The hypothalamic-pituitary-adrenal axis changes in non-pituitary brain tumors survivors and the best method of diagnosis secondary adrenal insufficiency

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The number of survivors with non-pituitary brain tumors is constantly increasing and will grow up in the future. There are few data about their ACTH and DHEA-S status while prevalence of secondary adrenal insufficiency (SAI) varies depending on methods of diagnosis. The aim of our study was to describe changes in the hypothalamic-pituitary-adrenal axis (HPAA) after craniospinal irradiation (CSI) and diagnostic utility of the basal cortisol (BC), DHEA-S and glucagon stimulation test (GST) in comparison with insulin tolerance test (ITT) in this group of patients.

Results

The frequency of SAI following CSI

Patients and methods

Main group Control

Diagnosis Medulloblastoma Healthy

Number of subjects 31 (15 females; 16 males) 11 (6 females; 5 males)

Treatment M-2000 (total or partial resection of the tumor, chemotherapy; craniospinal irradiation (CSI): for whole brain - 15 Gy; for tumor area - 55 Gy; for spine - 32 Gy) -

Median age at time of treatment, years 10.8 3.5 (3-15)

Median age, years 19±3 (15-27) 25 3 (21-30)

Median follow-up, years 8.7±4.7 (2-20)

Methods of examination

Basal ACTH, basal cortisol and DHEA-S

ITT with blood samples for ACTH and cortisol at 0, 15, 30, 45, 60, 90, 120 min.
GST with blood samples for ACTH and cortisol at 0, 90, 120, 150, 210, 240 min.

Cut-off point for SAI

Cortisol < 550nmol/l in ITT

Receiver-operating characteristic (ROC) analysis was performed to identify the thresholds for basal cortisol, DHEA-S and GST.

Cut-off points for basal cortisol and DHEA-S levels corresponding to 100% specificity (Sp) for SAI and 100% specificity (Sp) for patients W- SAI were estimated to select a group of patients not requiring simulative tests.

Conclusions:

1. Prevalence of SAI after CRT is high.
2. Patients W-SAI had tendency to increased BC while SAI had lower DHEA-S level.
3. GST may be used as screening simulative test when ITT is contraindicated while BC and DHEA-S levels are in a grey zone.

Conclusion:

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