

Intermittent claudication complicating beta-blockade

Intermittent claudication is an occasional side effect of beta-adrenergic blockade¹ but clinical details are lacking. Beta-blocking agents may exacerbate intermittent claudication in patients with severe peripheral arterial insufficiency.² The following cases suggest that they may also provoke claudication in patients with previously asymptomatic peripheral arterial disease.

Case 1

A man aged 54 without previous cardiovascular symptoms was found to be hypertensive. He was treated with methyldopa and, because of probable paroxysmal nocturnal dyspnoea, with bendrofluazide. After six months propranolol 120 mg daily was substituted for methyldopa. Three weeks later he developed cold extremities and bilateral calf claudication at 150 yards. After eight weeks' treatment, during which the blood pressure fell from 220/125 to 200/120 mm Hg, propranolol was withdrawn. Claudication began to improve after three weeks and resolved within five.

Seven weeks after stopping propranolol the patient could play golf. Although both feet were cool, all peripheral pulses were palpable. The resting Doppler pressure index³ was normal, but Doppler sonography⁴ indicated generalised atherosclerosis of the lower limbs without pronounced vessel narrowing. The electrocardiogram (ECG) showed left ventricular hypertrophy. There was no radiographic evidence of cardiac decompensation.

Case 2

A woman aged 60 without previous cardiovascular symptoms had a transient hemiplegia. Her blood pressure was 220/120 mm Hg. She was treated with practolol 300 mg daily. Six months later she developed bilateral calf claudication at 100 yards; blood pressure was unchanged and there were clinical signs of widespread distal arterial disease. ECG and chest x-ray examination indicated mild left ventricular hypertrophy; there was no evidence of cardiac decompensation. Methyldopa and bendrofluazide were substituted for practolol. One month later the blood pressure was 180/100 mm Hg and right calf claudication had resolved. Left calf claudication and the peripheral pulses were, however, unchanged. Left phenol sympathectomy was performed. After three months severe left calf claudication persisted, but right-sided symptoms had not recurred.

Case 3

A man aged 59 without previous cardiovascular symptoms sustained an anterior myocardial infarction. Despite digoxin and frusemide, signs of cardiac decompensation persisted for three months. Four months after infarction he developed angina, and propranolol 120 mg daily was added to his treatment. Two months later he had no angina but complained of cold feet. After a further three months he developed bilateral calf claudication: the clinical signs indicated bilateral superficial femoral artery occlusions with poor distal flow. Without a change in his drug therapy, a left phenol sympathectomy was performed. Six months later, on the same drugs, bilateral claudication persisted but was less severe.

Case 4

A woman aged 56 with a history of angina developed atrial fibrillation and acute left heart failure; there was no evidence of myocardial infarction. She reverted to sinus rhythm and cardiac failure resolved. Digoxin and frusemide were continued, and four months later propranolol 160 mg daily was added because of angina. Five months after starting propranolol and one month after the dose was increased to 240 mg daily she developed bilateral calf claudication. The clinical signs indicated widespread distal arterial disease. Practolol 600 mg daily was substituted for propranolol. Symptoms persisted and without a further change of drug treatment bilateral phenol sympathectomies were performed.

Discussion

From these and other similar cases we have concluded that, although not listed by the drug manufacturers,⁵ claudication is an important and potentially reversible side effect of cardioselective and non-selective beta-blockade. Presumably the drop in cardiac output causes a critical reduction in peripheral perfusion and hence unmasks previously asymptomatic arterial disease.

The incidence of claudication complicating beta-blockade may be higher in patients with myocardial ischaemia, and thus with established atheromatous disease, than has been reported in hypertensive patients¹;

patients with cardiac decompensation may be particularly vulnerable. We recommend that patients, especially those with a history of cardiac decompensation, should not be given beta-blocking agents without careful assessment of their peripheral vascular status.

¹ Conway, J, in *Modern Trends in Cardiology*—3, ed M Oliver, p 380. London and Boston, Butterworth, 1975.

² George, C F, *Prescribers' Journal*, 1974, **14**, 93.

³ Lennihan, R, and Mackereth, M A, *Angiology*, 1975, **26**, 211.

⁴ Gosling, R G, and King, D H, in *Cardiovascular Applications of Ultrasound*, ed R S Reneman, p 266. Amsterdam and London, North-Holland Publishing Company, 1974.

⁵ *Data Sheet Compendium*, London, Association of the British Pharmaceutical Industry, 1976.

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Normotensive primary aldosteronism

Primary aldosteronism is an uncommon condition, accounting for less than 1% of unselected hypertensives.¹ The condition classically presents with hypertension of only moderate degree and symptoms related to hypokalaemia. This classic picture, however, is not often seen. Hypokalaemia may be mild and symptomless and patients with malignant hypertension have been described. We report a case of normotensive primary aldosteronism due to adrenal adenoma, a condition that has not been reported before.

Case report

A 40-year-old man was admitted to hospital as an emergency after developing severe generalised muscle weakness associated with acral and circumoral paraesthesiae. He reported two similar attacks during the previous three years, each resolving without sequelae within three days. There was no family history of periodic paralysis and he denied taking medicines or liquorice. Examination showed generalised muscle weakness with normal tendon jerks. Blood pressure recorded on six occasions over one month before starting treatment and while taking a normal ward diet (sodium content 100-150 mmol (mEq) 24 h) varied from 120/80 to 140/90 mm Hg (mean 133/85 mm Hg). There was no postural fall. The means of five estimations of plasma electrolytes over the same period were: sodium 145 mmol/l (145 mEq/l), potassium 2.4 mmol/l (2.4 mEq/l), chloride 100 mmol/l (100 mEq/l), and bicarbonate 30 mmol/l (30 mEq/l). While on a 10-mmol sodium diet plasma renin activity was <3 µmol/l/min (<3 ng/l/min) both lying and standing (normal for our laboratory: 25-31 µmol/l/min (32-40 ng/l/min) lying, and 31-62 µmol/l/min (40-80 ng/l/min) standing). Peripheral venous aldosterone (measured at the MRC Blood Pressure Unit in Glasgow by radioimmunoassay after paper chromatographic separation) was 1180 pmol/l (42.5 ng/100 ml) on a free ward diet at 10 am after two hours of recumbancy (normal <500 pmol/l (<18.0 ng/100 ml)), and 800 pmol/l (28.8 ng/100 ml) at 12 noon after walking (a normal range was not available but the observed fall in aldosterone on ambulation is characteristic of aldosterone-producing adenoma rather than idiopathic adrenal hyperplasia, in which the level usually rises under these conditions²). The left adrenal venous plasma aldosterone was 340 pmol/l (12.3 ng/100 ml) and that in the inferior vena cava above the adrenal veins 930 pmol/l (33.5 ng/100 ml). The left adrenal venogram was normal but the right adrenal vein could not be catheterised. Adrenal scanning after administering ¹³¹I-iodocholesterol showed dense uptake on the right and minimal uptake on the left. The electrocardiogram showed flattening of T waves and prominent U waves in keeping with hypokalaemia. Chest x-ray films and an intravenous pyelogram were normal. Hypokalaemia was corrected initially with spironolactone 75 mg daily but this caused impotence. The right adrenal, bearing a tumour 2 cm in diameter, was removed. The presence of a benign adenoma was confirmed histologically. After operation serum potassium remained normal and blood pressure was 120/80 mm Hg.