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Surgery of secondary hyperparathyroidism

Leczenie chirurgiczne chorych z wtórną nadczynnością przytarczyc

INTRODUCTION

Persistent joints, bones and muscles pains, significant reduction of mobility in affected joints at patients with chronic kidneys failure treated by hemodialyses indicate the appearance of a serious complication — secondary hyperparathyroidism [1, 5, 11, 12, 16].

The radiological examination carried out in case if some patients indicated extensive calcinosis in the area of large joints, advanced osteoporosis, past and present fractures. The laboratory analyses confirm a significant increase of the level of calcium and magnesium accompanied by decrease of phosphorus in the blood serum, very high values of parathormone in the plasma and alkaline phosphatase in urine [1, 4, 5, 16].

In case of the majority of patients both gradual intensification of suffering and lack of improvement despite the application of various preventive treatment methods by nephrologists force the patients to consult surgeons.

MATERIAL AND METHOD

In the period of the last two years 32 patients with secondary hyperparathyroidism have been brought from other clinical centres in Lublin and other wards in Puławy, Janów, Przemyśl, Zamość, Chełm and Biała Podlaska for the operation to be carried out in the clinic of Lublin.

The results of he operative treatment were assessed prospectively.

The age of the patients suffering from the nephrogenic hyperparathyroidism varied from 25 to 65. There were 15 men and 17 women in this group. It was observed that all the patients at the time they were admitted to Traumatic Surgery Clinic had advanced and extensive bone-joint changes, two patients had new fractions, and the majority of them suffered from persistent itching of the skin.

Table 1. PTH and calcium levels in patients with secondary hyperpathyroidism

number	ID of patients	sex	age	Level of PTH pg/ml		Level of Ca mEq/l		Symptoms
				before operation	post operation	before operation	post operation	
1.	482/98	M	39	1360	740	4.1	1.76	Knee pains
2.	1049/98	M	40	1560	480	3.2	1.75	Bones pains
3.	76/99	F	65	864	176	4.16	1.11	Columna vertebralis reg lumbosacralis pains
4.	399/99	F	26	1260	480	3.8	1.70	Knee and columne vertebralis reg cervicalis pains
5.	292/00	F	47	2110	520	6.0	2.4	Bone pains
6.	316/00	F	56	2234	384	5.8	1.27	Shoulder, hip and knee pains
7.	364/00	F	40	1839	638	5.6	1.35	Cruris pains, itching
8.	942/00	M	29	>2500	420	5.4	1.8	Knee pains, osteoporosis
9.	833/00	F	50	2450	280	5.3	1.75	Bones pains, itching
10.	642/00	F	43	1980	630	3.3	1.53	Pedis pains

In Table 1 the selected parameters of the X-ray and laboratory examination of the operated group of patients have been presented.

High pre-operative values of parathormone together with its significant reduction at all the patients as observed in the examination carried out two days after the operation indicate, that the operation gave the results planned before. Additionally, in a long-term period the normalisation of the disturbances in the calcium-phosphate-magnesium balance should be observed. The long-term effects of the operative treatment of the nephrogenic hyperparathyroidism shall be presented in a separate work upon the completion of the currently performed control examinations. The majority of patients were operated with the value of haematocrit below 30 and haemoglobin below 10g/dl. In the mid- and post-operative period only in case of two patients it was necessary to complement the loss of blood in the amount 1–3 units and an trouble free mid- and post-operative course should be related to a precise mid-operative hemostasis and pre-operative settlement of the disturbances in the blood clotting system.

RESULTS

In the analysed group of 32 patients there were four cases of reparathyreoidectomy. In case of two patients these were the early re-operations carried out due to technical mistakes. During the first operation in case of one patient none of four parathyroids was removed, while in case of the second patient only one of them was removed. The third patient was operated for the first time four years before in Warsaw and had his three parathyroids removed. Three years after this operation the intensified symptoms of the hyperparathyroidism were observed. The fourth parathyroid gland was observed in the upper mediastinum on the left side. The last patient from this group was operated a year ago in our Clinic. A gradual increase in the level of parathormone and recurrence of pains made the patient undergo the second operation. The 1.5 x 2 cm big adenome was found at the height of the venous angle (cervico-subclavicular).

The operated patients stayed in the Clinic for 2–3 days and then came back to the hemodialyses in the Nephrology Clinic of the Medical Academy in Lublin. Only in one case out of the 32 patients treated operatively there was the need to carry out the revision of the surgical wound due to bleeding on the second day after the operation. After settling of the disturbances in the blood clotting system on the fifth day after operation the patient returned to her previous ward.

DISCUSSION

As emphasised by many authors, the therapeutic success at patients with hyperparathyroidism is possible only through an operative procedure carried out faultlessly. The surgery of parathyroid glands requires an excellent knowledge of the topographic anatomy of cervix and good pre-operative diagnostics because the ideal alternation of placement and number of glands require thorough cancerous attention. After detailed anatomical studies carried out on dead bodies it has been found that in over 80% of cases 4 glands were found, in 0.2% of cases there were only two parathyroid

glands, at 6% of patients there were three glands, in 5% — five glands and in 0.5% as many as six glands. In single cases it is possible to find as many as 8–10 glands. The position of glands is diversified and depends on the length of hyoid bone to the upper part of the front mediastinum. The exposition and removal of the parathyroid glands in the course of the first operation is critical as when left, they result in the recurrence of the hyperfunction. The condition determining the success of the treatment is the precise qualification of the patients on the basis of the location examination results. So far there are no explicit recommendations specifying which location examination should be perceived as the right examination. The majority of surgeons — endocrinologists carrying out the operative procedures rely on the result of subtractive scintiscanning of parathyroid glands Tc^{99m} — MIBI and Tl^{201}, which is characterised with high level of accuracy (approximately 75–85%) and specification (90–100%) with the lack of accompanying nodular goitre. A significant disadvantage of subtractive scintiscanning of parathyroid glands is the inability to precisely identify small size adenomas (below 500 mg) [3, 2, 6, 7, 8, 12, 13, 15].

The qualification for operative procedure may also be based on the result of the cervix ultrasonographic examination, which accuracy is estimated to be on the level of 75–90%. The USG does not offer an opportunity to examine the retrosternal area and mediastinum. Additionally it is a subjective method depending largely of the experience of the person carrying out the examination. The use of the Power–Doppler USG technique increases the probability of correct parathyroid adenoma diagnosis by demonstrating the microcirculation rete in the area of the adenoma. Both CT and NMR do not offer better diagnostic results than USG or subtractive scintiscanning at patients with secondary hyperparathyroidism, and their accuracy is estimated on the level of 50–60% [15, 6, 9, 10, 14, 17].

In order to carry out the mid-operative evaluation of the effectiveness of the performed parathyroidectomy some authors determine the level of 1–84 parathormone in the serum in the course of the operation. A significant decrease of the PTH level in the 15th–30th minute after the adenomectomy in relation to its level before the adenomectomy confirms the effectiveness of the performed procedure. In case of relatively low initial levels of PTH (200–300 pg/ml) the PTH level normalises — which is the indication of the result of the procedure. However, with the high initial level (500–20000 pg/ml) the normalisation period usually exceeds 1–2 hours. In these cases the observed decrease of the PTH level after 15–30 minutes may be the result of the resection of only one affected parathyroid gland in the multiglandular disease and the normalisation of the PTH level is not observed even after a number of hours after the procedure. It is recommended then to consider the repetition of the procedure, but only on the other side in order to prevent the permanent hyperparathyroidism. Therefore, for the patients with moderate initial PTH level in the serum it is a valuable mid-operative method, however in cases of high initial level the actual interpretation of the results may be carried out only in the post-operative period.

We draw your attention to modern methods of pre- and mid-operative diagnosis of diseases and localisation of parathyroid glands and the operative quality of our Clinic on purpose. We believe that it would be inadequate to compare the experiences of the medical centres and surgeons, who performed hundreds of parathyreoidectomies

with our experiences. However, we present our material concerning these patients with highly advanced sequels of the renal failure and hemodialysis, who we intended to help. These patients suffering from other accompanying diseases, often immobilised in beds either did not qualify for transport or could no longer wait for placement in a highly specialist medical centres. We believe it is necessary to improve the methods of disease diagnosis and localisation of parathyroid glands, but also to prepare the surgeons for the operations of parathyroid glands at least in every centre, where there is a Medical Academy and where the number of the dialysed patients suffering from renal failure is growing.

CONCLUSION

The purpose of this work was the analysis of the results of the operative treatment of 32 patients operated on in the Trauma Surgery Clinic of the Medical Academy in Lublin in the period 1998–2000 due to secondary hyperparathyroidism in the course of chronic renal failure. The complications of the operative treatment were observed only in one case, and in case of three other patients a non-radical treatment was conducted. The attained results indicate a high effectiveness of operative treatment which results in the improvement of the quality of life of patients chronically dialysed due to of chronic renal failure.

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STRESZCZENIE

Celem pracy była analiza wyników leczenia 32 chorych operowanych w Klinice Chirurgii Urazowej AM w Lublinie w latach 1998–2000 z powodu wtórnej nadczynności przytarczyc, w przebiegu PNN. Powikłania leczenia operacyjnego zanotowano w jednym przypadku, u trzech kolejnych chorych wykonano zabieg nieradykalny. Uzyskane wyniki wskazują na wysoką skuteczność leczenia operacyjnego umożliwiającą podniesienie jakości życia chorych przewlekle dializowanych z powodu PNN.