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Case Report

Endogenous Obesity Associated with Cushing's Disease: A Case Report

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Abstract

Cushing's disease (CD) constitutes most common cases of adrenocorticotropic hormone (ACTH) dependent Cushing's syndrome (CS). CD more often occurs in women. Recent studies indicate increasing prevalence of CD amongst the obese people. Therefore, the possibility of underlying CD should be ruled out in obese people. Inferior petrosal sinus sampling (IPSS) is an important diagnostic method for diagnosing and localizing CD cases who can't be diagnosed by standard imaging methods. IPSS can increase the success of the surgeon's treatment with information about the location of the adenoma. Here, we presented a case of a 36-year-old female patient admitted to the hospital for bariatric surgery who was diagnosed having CD localized by IPSS.

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Introduction

Cushing's syndrome (CS) is a rare disease characterized by hypercortisolemia. Endogenous CS is classified as adrenocorticotropic hormone (ACTH)-dependent or ACTH-independent.[1,2] ACTH-dependent CS accounts for 80-85% of the cases. Of these, 75-80% are due to ACTH production from a pituitary adenoma namely Cushing's disease (CD).[1] The prevalence of CD is of 40:1,000,000 people and more often occurs in women.[1,3] The most common sign of hypercortisolemia is central obesity.[4] Other findings in physical examination include moon face, buffalo hump, thinning of the skin, purple-colored cracks, atrophy and weakness in the proximal muscles, hirsutism, and hyperpigmentation.[1,4]

Case Report

A 36-year-old female patient without drug usage and comorbidity other than morbid obesity

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Table 1. IPSS results of our patient before and after CRH stimulation indicating a left sided Cushing's disease

	ACTH 5 minutes before CRH injection	ACTH before CRH injection	ACTH 2 minutes after CRH injection	ACTH 5 minutes after CRH injection	ACTH 10 minutes after CRH injection
Right inferior petrosal sinus sample	34 ng/L	34 ng/L	65 ng/L	81 ng/L	84 ng/L
Left inferior petrosal sinus sample	35 ng/L	40 ng/L	65 ng/L	94 ng/L	1035 ng/L
Peripheral venous blood sample	29 ng/L	29 ng/L	45 ng/L	68 ng/L	77 ng/L

Right and left inferior petrosal sinuses of the patient were accessed through the right common femoral vein. Blood sampling was performed from bilateral inferior petrosal sinuses and peripheral vein at the 5th minute before corticotropin releasing hormone (CRH) injection and at 0^{th}, 2^{nd}, 5^{th}, and 10^{th} minutes after intravenous injection of CRH.

was admitted for sleeve gastrectomy for the surgical treatment of obesity. The patient gained 35 kilograms in the last two years and had prominent central obesity. Although she had no menstrual irregularity, hirsutism, hyperpigmentation, plethora, moon face, purple striae and buffalo hump, CS was investigated for significant weight gain in 2-year time period. In the diagnosis of CS, 24-hour urinary free cortisol (UFC) level, serum or salivary cortisol measurements at night and 1 mg dexamethasone suppression test (DST) are used as screening tests as well as basal ACTH and cortisol measurements.3 In our case, the basal measurements suggest primarily ACTH-dependent CS with an ACTH level of 28 ng/dL and cortisol level of 11 mcg/dL. In our case serum cortisol level was not suppressed and measured as 11 mcg/dL (above 1.8 mcg/dL) at 1 mg DST. Serum cortisol level at night (23:00 h) was measured to be 13,2 mcg/dL with an ACTH level of 20 ng/L, indicating a disrupted diurnal rhythm. Her 24-hour UFC level was higher than normal. The next step in cases where CS is suspected includes performing a high-dose dexamethasone suppression test followed by localization of the lesion with imaging techniques. Since our patient who was not suppressed with 1 mg DST, a high dose 2 mg DST for 2 days was performed in which cortisol was not suppressed and measured to be 6.6 mcg/dL. After proving CD biochemically with increased cortisol levels, a sellar magnetic resonance imaging (MRI) was performed and a 2x2 mm isointense-slightly hypointense suspicious microadenoma was detected in the left side of the pituitary gland.

Discussion

On presentation, over 50% of the patients with CD have pituitary microadenoma with a diameter smaller than 5 mm.3 IPSS is the most important test, especially in patients who do not present with a definite pituitary lesion.2 Our patient had no suppression in both DST tests and a 2x2 mm suspicious microadenoma detected in pituitary MRI was decided to have an IPSS for making sure that the CS was caused by a pituitary adenoma. While the ratio of ACTH level in blood taken from inferior petrosal sinus to peripheral blood is almost always above 2 in CD, it is below 1.7 in ectopic ACTH syndromes.[4] Most of the time, sampling is done with a corticotropic releasing hormone (CRH) stimulation to strengthen the specificity of the test. In this test, central to peripheral ACTH ratio is expected to be above 3 for diagnosis to CD.[4] As a result of the IPSS the central to peripheral ACTH ratio was found to be high in our patient. The central to peripheral ACTH was 1.17 for the right side and 1.37 for the left side for our case. With CRH stimulation, this ratio was measured to be 1.09 for the right side and 13.44 for the left side at the 10th minute after CRH (Table 1). It was determined that 2x2 mm pituitary microadenoma caused CS in our patient whose ACTH ratio was above 3 on the left side after CRH stimulation. Upon these findings, the patient was referred to

neurosurgery department for pituitary surgery.

In conclusion, IPSS is an important test in distinguishing whether the cause is pituitary or ectopic in ACTH dependent CS patients. It can contribute to increasing the success of the treatment by increasing the rate of successful resection of pituitary adenomas by guiding the surgeon in terms of tumor localization.

Conflict of Interests

Authors declare that there are none.

Acknowledgment

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