Pseudo-Cushing's state in a patient with non-functioning pituitary adenoma

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DESCRIPTION

A 65-year-old Japanese woman was referred for investigation of hypertension. She had medical histories of osteoporosis, cataract and glaucoma, but no history of diabetes mellitus, polycystic ovary syndrome, depression or excessive alcohol intake. She had severe obesity (body mass index: 39.5 kg/m²) and had suffered from continuous pain due to internal derangement of the knee for 2 weeks. Physical assessment revealed Cushing's signs of moon face, buffalo hump and centripetal obesity (figure 1A). Both plasma adrenocorticotropin hormone (ACTH) and serum cortisol levels at 17:00 were high (77.9 pg/mL and 18.22 µg/dL, respectively). Pituitary contrast-enhanced MRI showed a pituitary tumour (24×23×21 mm), suggesting adenoma (figure 2A). Adrenal CT showed normal shapes. These results indicated Cushing's disease (CD), and she was admitted to our hospital 3 weeks later for thorough endocrinological examinations. Basal plasma ACTH and serum cortisol levels were normal (33.3 pg/mL and 11.4 µg/dL, respectively) with preserved circadian rhythms (figure 2B). A 24-hour urine collection showed a normal level of free cortisol (44.8 µg/day), and overnight administration of 0.5 mg of dexamethasone reduced the serum cortisol level (0.7 µg/dL) (figure 2B). Results of stimulation tests for anterior pituitary hormones, including corticotropin-releasing hormone (CRH), gonadotropin-releasing hormone and thyrotropin-releasing hormone, were unremarkable (figure 2C). We made a provisional diagnosis of non-functioning pituitary adenoma in a pseudo-Cushing's state (PCS), and endoscopic

Figure 2 (A) T1-weighted image of pituitary contrast-enhanced MRI showed a pituitary tumour (arrowheads), indicating pituitary adenoma. (B) Circadian rhythms of plasma adrenocorticotropin hormone (ACTH) and serum cortisol levels were preserved with normal urine free cortisol (UFC) level. (C) Anterior pituitary hormonal evaluation. A corticotropin-releasing hormone (CRH) test (left), thyrotropin-releasing hormone (TRH) test (middle) and gonadotropin-releasing hormone (GnRH) test (right) showed no remarkable results. DEX, dexamethasone; FSH, follicle-stimulating hormone; LH, luteinising hormone; PRL, prolactin; TSH, thyroid-stimulating hormone.

endonasal transsphenoidal surgery for the pituitary tumour was performed. Histopathology of the resected tumour confirmed pituitary adenoma with negative ACTH staining.

PCS is a mimic condition of overt hypercortisolism; the differential diagnosis between CD and PCS can be very challenging.^{1,2} Patients with obesity, metabolic syndrome, polycystic ovary syndrome, chronic alcoholism, depression and extreme physical stress are known to develop PCS.¹⁻³ Obese patients have been reported to have hyperactivation of the hypothalamus-pituitary-adrenal (HPA) axis in response to both physical and psychosocial stressors, as in our patient.^{1,2,4} The coincidental finding of

Figure 1 Cushingoid symptoms: buffalo hump (upper) and centripetal obesity (lower).

Learning points

- ▶ The differential diagnosis of pseudo-Cushing's state and Cushing's disease can be very difficult, especially in obese patients with a pituitary tumour.
- ▶ Obese patients cannot only present Cushingoid symptoms but also have hyperactivity of the hypothalamus-pituitary-adrenal (HPA) axis.
- ▶ Clinicians should pay attention to physical and psychosocial stressors that derange the HPA axis when evaluating obese patients with Cushingoid symptoms.

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non-functioning pituitary adenoma made the diagnosis in our patient more difficult; however, circadian rhythms of ACTH/cortisol, an overnight dexamethasone suppression test and a CRH test suggested PCS rather than CD.^{1–3} Clinicians should pay attention to factors leading to derangement of the HPA axis when evaluating severely obese patients with Cushingoid symptoms.

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