

**Case 2**—A 56-year-old man suffered severe unstable angina three months after an inferior myocardial infarction. Treatment with propranolol 160 mg/day and isocardide dinitrate 60 mg/day was ineffective, and nifedipine 40 mg/day was added to the regimen. Three days later severe muscle cramps occurred in both legs and hands. The pain occurred only at night, the patient being asymptomatic during the day. The drug was discontinued and the cramps resolved. After a week the drug was readministered and the pain reappeared within 24 hours. The drug was again discontinued and the patient referred for surgery.

**Case 3**—A 73-year-old man with severe ischaemic heart disease and old myocardial infarction was referred to the outpatient clinic with severe stable angina. Treatment with isocardide dinitrate 80 mg/day and propranolol 240 mg/day was ineffective and nifedipine 30 mg/day was begun. He felt better for two weeks but then began to complain of severe muscle cramps in both legs during the day and night, which necessitated discontinuation of the drug, with dramatic relief from pain. He died a month later after a myocardial infarction.

### Comment

Serious underlying side effects due to nifedipine rarely occur.<sup>1</sup> They are more common at the start of treatment, usually transient, and in most cases mild. The most common side effects are headache, facial flush, a sensation of heat, dizziness, nausea, and fatigue. In a therapeutic evaluation of 5000 patients none complained of muscle spasm.<sup>1</sup> In two other patients treated with nifedipine muscle cramps resolved when the drug was stopped.<sup>2</sup>

In the three patients reported here the drug was stopped; re-challenge in two cases provoked the symptoms.

<sup>1</sup> Hashimoko K, Kimvra E, Kotayashi T, eds. *First international Adalat symposium: new therapy of ischaemic heart disease*. Tokyo: University of Tokyo Press, 1975.

<sup>2</sup> Antman E, Muller J, Goldberg S. Nifedipine therapy for coronary spasm. *N Engl J Med* 1980;302:1269-73.

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## Postexertional hypotension: a valuable physical sign

Measurement of blood pressure on standing up from the supine position to detect postural hypotension is a well-recognised manoeuvre to assess the adequacy of the circulating blood volume and cardiovascular reflexes. Even though exercise in the upright position is a more demanding test of the integrity of the cardiovascular homeostatic mechanisms, measurement of blood pressure during or immediately after exercise is not generally advocated in clinical practice. I believe that detection of postexertional hypotension may have important diagnostic and therapeutic implications.

### Case reports

Blood pressure and pulse rate were measured after patients had rested supine for three minutes, after they had been standing erect for one minute, and when they were standing erect immediately after exercise. A hand-held anaeroid sphygmomanometer calibrated regularly against a standard mercury instrument was used with a Velcro fixed cuff for speed of application. Depending on the patient and the facilities available the exercise consisted of two-step exercise, walking up and down a flight of stairs, or running on the spot. The exercise was judged by the patient's response and stopped at the onset of tiredness or breathlessness. Care was taken to ensure that the patient's arm was hanging relaxed or well supported at heart level to avoid an isometric effect.

**Case 1**—A woman treated with psychotropic drugs and a diuretic for a personality disorder and hypertension was found to be severely hyponatraemic. Although she was not apparently dehydrated, her blood pressure was 120/80 mm Hg supine, 110/64 mm Hg erect, and 64/40 mm Hg after exercise. This indicated salt and water depletion and she was treated appropriately, having been subjected to water restriction for presumed inappropriate secretion of antidiuretic hormone.

**Case 2**—A 69-year-old man with dizziness on playing tennis was found to have a blood pressure of 158/80 mm Hg supine, 136/84 mm Hg erect, and 100/66 mm Hg after exercise. Idiopathic "postural" hypotension was eventually diagnosed; his symptoms and hypotension were certainly not postural.

**Other cases**—Several patients with congestive cardiac failure due to hypertensive heart disease treated with methyldopa and diuretics complained of weakness and breathlessness on exertion associated with postexertional hypotension. These symptoms improved and the hypotension disappeared when the dose of the drugs was reduced.

### Comment

On dynamic exercise in healthy people systolic blood pressure reaches 200 mm Hg with a smaller rise or no rise in diastolic pressure.<sup>1</sup> When exercise stops the blood pressure dips transiently but then rises again and slowly falls to normal. Any fall in systolic blood pressure below the resting value half a minute after exercise is probably abnormal.<sup>2</sup>

The sympathetic nervous system mediates reflexes that maintain blood pressure in the presence of skeletal muscle vasodilatation and are called into play at the onset of exercise.<sup>3</sup> The importance of these early reflex responses is highlighted by the pronounced fall in blood pressure regularly observed after only trivial exercise in patients taking adrenergic-neurone-blocking drugs. Impairment of cardiovascular homeostatic mechanisms thus seems to be demonstrable with short spells of uncontrolled mild exercise as described above. Assessment is feasible in all but the most disabled patients even in domiciliary practice.

The sympathetic nervous system plays an especially important part in hypovolaemic states,<sup>4</sup> and in these circumstances exercise testing has been of particular value. Heart responses have not proved helpful in assessing the relative contribution of neural and blood-volume abnormalities to postexertional falls in blood pressure.

The symptoms associated with postexertional hypotension are often not the classical ones of presyncope or frank syncope<sup>5</sup> but may, as noted above, consist of tiredness, heavy legs, and breathlessness. Careful measurement of the erect systolic blood pressure before and after dynamic exercise may help in assessing patients with suspected hypovolaemia, neurodepressant drug effects, or otherwise unexplained symptoms on exertion.

<sup>1</sup> Holmgren A. Circulatory changes during muscular work in man. *Scand J Clin Lab Invest* 1956;8,suppl 24:1-97.

<sup>2</sup> Korner PI. The normal human blood pressure during and after exercise, with some related observations on changes in the heart rate and the blood flow in the limbs. *Aust J Exp Biol Med Sci* 1952;30:375-84.

<sup>3</sup> Buskirk ER. Cardiovascular adaptation to physical effort in healthy men. In: Naughton JP, Hellerstein HK, eds. *Exercise testing and exercise training in coronary heart disease*. New York: Academic Press, 1973: 23-31.

<sup>4</sup> Anderson RJ, Linas SL. Sodium depletion states. In: Brenner BM, Stein JH, eds. *Sodium and water homeostasis*. New York: Churchill Livingstone, 1978:154-77.

<sup>5</sup> Judson WE. Hypotension; physiologic mechanisms and treatment. *Med Clin North Am* 1953;37:1313-39.

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## Nutritional rickets in Rastafarian children

Nutritional rickets in Asian children living in the United Kingdom has been the subject of much discussion during the past 20 years and increasingly in the past decade. We diagnosed nutritional rickets in four black Rastafarian children and believe we have identified another population at risk.

### Case reports

**Case 1**—An 11-month-old girl presented with a painful arm. X-ray examination of the wrist showed classic changes of rickets. Serum calcium