Online Case Report

Laparoscopic adrenalectomy – a cure for male pattern baldness

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A 64-year-old woman presented to a dermatologist with male pattern hair loss and was found to have grossly elevated testosterone levels at 22.3 nmol/l (normal range, 0.0–2.9 nmol/l). The diagnosis of an androgen-secreting adrenal tumour was made and she underwent a laparoscopic retroperitoneal right adrenalectomy with an uneventful speedy recovery, being discharged in less than 48 h, underlining the clear advantage of this approach.

Keywords: Hair loss – Testosterone – Androgen-secreting adrenal cancer

A 64-year-old woman presented to a dermatologist with male pattern hair loss and was found to have grossly elevated testosterone levels at 22.3 nmol/l (normal range, 0.0–2.9 nmol/l). The elevated levels were confirmed on repeated samples. In addition to hair loss, the patient also had deepening of her voice. Other investigations showed that her gonadotrophins were suppressed, appropriate for her high testosterone level, the FSH being 13.4 IU/l (normal range, 26–135 IU/l) and the LH 7.7 IU/l (normal range, 8–58 IU/l). The DHEAS was not elevated and she had normal progesterone and β -HCG of < 1 U/l. The 24-h urinary steroid profile showed that she had a normal urinary free cortisol at 121 nmol/day (normal range, 25–280 nmol/day) and the only other elevated steroid was androsterone at 19 μ mol/day, *i.e.* raised androgens for a postmenopausal female. The steroid profile showed no evidence of a rise in the metabolites, which would be expected with any form of congenital adrenal hyperplasia. CT scan of her adrenals and pelvis showed a 2.4 x 1.7 cm right adrenal mass (Fig. 1). There was no evidence of an ovarian mass, although neither ovary was positively identified. Further investigations included normal 24-h urine catecholamines and aldosterone–renin ratio.

The diagnosis of an androgen-secreting adrenal tumour was made and she underwent a laparoscopic

retroperitoneal right adrenalectomy with an uneventful speedy recovery, being discharged in less than 48 h, underlining the clear advantage of this approach.

Her serum testosterone measured at 2 weeks' postoperatively was 0.4 nmol/l, this being a huge fall from pre-operative values. The FSH and LH levels at 2 weeks' postoperatively showed similar improvements, FSH being 105.4 IU/l and LH being 51.8 IU/l. Three weeks later, her hair loss has stopped and she has noticed marked improvement in her symptoms. Her serum testosterone repeated again at 8 weeks' postoperatively was at 0.3 nmol/l and FSH and LH at 107.4 IU/l and 55.8 IU/l, respectively.

Histology suggested a benign adrenocortical adenoma; however, immunohistochemistry revealed that the tumour was positive for vimentin and negative for cytokeratin. At 6 months' postoperatively, she remained asymptomatic and had no further hair loss. She is under long-term surveillance.

Comment

Ovarian and adrenal tumours secreting androgens constitute less than 1% of cases of hypersecretion of

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Figure 1 CT scan demonstrating the adrenal mass (as marked with arrow).

androgens in females. Whereas virilisation is the hallmark of Cushing's syndrome secondary to adrenal carcinoma, virilisation in the absence of elevated urinary 17-ketosteroids is uncommon, however, and should raise the possibility of testosterone-secreting ovarian or adrenal lesions. Of the two sites of origin, adrenal cortical tumours that secrete testosterone are exceedingly rare. Most adrenal tumours have been adenomas, but several have been ganglioneuromas with Leydig's cell nodules¹ or Leydig's cell adenoma.² Most tumours have been found in women, although they have been reported in men and children. Testosterone secretion can be autonomous, under gonadotropin control³ or under ACTH control.² In contrast to the other adrenal tumours, these tumours are usually smaller than 6 cm, and they behave in a benign fashion. In a review of 47 documented cases of testosterone-producing neoplasms, however, eight were virilising carcinomas.^{4,5}

The majority of the previously described androgen-secreting adrenal tumours have presented with hirsutism and menstrual irregularities in young women.⁶ This case is unusual, therefore, in that the patient is not only a postmenopausal lady but that she describes male pattern baldness and voice changes which in themselves have not been described relating to these tumours. Furthermore, it underlines the ever increasing role of the laparoscopic

approach in urology in the management of adrenal masses. In spite of the rarity of this clinical problem, the principles for optimum management are obvious in that every woman with male pattern baldness warrants screening for a testosterone-producing neoplasm. Current laboratory and roentgenological assessment permits an accurate diagnosis as to the location of the tumour. Pure testosterone-secreting adrenal tumours tend to have a low malignant potential and distinction between a carcinoma and adenoma is based on several macroscopic and microscopic findings as well as imaging characteristics. Immunohistochemistry shows no pathognomonic profile for adrenal carcinoma; however, vimentin has been reported to be positive in carcinoma with a variable frequency. Neoplasms with other features of carcinoma (size, adverse radiology and typical morphology) have been shown to be vimentin-positive and cytokeratin-negative. Vimentin positivity varies from 0–14% in adenomas in contrast to 73–100% in carcinomas.⁷ These features suggest the need for a long-term follow-up.

References

1. Aguirre P, Sculley RE. Testosterone secreting adrenal ganglioneuroma containing Leydig cells. *Am J Surg Pathol* 1983; 7: 699–705.

2. Trost BN, Koenig MP, Zimmermann A, Zachmann M, Muller J. Virilization of a post-menopausal woman by a testosterone-secreting Leydig cell type adrenal adenoma. *Acta Endocrinol (Copenh)* 1981; **98**: 274–82.
3. Werk Jr EE, Sholiton LE, Kalejs L. Testosterone-secreting adrenal adenoma under gonadotropin control. *N Engl J Med* 1973; **289**: 767–70.
4. Gabrilove JL, Seman AT, Sabet R, Mitty HA, Nicolis GL. Virilizing adrenal adenoma with studies on the steroid content of the adrenal venous effluent and a review of the literature. *Endocr Rev* 1981; **2**: 462–70.
5. Mattox JH, Phelan S. The evaluation of adult females with testosterone producing neoplasms of the adrenal cortex. *Surg Gynaecol Obstet* 1987; **164**: 98–101.
6. Kelly TR, Mayors DJ, Boutsicaris PS. Adrenal adenoma – isolated testosterone secretion. *Am Surg* 1982; **48**: 604–6.
7. Lack EE. Tumours of the adrenal gland and extra-adrenal paraganglia. In: Rosai J. (ed) *Atlas of Tumor Pathology*, vol 19, 3rd Series. Washington DC: Armed Forces Institute of Pathology, 1995; 123–52.