since the study period. In-vitro tests of thryoid function have become more specific and more available recently and we believe that these should now be included in the routine investigations whenever there is the slightest suspicion that hyperthyroidism or hypothyroidism might account for a patient's presenting bowel disorder.

A total of 57% of the surviving patients (18 men and 26 women) still had their symptoms at follow up, though most had learnt to live with the problem and confirmed that reassurance and explanation were particularly important in treatment. This confirms the conclusions of previous studies that the irritable bowel syndrome is often a chronic, relapsing disorder[4 6] and further investigations are not necessary unless there is an appreciable change in the symptom pattern.

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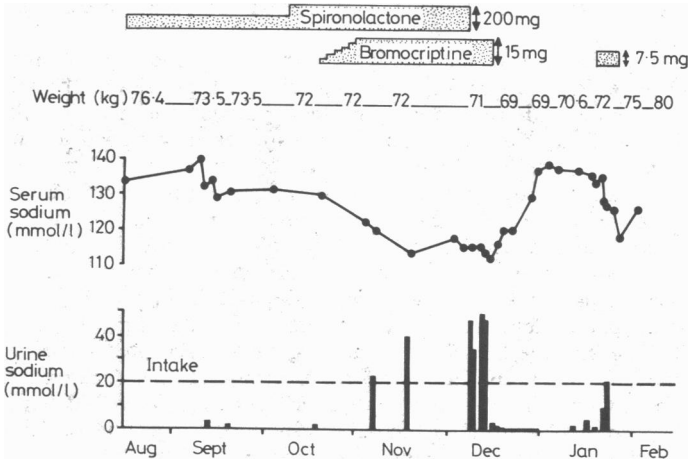
SHORT REPORTS

Bromocriptine-associated hyponatraemia in cirrhosis

Bromocriptine (2-bromo-α-ergocryptine) is a dopaminergic agonist that has been used to treat chronic portosystemic encephalopathy in selected patients.[1] We report on such a patient in whom use of bromocriptine resulted in profound hyponatraemia.

Case report

A 60-year-old man with inactive cirrhosis was admitted to hospital after sustaining a variceal haemorrhage. He had never abused alcohol. On examination he had hepatosplenomegaly, moderate ascites, and features of portosystemic encephalopathy. Serum sodium concentration was 130 mmol (mEq)/l (normal 136-148 mmol/l) and urinary sodium excretion 1 mmol/l (normal 50-120 mmol/l) (figure); serum and urinary osmolalities were appropriate at 261 and 209 mmol (mosmol)/kg.



Changes occurring in serum sodium concentration, urinary sodium excretion, and weight during treatment with bromocriptine and subsequent challenge with the drug. Dietary sodium intake was constant throughout and fluid intake never more than 1 l daily.

Conversion: SI to traditional units—Sodium: 1 mmol/l = 1 mEq/l.

The variceal haemorrhage stopped without vasopressin. Fluid retention was treated by restricting fluids and sodium and administering spironolactone, up to 200 mg daily. His encephalopathy responded initially to protein restriction and lactulose, but later bromocriptine was added to a final dose of 15 mg daily. Seven weeks later his mental state had deteriorated and he was confused. The serum sodium concentration was 116 mmol/l (figure) with normal blood urea and serum potassium concentrations. Spironolactone was stopped and fluid intake restricted to 500 ml daily, but there was no improvement. Three days later, when the serum sodium concentration was 113 mmol/l, urinary sodium excretion 47 mmol/l, and serum and urinary osmolalities 242 and 639 mmol/kg, the bromocriptine was stopped. Within 24 hours urinary sodium excretion was 3 mmol/l and osmolality 234 mmol/kg. Over the next two weeks his clinical condition and electrolyte abnormalities improved; he had a moderate diuresis and lost 2 kg in weight.

The development of hyponatraemia with continued renal excretion of sodium during treatment with bromocriptine suggested inappropriate secretion of antidiuretic hormone. He was restabilised taking 20 mmol sodium and 1 l fluid daily. Plasma cortisol concentrations were normal. Plasma renin activity was 10·4 nmol/l/h (13·5 ng/ml/h) (normal 0·8-3·5 nmol/l/h; 1·0-4·5 ng/ml/h) and plasma aldosterone concentration 13·5 nmol/l (0·49 μg/100 ml) (normal 0·3-1·1 nmol/l; 0·01-0·04 μg/100 ml), both measured with the patient supine. The rate of urinary excretion of antidiuretic hormone was 144 fmol/min (156 pg/min) (normal 40-90 fmol/min; 43-98 pg/min).

With the patient's consent bromocriptine was reintroduced at a dose of 7·5 mg daily. Within five days the serum sodium concentration had fallen to 118 mmol/l and urinary sodium increased to 21 mmol/l; serum and urinary osmolalities were 268 and 433 mmol/kg. Plasma renin activity (9·2 nmol/l/h; 12·0 ng/ml/h), plasma aldosterone concentration (9·0 nmol/l; 0·33 μg/100 ml) and the rate of urinary excretion of antidiuretic hormone (163 fmol/min; 177 pg/min) did not change appreciably. Bromocriptine was stopped with prompt improvement in the electrolyte abnormalities.

Comment

Hyponatraemia is common in cirrhosis; the mechanism is unclear since total body sodium is often increased. Bromocriptine contributed substantially to the hyponatraemia in this patient, although how it did so is necessarily speculative. Several features suggested that the drug induced inappropriate secretion of antidiuretic hormone. Urinary sodium excretion continued despite profound hyponatraemia, and the urinary osmolality was inappropriately higher than the serum osmolality; the patient was not dehydrated and had normal renal and adrenal function. Pretreatment urinary excretion of antidiuretic hormone was, however, high, a feature often observed in patients with cirrhosis,[2] and it did not change substantially when the drug was reintroduced. This does not exclude inappropriate secretion of antidiuretic hormone since plasma concentrations of the hormone were not measured; indeed, bromocriptine stimulates secretion of antidiuretic hormone in normal subjects.[3] It may possibly also alter renal responsiveness to circulating antidiuretic hormone; as a result expansion of the circulating fluid volume and secondary natriuresis might follow. Bromocriptine can produce modest natriuresis either from a direct effect on the kidney or because of dopaminergic inhibition of release of aldosterone.[4] The latter mechanism is unlikely to have been important in this patient as plasma renin activity and aldosterone concentrations were little affected by bromocriptine. The high pretreatment values reflected the patient's secondary aldosteronism. Bromocriptine consistently lowers serum prolactin concentrations, but prolactin appears to have only a minor role in regulating fluid and electrolyte balance in mammals.[5] We suggest that bromocriptine should be used with extreme caution in patients with cirrhosis and ascites.

We thank Professor Dame Sheila Sherlock for allowing us to study a patient under her care.

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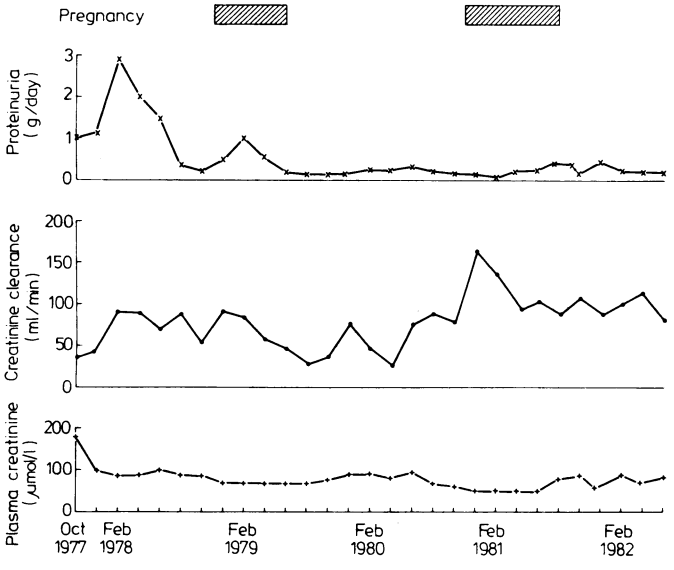
Normal pregnancy in renal transplant recipient with history of eclampsia and intrauterine death

The only case of eclampsia in a renal transplant recipient was reported in 1979 from this unit.[1] The patient's subsequent pregnancy was not complicated by hypertension and had a normal outcome, as is reported here.

Case report

The patient originally presented in 1973, aged 14 years, with hypertension and the nephrotic syndrome due to mesangiocapillary glomerulonephritis. In 1977 she received a cadaveric renal transplant (with no HLA antigens in common) that functioned well after three rejection episodes.

In 1979 she presented at the antenatal clinic with a 20-week pregnancy. She was normotensive, and the pregnancy progressed uneventfully until 30 weeks, when she developed an acute fulminating hypertensive illness (blood pressure 170/130 mm Hg, proteinuria 1 g/24 h) resulting in eclampsia and intrauterine death. She was treated with diazepam and hydralazine. She was delivered vaginally of a female stillborn infant weighing 2193 g after induction of labour with prostaglandin E_2. Recovery was uneventful, her blood pressure settled to 140/90 mm Hg, and the proteinuria diminished. The figure shows renal function after transplantation.



Serial measurements of plasma creatinine concentration, creatinine clearance, and urine protein excretion after transplantation.

Conversion: SI to traditional units—Plasma creatinine: 1 μmol/l≈0·01 mg/100 ml.

The patient was advised against further pregnancies but conceived again 17 months later, accepted the risks to her kidney, and continued with the pregnancy, which progressed without complication. Clear liquor drained spontaneously at 37 weeks and was followed by a low forceps delivery of a healthy female infant weighing 3530 g. Renal function remained unimpaired during and after pregnancy, blood pressure did not exceed 145/90 mm Hg, and proteinuria remained less than 0·25 g/day.

Drug treatment consisted of immunosuppression with prednisolone 12·5 mg and azathioprine 150 mg daily. Antihypertensive treatment comprised propranolol 160 mg, hydralazine 50 mg, and bendrofluazide 5 mg daily at the time of the first pregnancy and labetolol 300 mg and hydralazine 50 mg daily at the time of the second pregnancy.

Comment

The occurrence and course of hypertension in pregnancy are unpredictable, and this case exemplifies the difficulty in advising patients about the risks. Incorrect advice had initially been given to this patient. In retrospect, the hypertensive illness in the first pregnancy was classical toxaemia of pregnancy and not complicated renal hypertension, which would be expected to recur in subsequent pregnancies.

The risks of damage to the renal transplant associated with pregnancy are well documented.[2,3] Some patients, however, are willing to accept these in the hope of a successful outcome. Eclampsia in the first pregnancy need not be a contraindication to further pregnancies in renal transplant recipients, even in the presence of mild hypertension.

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Exercise testing in assessment of hypertension

Recently Millar-Craig *et al* claimed that maximal and submaximal exercise measurements of blood pressure may provide a better estimate than casual resting values of blood pressure outside the clinic.[1] We carried out a study of blood-pressure response to exercise testing to define a normotensive and a hypertensive response pattern.

Patients, methods, and results

We studied 28 normotensive volunteers aged 35±2 years and 35 patients with untreated hypertension aged 42±1 years. Hypertension was diagnosed when diastolic blood pressure was ⩾95 mm Hg on three consecutive occasions. A standard ergometric exercise test was performed, the work load being increased at three-minute intervals from 3000 N m (300 kp m) to 4500 N m (450 kp m) and finally 6000 N m (600 kp m). Blood pressure and pulse were measured at the end of each interval. On conclusion the exercise was stopped abruptly and blood pressure and pulse recorded after one and five minutes' rest. Results are expressed as means ±SE. Statistical analyses were performed with the one-tailed *t* test.

The data obtained in the normotensive group were used to construct a "one-tailed" nomogram. At every point of the exercise testing mean systolic blood pressure and diastolic blood pressure+1·65 SD were plotted (figure). A normotensive response to exercise was defined as diastolic blood pressure <90 mm Hg at the baseline reading and at a work load of 6000 N m; a hypertensive response was defined as diastolic blood pressure ⩾95 mm Hg at the baseline reading and >95 mm Hg at a work load of 6000 N m (figure).

Systolic blood pressure in the normotensive subjects was 116±4 mm Hg before exercise, rising to 168±4 mm Hg at 6000 N m. Diastolic pressure was 77±1 mm Hg initially and remained virtually unchanged; after one and five minutes' rest it was 66±2 and 69±2 mm Hg respectively. In the