Combination of computer tomography and magnetic-resonance imaging in diagnosis of hypothalamo-hypophysial system disorders

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Aim: to study efficacy of combination of computer tomography (CT) and magnetic -resonance imaging (MRI) in the diagnosis of hypothalamo-hypophysial system (HHS) disorders.

Materials and methods: we followed up 65 patients with various HHS disorders aged from 12 to 46, 21 men and 44 women among them. All patients underwent general clinical, biochemical and hormonal investigations, levels of TTH, LH, FSH, STH, prolactin and cortisol being measured at the radioimmune laboratory, as well as roentgenologic (cranigraphy, CT and MRI), neurophysiological (EEG, REG) and ophthalmaological (vision acuity, perimetry, fundus of the eye) examinations.

All patients were divided into 5 groups, 1st group including 12 patients with AKTH-secreting pituitary adenomas (Cushing’s disease), 2nd and 3rd groups comprising 20 and 10 patients with STH-secreting and prolactin-secreting pituitary adenomas, respectively, the 4th group included 13 patients with empty saddle syndrome, the 5th one – 10 patients with functionally inactive pituitary tumors.

Results and discussion. CT and MRI of the Turkish saddle allowed detecting pituitary adenomas of various size from microadenomas (up 19 mm) to massive tumors (> 30 mm), the methods being used on the 1st stage of the patients’ examination making possible assessment of the examined area both in the radio-frequency range (MRI) and of moving parts (CT).

This allowed dividing the tumors in compliance with roentgenologic classification by Dedov I.I. (1997) as follows: I. Microadenomas (intrasellar, d < 10 mm), II. Macroadenomas with suprasellar invasion:

a) Group A (12 patients with suprasellar growth of tumors, size under 10 mm over hypophysial fossa)

b) Group B (6 patients with suprasellar growth of tumors, size 20 mm uprising anterior pocket of the III ventricle)

c) Group C (8 patients with suprasellar growth of very large pituitary adenomas, size up 30 mm performing anterior part of the III ventricle)

d) Group D (2 patients with suprasellar growth of massive tumors more than 30 mm, arising higher than Monro’s aperture or Group C adenomas with asymmetric lateral or all side growth).

It should be noted that ACTH-secreting pituitary adenomas could be observed as hypointensive foci on T-1 images and those with the increase intensity on T-2 images. Diagnosis of corticotropinomas is difficult due to small diameter (from 2-3 to 5-6 mm). Some authors recommend that gadolinium (DPTA), a contrast agent (Dwyer A.J., 1997, Doppman J.L., 1998) be used in the diagnosis of corticotropinomas. In contrast to corticotropinomas, somatotropinomas are large at the diagnosis; their degree of invasion and interrelations with the adjacent structures can be assessed by means of MRI. Microprolactinomas are better observed on T-2 weighted MT- tomograms (Dedov I.I., 1997), since the tumors are more contrast with more precise edges. Protrusion of local upper edge of the pituitary is an indirect sign of the pituitary microadenoma, the MRI and CT imaging of tumors less 3 mm in diameter being quite difficult.

Conclusions. 1) Combination of MRI and CT is indicated in examination of the Turkish saddle in patients with HHA disorders 2) CT is more useful in patients with the empty saddle syndrome 3) Saddle CT is more informative method of imaging in diagnosis of pituitary microadenomas (<19mm) with soft consistency and false capsule 4) As more economic and rapid method CT should be used initially in most cases in diagnosis of the brain disorders.