without any recurrence of sneezing and six months later she remained symptom-free with no medication.

Comment

The graduated response of this patient to haloperidol indicates that it was the drug's pharmacological action, rather than any placebo effect, that relieved the persistent sneezing. There may also be merit in the hypothesis on which the treatment was based, with the inference that, as haloperidol is a potent dopamine-receptor blocker,³ repetitive sneezing may depend on a disturbance in the cerebral dopaminergic transmission system.

It will be interesting to learn whether this treatment is generally applicable in this distressing syndrome and possibly the related phenomenon of intractable hiccoughing.

¹ Co S. Intractable sneezing. Case report and literature review. *Arch Neurol* 1979;**36**:111-2.

² *Guinness book of records*. McWhirter N, ed. London: Guinness Superlatives Ltd, 1982:24.

³ Shapiro AK, Shapiro ES, Bruun RD, Sweet RD. *Gilles de la Tourette syndrome*. New York: Raven Press, 1978.

(Accepted 12 January 1982)

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Phaeochromocytoma presenting as pyrexia of undetermined origin: diagnosis using gallium-67

Paroxysmal or sustained hypertension is a presenting feature in over 98% of patients with phaeochromocytoma.¹ We describe a patient with pyrexia of undetermined origin who remained normotensive throughout investigations. Gallium imaging localised a tumour in the region of the left adrenal, which on resection was shown to be a phaeochromocytoma.

Case report

A 56-year-old woman was admitted for investigation of a six-month history of night sweats, malaise, weakness, and weight loss (11 kg). She was wasted and had a fever of 37.8°C and modest tachycardia (90 beats/min). Blood pressure was 110/70 mm Hg. Over the next six weeks she had a persistent fever, ranging between 37 and 38°C, but remained normotensive.

On admission haemoglobin concentration was 10.6 g/dl, mean corpuscular volume 73 fl (73 μm^3) and serum iron concentration 50 $\mu\text{mol/l}$ (279 $\mu\text{g}/100\text{ ml}$). Erythrocyte sedimentation rate was 87 mm in first hour and white cell count $8.9 \times 10^9/\text{l}$ with normal differential. Alkaline phosphatase activity was raised at 46 KA units, but all other results of biochemical screening tests were normal. Microbiological investigations were negative, as were results of full bowel radiology, cholangiography, intravenous urography, lymphangiography, abdominal computed tomography, laparoscopy, and liver biopsy. A single estimation of urinary methylated amines was within normal limits at 10 μmol (1.8 mg)/24 h. Plasma adrenaline concentrations were normal (0.49 nmol/l (0.09 ng/ml); normal range 0.1-1.1 nmol/l (0.02-0.2 ng/ml)) and noradrenaline concentrations only minimally raised (5.26 nmol/l (0.89 ng/ml); normal range 1.2-4.7 nmol/l (0.2-0.8 ng/ml)). Results of abdominal ultrasonography suggested a para-aortic mass above the left kidney. Gammacamera pictures of gallium distribution (figure) confirmed abnormal uptake in this region.

At surgical exploration a single well-encapsulated tumour arising from the left adrenal gland was found. The cut surface of the tumour was yellow-white with areas of haemorrhage. Histology showed a fine vascular connective tissue network supporting sheets of highly pleomorphic cells with fine basophilic stippling of the cytoplasm. The nuclei were vesicular with numerous bizarre or giant forms and occasional mitoses. The appearances were typical of a phaeochromocytoma. After operation the patient recovered well, the fever remitted, erythrocyte sedimentation rate returned to normal, and haemoglobin concentration rose to 15 g/dl.

Six months later symptoms recurred, gallium pictures again indicated a tumour, and a recurrence histologically similar to the primary tumour was removed.

Gammacamera picture 72 hours after injection of gallium citrate.

Comment

Phaeochromocytoma presenting as pyrexia of undetermined origin is rare but may occur with abdominal pain, nausea, and sweating when the tumour predominantly secretes adrenaline.² However, such patients typically have episodes of profound hypotension, and the plasma adrenaline concentrations in this patient were normal.

The diagnosis of phaeochromocytoma was unexpected on the basis of clinical features and the results of investigations. A possible abnormality above the left kidney was, however, shown by ultrasonography, and this was confirmed by unequivocally abnormal uptake of gallium. Gallium may be useful in localising occult tumours³ and sites of infection.⁴ There are, however, no reports of phaeochromocytoma being localised by this technique, but a neuroblastoma, which is a related tumour, has been detected in a child.⁵ This case emphasises the value of gallium citrate in investigating unexplained fever when other techniques have failed.

We thank Dr M Brown for plasma catecholamine estimations, and Dr R Cockel for permission to study a patient under his care.

¹ Kaplan NM. *Clinical hypertension*. Baltimore: Williams and Wilkins, 1978.

² Page LB, Raker JW, Berberich FR. Pheochromocytoma with predominant epinephrine secretion. *Am J Med* 1969;**47**:648-52.

³ Lavender JP, Lowe J, Barker JR, Burns JI, Chaudhri MA. Gallium 67 citrate scanning in neoplastic and inflammatory lesions. *Br J Radiol* 1971;**44**:361-6.

⁴ Littenberg RL, Taketa RM, Alazraki WP, Halpern SE, Ashburn WL. Gallium 67 for localization of septic lesions. *Ann Intern Med* 1973;**79**:403-6.

⁵ Feldman JA, Morales JO. Gallium scanning for neuroblastoma. *J Pediatr Surg* 1975;**10**:553-4.

(Accepted 20 January 1982)

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Correction

Sinus arrest during treatment with amiodarone

An error occurred in this article by Dr Brian McGovern and others (16 January, p 160). The serum digoxin concentration should have read 2.2 $\mu\text{g/l}$, not 2.2 mg/l.