Case Report

Pure Androgen-Secreting Adrenal Adenoma Associated with Resistant Hypertension

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Pure androgen-secreting adrenal adenoma is very rare, and its diagnosis remains a clinical challenge. Its association with resistant hypertension is uncommon and not well understood. We present an 18-year-old female with a 10-year history of hirsutism that was accidentally diagnosed with an adrenal mass during the evaluation of a hypertensive crisis. She had a long-standing history of hirsutism, clitorimegaly, deepening of the voice, and primary amenorrhea. She was phenotypically and socially a male. FSH, LH, prolactin, estradiol, 17-hydroxyprogesterone, and progesterone were normal. Total testosterone and DHEA-S were elevated. Cushing syndrome, primary aldosteronism, pheochromocytoma, and nonclassic congenital adrenal hyperplasia were ruled out. She underwent adrenalectomy and pathology reported an adenoma. At 2-month followup, hirsutism and virilizing symptoms clearly improved and blood pressure normalized without antihypertensive medications, current literature of this unusual illness and it association with hypertension is presented and discussed.

1. Introduction

Benign and malignant tumors of the adrenal gland might be functional or silent. The majority of these tumors are benign, nonfunctioning adenomas that are incidentally discovered on abdominal image studies. Others are functional adenomas able to secrete cortisol, aldosterone, or less commonly androgens or estrogens [1]. Pure androgen-secreting adrenal tumors are very unusual, and their diagnosis represents a clinical challenge. Hirsutism and virilization syndrome, characterized by clitorimegaly, male pattern baldness, and deepening of the voice along with menstrual irregularities are the most common findings [2–4]. Resistant hypertension is also a clinical feature in these cases, and it is defined as arterial hypertension above goals in spite of the concurrent use of three different antihypertensive drugs of different classes, including a diuretic [5].

The association of pure androgen-secreting adrenal tumors with hypertension has exceptionally been reported. Most of the cases have been carcinomas and mixed hormone-secreting tumors [6–8]. Even though it is well known that testosterone can increase blood pressure and epidemiological studies have demonstrated a higher blood pressure in males than females, most studies agree that androgens are only an aggravating factor rather than the exclusive cause of resistant hypertension [9, 10].

Herein, we present the case of an 18-year-old female with a 10-year history of hirsutism, virilization, and primary amenorrhea associated to an incidental adrenal mass found after a hypertensive crisis.

2. Case Report

An 18-year-old female with past medical history of hirsutism and hypertension was referred to the endocrinology clinic for assessment of an adrenal mass and resistant hypertension. She had a normal childbirth, no medical illness, and a normal
sexual, social, and physiological development during her infancy and childhood. At age eight, she began to notice progressive hirsutism. However, she never asked for medical advice. Six years later, she was diagnosed with hypertension that was uncontrolled with full-dose telmisartan, metoprolol, prazosin, and nifedipine. She never had menarche. Two months before our evaluation, she presented a hypertensive crisis with right-sided hemiplegia and severe chest pain that relapsed after blood pressure was controlled. MRI was negative for stroke and electrocardiogram, and heart enzymes were normal. During the evaluation, a chest-abdomen CT scan was performed and a left adrenal mass of $10 \times 9$ cm was found (Figure 1). At physical examination, heart rate was 82 per minute, blood pressure 150/90 with respiratory rate of 16 per minute, and temperature of 36.3°C. Hirsutism was evaluated based on Ferriman-Gallwey modified score (result = 24). Clitorimegaly, nondeveloped mammary glands, voice deepening and primary amenorrhea were also present (Figures 2, 3, and 4). She had gone through puberty mentally and socially as a male. FSH, LH, prolactin, estradiol, 17-hydroxyprogesterone, and progesterone were normal. Total testosterone was 4.33 ng/mL (0.06–0.82), androstenedione 10 ng/mL (0.4–2.7), and dehydroepiandrosterone sulfate (DHEA-S) $> 1000 \mu$g/dL (35–430 $\mu$g/dL). Adrenocorticotropic hormone (ACTH), urinary free cortisol, 1 mg dexamethasone suppression test, and 11-deoxycorticosterone were normal. Following a complete removal of telmisartan and metoprolol for 6 weeks, plasmatic methanephrines, urinary metanephrines, and plasma aldosterone concentration/plasma renin activity were found to be normal (Table 1). As well, Doppler ultrasound of renal arteries was found to be without any phytology. After controlling the blood pressure, the patient underwent a successful left adrenalectomy. The specimen was a $10 \times 11$ cm tumor. Pathology reported an adrenal adenoma with no signs of malignancy. After surgical intervention, plasma DHEA-S and testosterone concentration became normal. At 2-month followup, she was off antihypertensive agents and normotensive and referred that hair growth had clearly stopped.

3. Discussion

This case illustrates a long delay in the diagnosis of a virilizing syndrome due to a pure androgen-secreting adrenal adenoma that presented with simultaneous resistant hypertension. Pure androgen-secreting adrenal tumors are extremely rare. Hyperandrogenemia in women may be from an ovarian or adrenal source. DHEA-S, DHEA, androstenedione, testosterone, and dihydrotestosterone are the major circulating androgens in women. DHEA-S, is produced solely in...
and malignant tumors were primary adrenal benign disease adrenalectomies and one for severe hypertension since blood pressure normalization rapidly occurred after the removal of this benign adrenal neoplasm.

4. Conclusion

Pure androgen-secreting adrenal tumors are extremely rare. Hiruitism, virilization, and menstrual irregularities are
the usual clinical findings. Malignancy is difficult to predict, but it is usually related with tumor size, type of hormones secreted, and the velocity of the tumor progression. The association with hypertension is extraordinarily rare, and it is usually accompanied by glucocorticoid or aldosterone hypersecretion. The exact mechanism by which a pure androgen-secreting adrenal tumor can cause hypertension remains unclear.

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