Abstract

The aim of this work is the assessment of the diagnostic accuracy in parathyroid glands (PG) detection by various scintigraphic methods and to propose the optimal examination procedure for successful localization of hyperfunctional PG. The patients were divided into 3 groups with individual types of hyperparathyroidism (HPT): group I. primary PHPT (253 patients), group II. normocalcemic NPHPT (75 patients) and group III. secondary SHPT (61 patients). For all the patients **protocol A** was performed: one day a two-phase SPECT/CT scan using 99mTc-MIBI (technetium 2-methoxyisobutylisonitrile) depicted simultaneously thyroid gland and PG, and another day thyroid SPECT using 99mTc-NaTcO4 (pertechnetate) for 3D subtraction analysis. In case of 44 patients from group I with negative or unclear results of the protocol A also **protocol B** was performed: PET/CT using 18F-FCH (fluorocholine). The results of surgery and histology served as a „gold standard„ for the assessment of the accuracy of scintigraphic findings.

In group I. 209/253 patients had a positive finding on scintigraphy using protocol A and 44 patients with an unclear or negative finding of protocol A underwent protocol B examination. In total, 253 patients were operated. The results of the diagnostic accuracy: sensitivity, specificity, positive predictive value and negative predictive value were established for all protocols (protocol A, protocol B, combination of both methods A and B). In group II. 26 patients with NPHPT had a positive finding by protocol A, 12 from them were indicated for surgery. A complete agreement of surgical and scintigraphic findings was found in 10/12 patients (83 %). Positive scintigraphic finding using protocol A was found in 40/61 patients (65.5 %), unconvincing outcome in 7/61 patients (11.5 %) and negative finding in 14/61 patients (23 %) in group III.

The proposed basic protocol A demonstrated sufficient diagnostic accuracy for the hyperfunctional PG localization in many cases, not only for patients with PHPT, but also for patients with NPHT or SHPT. According to the results of the diagnostic accuracy in the combination of both methods, the proposal for the optimal scintigraphic examination while maximizing the accuracy in the localization of pathological PG was developed. It is adviced to start with scintigraphic examination using protocol A for all patients, only in case of negative or unclear finding investigation supplement with protocol B is recommended.

Key words: Hyperparathyroidism, nuclear medicine, SPECT/CT, PET/CT