Correspondence

Bilateral renal artery stenosis and primary aldosteronism in a diabetic patient

Sir,

The close association between diabetes mellitus and cardiovascular disease is well known, the risk of cardiovascular disease being 2–5 times greater in diabetics than in the background population. Renal arteries seem to be widely involved in the macrovascular disease of diabetes, and primary aldosteronism is also a well-recognized cause of secondary hypertension. We report a diabetic woman presenting with refractory hypertension, who had coexisting bilateral atherosclerotic renal artery stenosis and aldosteronism due to bilateral adrenal hyperplasia.

A 58-year-old woman was admitted to our Department because of refractory hypertension during the last 4 months, superimposed on preexisting and poorly controlled hypertension. The patient was completely asymptomatic. There was a 10-year history of hypertension and type 2 diabetes mellitus. Her medications comprised atenolol, irbesartan, hydrochlorothiazide, amlodipine, terazosin, ticlopidine, metformin, and glibenclamide.

Blood pressure was 230/100 mmHg, equal in both arms, and the pulse was 80 bpm. On physical examination, renal bruits were heard bilaterally. Twenty-four-hour blood pressure monitoring confirmed marked hypertension and also showed extreme dipping during night-time.

On admission, the laboratory values included Ht 31.8%, Hb 10.4 g/dl, MCV 83.0 fl, MCH 27.3 pg, MCHC 32.8 g/dl, potassium 4.3 mmol/l, glucose 288 mg/dl, urea 57 mg/dl, creatinine 1.28 mg/dl, HbA1c 8.6%, total cholesterol 258 mg/dl, LDL cholesterol 169 mg/dl, HDL cholesterol 60 mg/dl, and triglycerides 144 mg/dl. Her urine was positive (++) for protein and glucose. Protein excretion in a 24-h urine collection was estimated at 1 g, and creatinine clearance was 33 ml/min. An electrocardiogram was normal. A chest radiograph showed cardiomegaly. On ultrasonographic examination of the abdomen, the right and left kidneys measured 10.0 cm and 10.9 cm, respectively. A renal scan was performed and indicated the presence of bilateral renal artery stenosis. Renal angiography was subsequently undertaken, and confirmed the diagnosis of bilateral renal artery stenosis (Figure 1). Angioplasty was successfully performed in both renal arteries, and a stent was placed in the right renal artery.

At subsequent out-patient review 1 month later, the patient’s blood pressure remained elevated at 170/90 mmHg, and she was therefore readmitted for further investigation. Routine tests for primary aldosteronism were performed. Supine plasma renin activity and plasma aldosterone were 0.02 ngAl/ml/h (normal range 0.2–2.7 ngAl/ml/h) and 22.3 ng/dl (normal range, 1.0–16.0 ng/dl), respectively. The plasma aldosterone/plasma renin activity ratio was 1115 ng/dl/ng/ml/h, well above the cut-off level of 30 ng/dl/ng/ml/h. These results were consistent with a diagnosis of primary aldosteronism. A computed tomographic scan of the abdomen with fine cuts

Figure 1. Renal angiography showing bilateral renal artery stenosis.
showed a nodule of 1.8 cm in diameter in the left adrenal gland, and a nodule of 1.4 cm in diameter in the right adrenal gland, consistent with bilateral adrenal hyperplasia (Figure 2).

Spironolactone 100 mg bid was administered, and blood pressure fell to normal levels after a few days; spironolactone was then reduced gradually and was maintained at 25 mg bid. After discharge, she is still being followed-up in the out-patient clinic and at a recent review, her blood pressure was 125/80 mmHg.

The prevalence of renovascular hypertension varies from 5% in all hypertensive patients to as many as 30% of patients with known or suspected atherosclerotic cardiovascular disease in coronary, cerebral or peripheral arterial beds. Furthermore, renovascular disease is the primary cause of renal insufficiency in 15% of patients aged >50 years who develop end-stage renal disease. The precise prevalence of renal artery stenosis (RAS) in patients with type 2 diabetes and hypertension has not yet been established. In an autopsy study of 5194 consecutive cases, RAS was found in 10.1% of cases with a history of both hypertension and diabetes, compared with 6.1% of those with a history of hypertension alone. However, the clinical significance of stenosis was unknown. In a cohort of 589 diabetic hypertensive patients, 99 (16.6%) had RAS (at least 50% of one renal artery). In two other series, a similar prevalence of 16–17% was reported in hypertensive patients with type 2 diabetes.

Atherosclerotic RAS is a progressive disease, particularly in patients with diabetes or other manifestations of atherosclerosis. Progressive stenosis has been reported in 51% of renal arteries 5 years after diagnosis: 3–16% of renal arteries became totally occluded and renal atrophy developed in 21% of patients with renal artery stenosis of >60%.

Percutaneous revascularization of renal artery stenosis involves conventional balloon angioplasty, with or without stenting. The main goals of renal revascularization are better control of hypertension, stabilization of renal function in a substantial percentage of patients, and the elimination of recurrent cardiac events, such as flash pulmonary oedema. In our patient, a successful percutaneous transluminal angioplasty of both renal arteries was performed, and a stent was placed in the right renal artery.

Primary aldosteronism (PA) was until recently believed to account for <1% of hypertensive patients. Hypokalaemia was considered a prerequisite for pursuing diagnostic tests for PA. However, recent reports applying the plasma aldosterone/plasma renin activity ratio (ARR) as a screening test among both hypokalaemic and normokalaemic hypertensives have suggested that the prevalence of PA may exceed 10%. Patients with PA may have either bilateral adrenal hyperplasia (BAH) or aldosterone-producing adenoma (APA). Hypertension in patients with APA can be cured or at least significantly ameliorated by unilateral adrenalectomy. On the other hand, in patients with BAH, the diagnosis of the underlying cause of hypertension is fundamental for targeted pharmacotherapy with aldosterone receptor antagonists. Increased aldosterone levels induce vascular and cardiac toxicity that is, in part, independent of the effect on blood
pressure.\textsuperscript{13,14} Therefore, if BAH is left undiagnosed, the majority of these patients would be treated with antihypertensive drugs other than aldosterone receptor antagonists, and aldosterone-induced toxicity might advance unabated. In our patient, the increased ARR, in combination with the findings of the CT scan of the adrenals, led to the diagnosis of bilateral adrenal hyperplasia and with the administration of spironolactone, blood pressure normalized after a few days.

Few studies report the coexistence of renal artery stenosis and primary aldosteronism. In three reports, the renal artery stenosis was atherosclerotic\textsuperscript{15–17} and in one case was compatible with fibromuscular dysplasia.\textsuperscript{18} In our patient with a history of type 2 diabetes and severe hypertension, the diagnostic tests revealed bilateral atherosclerotic renal artery stenosis and primary aldosteronism due to bilateral adrenal hyperplasia: two causes of secondary hypertension that rarely coexist.

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References

doi:10.1093/qjmed/hci143

Colonic diverticular haemorrhage is associated with atherosclerosis

Sir,

Colonic diverticulosis occurs in the majority of Western populations, but only a small proportion of people experience symptoms. Diverticular disease usually presents with either diverticulitis or haemorrhage. Bleeding from colonic diverticulum is usually

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