We subsequently studied according to the same protocol 13 hypertensive patients taking bendrofluazide 5 mg daily. Symptomatic hypotension occurred after enalapril in three of them. We were unable to differentiate the hypotensive effects of single oral doses of 10 and 20 mg enalapril.

Comment

It is well recognised that angiotensin converting enzyme inhibitors may cause a profound drop in blood pressure when given to hypertensive patients, especially if the patients are receiving diuretic treatment or are salt depleted.¹ Profound hypotension may also occur in some patients with congestive heart failure.²

We used only a modest dose of background thiazide diuretic in our study; many hypertensive patients receive larger doses and more potent diuretics and may be at greater risk of hypotension. Whether a lower initial dose of enalapril such as 2.5 or 5 mg would cause hypotension is uncertain, and further studies are planned to investigate this. In the meantime we emphasise the need for caution when enalapril is added to existing diuretic treatment.

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Accidental digitalis poisoning due to drinking herbal tea

I report on a patient who developed digitalis toxicity after drinking a herbal tea made with foxglove leaves, which he had mistaken for comfrey leaves.

Case report

A 70 year old, previously healthy, man was admitted with a two day history of frequent bile stained vomiting and a one day history of watery diarrhoea. On admission he was confused, listless, lethargic, and dehydrated and had hiccoughs. He complained of seeing flashing lights and was hypotonic and unsteady on his feet. In the casualty department he was noted to have an irregular pulse of around 45 beats/min and a blood pressure of 150/90 mm Hg; he did not have fever or any other abnormal cardiovascular or respiratory signs. Abdominal examination showed minimal epigastric tenderness and normal bowel sounds. Neurological examination showed him to be mildly confused, with no focal neurological signs, normal reflexes, and downgoing plantars. An electrocardiogram showed a bradycardia with a varying P-R interval (0.14-0.21 s), occasional dropped beats, and "reversed ticking" of the ST segment in leads I, AVL, V₄₋₆, II, III, and AVF. Serum biochemistry gave the following results: amylase activity 184 IU/l, urea concentration 9.0 mmol/l (54 mg/100 ml), sodium 138 mmol (mEq)/l, potassium 6.8 mmol(mEq)/l, chloride 105 mmol(mEq)/l, and bicarbonate 28 mmol(mEq)/l.

Digoxin toxicity was provisionally diagnosed, although he denied having taken any medication and close questioning of his family did not indicate any possible source of digoxin. Electrocardiographic monitoring showed complete heart block with a ventricular rate of 40 beats/min. Serum was sent for digoxin assay, and he was given 0.6 mg atropine intravenously slowly, and activated charcoal by mouth. The hyperkalaemia was corrected with 20 units soluble insulin in 500 ml 10% dextrose given intravenously, the serum potassium concentration falling to 4.9 mmol/l.

After the administration of atropine the electrocardiogram showed complete heart block with accelerated idionodal rhythm at 100 beats/min. He remained well perfused and normotensive. Two hours later, however, he again had complete heart block with a slow ventricular rate. A temporary pacemaker was inserted percutaneously into the right ventricle and he was paced at a ventricular rate of 70 beats/min.

His wife then said that he had for many years brewed "knitbone," a herbal tea concocted from comfrey leaves (*Symphytum* spp) that he harvested locally, and it was to this potion that he attributed his previous good health. He had drunk one litre of the brew over the preceding few days. His wife provided a similar bottle of knitbone of a more recent brew, and this was retained for analysis.

He remained confused with visual disturbance for four days, after which his electrocardiogram indicated first degree heart block (P-R interval 0.21 s). Ten days after admission he had completely recovered and was in sinus rhythm, and he was discharged from hospital. An electrocardiogram did not show ischaemic heart disease. Subsequently he brought in a sample of the plant that he had harvested thinking it was comfrey. It was a specimen of foxglove.

Comment

Herbal tea is a common drink throughout the world and is becoming more popular in England. It is surprising that only one similar incident of accidental digitalis poisoning, which occurred in Ohio, America, has been reported.¹ Those wishing to make comfrey tea must distinguish the broad leaves of comfrey from those of the foxglove (figure), particularly when the plant is not in flower and so is less immediately identifiable.

In acute digitalis poisoning the treatment is essentially supportive. Mortality is high and depends on the dose ingested and the presence of any underlying ischaemic heart disease.² Even comfrey tea correctly made may not be without its dangers: the leaf is carcinogenic in rats,³ and pyrrolidine alkaloids in the leaves and roots can produce severe liver dysfunction.⁴

I thank Dr M MacIver for permission to report this case and Dr S R Willets and Dr J Wood for undertaking the digitoxin assays.

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Treatment of a phaeochromocytoma of the urinary bladder with nifedipine

Calcium channel blockers could be useful in the treatment of a phaeochromocytoma.¹ In this report we describe the effects of nifedipine in a patient with a phaeochromocytoma of the urinary bladder which caused severe rises in blood pressure as a result of mechanical stimulation during voiding.

Case report

A 25 year old woman was referred because of hypertension. For six years she had noticed that severe headache, blurred vision, nausea, and pallor always occurred immediately after voiding. Extensive investigation confirmed the presence of a phaeochromocytoma of the wall of the urinary

bladder. At rest plasma noradrenaline concentration was increased to 14.0 nmol/l (2369 ng/l; normal (SD) 1.42 (0.61) nmol/l (240 (103) ng/l)) but plasma adrenaline concentration was normal (0.13 nmol/l (24 ng/l); normal 0.17 (0.07) nmol/l (31 (13) ng/l)). Before surgical removal of the tumour seven experiments were performed with informed consent.

On day 1 the effects of micturition on blood pressure and plasma catecholamines were studied without treatment (M1) and after one sublingual dose of 10 mg nifedipine (M2, 3, 4). After one week of treatment with nifedipine 10 mg three times daily, another experiment was performed

response to exogenous noradrenaline has been observed during treatment with nifedipine in normotensive patients.³ Our patient who had very high plasma noradrenaline concentrations after micturition showed a total abolition of the blood pressure response after experiments M3, M4, and M5. This might be explained by the exhaustion of intracellular calcium stores due to chronic exposure to the high circulating noradrenaline concentrations when the agent to block calcium influx has taken effect.⁴

Details of blood pressure, heart rate, and plasma catecholamines (log scale) before and after micturition (M).

(M5). A control experiment was performed two days after stopping nifedipine (M6 and 7). In every experiment the patient voided spontaneously in the supine position. No other medication was used. Before and every two minutes after each micturition blood pressure, heart rate, and plasma catecholamines² were measured. Urinary excretion of catecholamines over 24 hours and vanillylmandelic acid content were measured twice both before and during the last two days of treatment with nifedipine.

Without nifedipine, micturition provoked a steep rise in blood pressure (M1, 6, 7), accompanied by a throbbing headache, nausea, and pallor. Acute treatment (M3 and 4) and treatment for one week with nifedipine prevented both the severe rise in blood pressure and all accompanying symptoms, despite similar rises in plasma catecholamines and unchanged urinary excretion of noradrenaline over 24 hours. The noradrenaline concentration was 126 nmol/mmol creatinine and became 131 nmol/mmol creatinine (normal 5-34). Vanillylmandelic acid concentration measured 4.1 nmol/mmol creatinine and afterwards became 4.8 nmol/mmol creatinine (normal 1.2-4.5).

Comment

Our case report shows that an agent which blocks the entry of calcium can prevent severe hypertensive spells which are provoked by the mechanical stimulation of a pheochromocytoma.

This patient provided an excellent opportunity to study the effect of nifedipine because the rise in blood pressure and plasma catecholamine concentrations could be reproducibly provoked by micturition. Acute and hebdomadal treatment with nifedipine prevented the steep rise in systolic and diastolic blood pressure. The high systolic blood pressure rise after the sublingual dose of 10 mg might be explained by the short interval between the nifedipine dose and M2.

The complete absence of a rise in blood pressure after experiments M3 and M4 might be explained by one of three mechanisms: exhaustion of the release of noradrenaline from the tumour as a consequence of the repeated contractions of the bladder within a short time; inhibition of the release of noradrenaline from the tumour by nifedipine as suggested by Serfas *et al*.¹; or interference of nifedipine with the action of noradrenaline on the blood vessels and heart. The first possibility is rendered less likely by the persistently strong increments of plasma noradrenaline two days after stopping nifedipine. The increase in plasma noradrenaline after experiment M5 and the unchanged excretion of catecholamines over 24 hours after hebdomadal treatment with nifedipine strongly deny the case for the second possibility.

The third possibility is the most likely. An attenuated pressor

It is most likely that the steep increases in blood pressure in our patient were prevented by the effect of nifedipine on the target organ—that is, vascular smooth muscle.

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Cluster headache and herpes simplex: an association?

A patient presented with cluster headache occurring in association with ipsilateral facial herpes simplex. This suggested that the localised vasodilatation seen during an attack of cluster headache may result from an axonal reflex activated by a latent viral infection in the trigeminal system.