

3. Abstract (Streszczenie w języku angielskim)

Title: Morphometric parameters in primary hyperparathyroidism - analysis of the affect on calcium-phosphate balance.

Introduction: The most common cause of hyperparathyroidism is parathyroid adenoma representing up to 85% of cases of primary hyperparathyroidism (PHPT). Scarce variants of parathyroid adenomas, weighing more than 2.0-3.5g are called “large” or “giant” adenomas and account for about 1.5% of all parathyroid adenomas. Extremely rare entities are parathyroid cystic adenomas (PCA) representing only 0.5–1% of parathyroid adenomas. Less than 1% of all cases of primary hyperparathyroidism (0.1% of parathyroid tumors) are parathyroid carcinoma (PC).

Objective: The aim of the study was to identify selected risk factors for severe hypercalcemia including morphometric parameters of the parathyroid glands and analysing their impact on calcium-phosphate and hormonal metabolism.

Methods: The retrospective study was performed in a group of 117 patients with PHPT admitted to the Department of General, Vascular, Endocrine and Transplantation Surgery, Medical University of Warsaw between 2018 to 2022. All patients underwent parathyroidectomy.

First study compared a total of 17 patients with PHPT and parathyroid cysts (study group) with the group of 100 patients with hyperparathyroidism caused by adenoma or hyperplasia (control group). In this study in both groups the majority were women (88% vs. 12%, with gender ratio 7, 3:1).

In the second study, 27 patients with PHPT and parathyroid lesion $\geq 2,0\text{cm}^3$ (study group) were compared with 73 patients with PHPT and lesion $< 2,0\text{cm}^3$ (control group). In both groups also majority were women (81,5%-study group, 90,5%-control group, gender ratios 9,4:1 and 4,4:1 respectively).

In both studies the patients were examined preoperatively and postoperatively: parathormone (PTH), creatine, calcium and phosphate serum and urine concentrations and calcidiol serum levels were assessed. Preoperatively ultrasonography (US) of parathyroid was performed.

The case report presents a 27-years history of diagnosis and treatment of a patient with hyperparathyroidism. Initial diagnosis of recurrent primary hyperparathyroidism due to

parathyroid adenoma, then the presence of parathyromatosis was confirmed until the final diagnosis was parathyroid cancer. The patient underwent 13 surgical procedures and 33 courses of radiotherapy in case of disease stabilization.

Results: Patients with parathyroid cyst had statistically the highest parathormone (PTH) and calcium serum concentration, the highest calciuria and the lowest serum phosphate concentration. Patients with parathyroid lesions $\geq 2,0\text{cm}^3$ had significantly higher PTH and calcium serum concentration and lower serum phosphate and calcidiol concentration compared with patients with lesions $< 2,0\text{cm}^3$.

There were no statistically significant differences in the concentration of creatine in serum and urine and tubular reabsorption of phosphorus (TRP).

Ultrasound (US) relatively underestimated the parathyroid volume of about 0,3-0,4ml (10% in larger lesions and 43% in smaller ones);

Conclusions: Cystic parathyroid adenomas and parathyroid adenomas $\geq 2,0\text{cm}^3$ may be the higher risk of severe hypercalcemia and hypercalcemic crisis. US underestimated in general parathyroid volume. Despite a previous histopathological diagnosis of adenoma, the diagnosis of parathyroid carcinoma should also be considered in patients with persistent or recurrent PTH-related hypercalcemia.