腦下垂體生理及診斷評估

Pituitary physiology and diagnostic evaluation

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The pituitary is a small gland located at the sella turcica and is attached to the hypothalamus by the pituitary stalk. The endocrine system is tightly regulated. The hypothalamus is the central mediator, via the pituitary gland; hormones from the anterior pituitary gland stimulate the target endocrine cells in the thyroid, adrenal, and gonads and in turn respond to suppression by the products of their targets (feedback control), i.e., hypothalamic–pituitary–thyroid axis, hypothalamic–pituitary–adrenal axis, hypothalamic–pituitary–growth hormone axis, and hypothalamic–pituitary–gonadal axis. Unlike the secretion of other pituitary hormones, prolactin (PRL) is primarily secreted under the tonic inhibitory control of the hypothalamus by the dopamine. Diverse neoplastic, inflammatory–infectious, and vascular diseases or defects in the cranial development could affect the pituitary gland.

The symptoms and signs of pituitary hormone insufficiency included growth retardation (children), decrease in energy and physical activity (adult) in growth hormone (GH) deficiency; amenorrhea, infertility, loss of libido in follicle stimulating hormone/luteinizing hormone (FSH/LH) deficiency; weakness, weight loss, low blood pressure, poor appetite, hyponatremia in adrenocorticotropic hormone (ACTH) deficiency; secondary hypothyroidism in thyroid-stimulating hormone (TSH) deficiency and inability to breast feed after delivery in prolactin (PRL) deficiency. By following the “feedback control” rule, the baseline hormonal levels could give physicians some idea in diagnosing pituitary hormone deficiency. Dynamic

endocrinology tests such as insulin tolerance test (ITT), thyrotropin-releasing hormone (TRH) stimulation test, and gonadotropin-releasing hormone (GnRH) stimulation test can help in the diagnosis of pituitary hormone insufficiency. ITT was performed by intravenously injecting 0.15 U/kg of RI to induce hypoglycemia. When hypoglycemia occurred, growth hormone and cortisol levels were checked. Growth hormone levels of <3 ng/mL indicated growth hormone deficiency, while cortisol level of <18.5 μg/dL indicated central adrenal insufficiency. TRH stimulation test was performed by intravenously injecting 200 μg of TRH; TSH levels of <5 μIU/mL after the stimulation suggested decreased response.

The most common symptom of pituitary tumor is headache. Temporal side visual field defects may also develop. In non-functioning pituitary tumors, the mass effect causes hyperprolactinemia; however, the level is frequently lower than that of a true prolactinoma. Functioning pituitary tumor caused various endocrine diseases, such as acromegaly (somatotroph adenoma), Cushing's disease (CD) (corticotroph adenoma), TSHoma, and hyperprolactinemia (lactotroph adenoma). The diagnosis and evaluation of these diseases are complicated. Multiple diagnostic tests and MR images of the sella are also indicated. Acromegalic patients had an elevated insulin-like growth factor 1 (IGF-1) level, and oral glucose suppression test did not result in a nadir growth hormone level of <1 ng/mL, together with typical bony and soft tissue characteristic features. Patients with CD had a moon face, buffalo hump, central obesity, and purple striae. Loss of diurnal cortisol changes and ACTH secretions with elevated urine free cortisol levels are found. To confirm the occurrence of CD, either overnight dexamethasone suppression test or low-dose dexamethasone suppression test can be performed. High-dose dexamethasone suppression test, desmopressin stimulation test, and corticotropin-releasing hormone stimulation tests help in localizing the ACTH-secreting tumor. However, bilateral inferior petrosal sinus

sampling is the gold standard in diagnosing a Cushing’s disease. TSHoma is a rare disease, which is confirmed by a positive pituitary image and blunted TSH response in the TRH test.