifth) parathyroid adenoma in thymus gland

mour was 1.5 cm, the tumour was hard and brown. Also, the left lobe of the thymus (6 × 1.5 cm), containing an accessory (fifth) parathyroid gland adenoma (3 × 3 × 2 cm) (Fig. 2) was removed. An immediate histological examination showed that both formations were parathyroid adenomas. Approximately 20 mg of shredded parathyroid gland was injected into the right deltoid muscle. The wound was closed using single 5/0 monocrile stitches.

The patient was discharged from the department two days after surgery; he had no complaints; neither fever nor hoarse voice were present, and the cough wham sign was normal. The PTH plasma level was 24.26 pmol/l.

Final histology report: nodular oncocytic cell hyperplasia.

DISCUSSION

Secondary hyperparathyroidism is a common renal insufficiency complication causing osteodystrophy, treatment-resistant anemia, disorders of the immune system and cardiovascular lesions (10, 11). This complication is treated conservatively in 90–95% of cases (7). The aim of the conservative treatment is to maintain normal calcium, phosphorus and PTH levels in blood serum (8, 9). A low-phosphorus diet with phosphorus-binding agents is prescribed because of chronic hyperphosphataemia. Hypocalcaemia is a direct cause of the hyperplasia of parathyroid glands. Hypocalcaemia is treated by means of oral calcium preparations (7), and vitamin D is prescribed to control the PTH serum level (12, 13).

Surgical treatment is required in approximately 5–10% of patients on haemodialysis [4, 7, 14]. The indications for surgical treatment include osteodystrophy diagnosed radiologically, uncontrolled hyperphosphatemia, evident skeletal deformations, progressive decrease in bone mass, erythropoietin-resistant anemia, bone and muscle pain, pruritus, and soft tissue calcification. Various types of parathyroidectomy are being performed in order to treat secondary hyperparathyroidism; they include subtotal parathyroidectomy, total parathyroidectomy, or total parathyroidectomy with parathyroid gland autotransplantation [13, 16]. Total parathyroidectomy is performed for the patients who are not going to have renal transplantation. Following total parathyroidectomy, the normal calcium concentration is maintained with the help of calcium and vitamin D preparations. It is easier to maintain normal calcium serum levels after subtotal parathyroidectomy or total parathyroidectomy with parathyroid autotransplantation; however, relapses following 5–10 hemodialysis sessions are seen in approximately 10–70% of such cases; these cases require reoperation. Therefore, subtotal parathyroidectomy or total parathyroidectomy with parathyroid autotransplantation are performed for patients who would normally receive a kidney transplant, because PTH is required for the normal renal function once the transplant is functioning. A total of five parathyroid glands are found in approximately 5% of people (17). Increased PTH levels remain if the fifth gland is not removed. Accessory parathyroid glands are most commonly found within the thymus (17).

For the first time our patient had undergone subtotal parathyroidectomy without thymectomy because of secondary hyperparathyroidism. The indications for simultaneous thymectomy during the first surgery are questionable as the inferior parathyroid gland is found in 14–45% of cases, and the accessory gland is found in 5% only (18–20). We have found the accessory parathyroid gland that caused the relapse of the disease in our patient's thymus.

CONCLUSIONS

The thymus is the most common location of accessory parathyroid glands; therefore, thymectomy is indicated when any type of operation is being performed to treat hyperparathyroidism.

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PARATIROIDEKTOMIJA: ANTRINIO HIPERPARATIROIDIZMO GYDYMAS. LIGOS ATKRYČIO PRIEŽASTYS IR PROFILAKTIKA

Santrauka

Įvadas. Pastaraisiais metais daugėjant hemodializuojamų pacientų skaičiui ir ilgėjant jų išgyvenamumui, daugėja ir su ilgalaike hemodialize susijusių komplikacijų. Šiame straipsnyje pateiksime antrinio hiperparatiroidizmo atkryčio sėkmingo chirurginio gydymo atvejį ir aptarsime jo priežastis.

Tyrimo medžiaga ir metodai. Pristatomas klinikinis atvejis – 63 metų vyras, kuriam dėl inkstų funkcijos nepakankamumo 18 metų atliekamos hemodializės, prieš 10 metų dėl antrinio hiperparatiroidizmo atlikta subtotalinė paratiroidektomija. Atsiradus odos niežuliui ir raumenų skausmams įtartas antrinio hiperparatiroidizmo atkrytis. Ligoniui atlikti biocheminiai kraujo tyrimai (kalcio, paratiroidinio hormono – PTH koncentracija plazmoje), ultragarsinis skydliaukės tyrimas, prieskydinių liaukų 99 mTc – MIBI scintigrafija, kaklo ir tarpuplaučio vieno fotono emisijos kompiuterinė tomografija (KT).

Rezultatai. Nustatyta padidėjusi kalcio (2,73 mmol/l) koncentracija kraujo serume ir PTH (1352 pg/ml) koncentracija kraujo plazmoje. Ultragarsu, 99 mTc MIBI scintigrafija, kaklo ir tarpuplaučio vieno fotono emisijos KT diagnozuota prieskydinės liaukos adenoma kairės skydliaukės skilties apatinio poliaus srityje. Pacientas operuotas 2011 m. Pašalintas rezekuotos prieskydinės liaukos likutis, užkrūčio liaukoje aptikta ir pašalinta pridėtinė (penktoji) prieskydinė liauka; jos dalis autotransplantuota. Pirmą parą po operacijos PTH koncentracija kraujo serume sumažėjo iki 24 pg/ml. Atliktas pašalintų audinių histologinis tyrimas.

Išvados. Pridėtinės prieskydinės liaukos dažniausiai randamos užkrūčio liaukose, todėl bet kokiu metodu operuojant dėl antrinio hiperparatiroidizmo reikia šalinti užkrūčio liaukas.

Raktažodžiai: prieskydinės liaukos, antrinis hiperparatiroidizmas, hemodializė, paratiroidektomija