Nephroquiz
(Section Editor: M. G. Zeier)

Malignant hypertension after adrenalectomy

Case

A 48-year-old Chinese presented with bilateral blurred vision, and was found to have accelerated hypertension and funduscopic manifestation of papilloedema. He had been diagnosed as having a left adrenal tumour 2 months previously, when he first reported anorexia and left upper quadrant pain. Computed tomography (Figure 1) and subsequent laparotomy excision revealed a large adrenocortical carcinoma characterized by moderate pleomorphism of tumour cells and mitosis. Preoperative investigation details were not known to the patient, who was thought to be normotensive at that time. He never reported paroxysmal palpitation or symptoms related to catecholamine excess.

His plasma potassium level was 2.7 mmol/l (normal range 3.5–5.1 mmol/l), with a bicarbonate level of 29 mmol/l and corresponding urinary potassium of 51 mmol/l. Urinary cortisol and catecholamines were within normal range.

Questions

What is the cause of his hypertension?

Fig. 1. Preoperative computed tomography of abdomen showing a displaced left kidney.
These biochemical features and the development of malignant hypertension 2 months after adrenal tumour removal suggested renin-mediated hypertension. Possible adrenal tumour compression of left renal parenchyma and subsequent ischaemia (known as Page kidney) might have been considered in view of the substantial mass effect of adrenal tumour (Figure 1). Onset of marked hypertension after surgical adrenalectomy, nevertheless, was less compatible with Page kidney. Accordingly, further imaging including a $^{99m}$Tc DTPA radionucleotide study and computed tomography disclosed right renal compensatory hypertrophy and left ischaemic kidney secondary to an abrupt complete occlusion of the main renal artery (Figure 2) near the aortic origin.

The disease entity in our case depicted renal underperfusion due to renal artery stenosis, reminiscent of the contemporary experimental two-kidney, one-clip model. Since renovascular hypertension after surgical treatment for adrenal diseases is rare except in phaeochromocytoma (which might be associated with renal artery lesions) [1], the most likely cause of accelerated hypertension in this particular patient is iatrogenic renal artery injury.

Unintentional clipping or ligation injury of renal artery during adrenal surgery, albeit uncommon, should be considered among patients who returned with hypertension after apparent successful adrenal removal. Five similar cases of iatrogenic renovascular hypertension following adrenal tumour or phaeochromocytoma excision have been reported in the literature [2–5], with four of them requiring hypertension cure by nephrectomy. Putatively, development of hypertension in this case was mediated by activation of the renin-angiotensin system, secondary to iatrogenic renal arterial occlusion. Increased renin secretion and circulation (as supplied by collateral renal vasculature) [6] resulted in refractory renin-dependent hypertension. Our patient underwent surgical removal of the shrunken left kidney; his blood pressure promptly normalized during intraoperative occlusion of renal vasculature, and remained so thereafter since nephrectomy.

This uncommon entity of hypertension deserves emphasis, in as much as it is potentially curable—and obviously preventable.

Conflict of interest statement. None declared.

References

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