which is quite noticeable in many term infants, obscures real differences in the size of the underlying breast nodule, while in preterm infants this postnatal breast engorgement does not occur.

It is known that circulating oestradiol concentrations are relatively high in normal infancy, and especially in girls.³ The development of breast tissue by preterm girls suggests that not only is there active oestrogen secretion by the ovary but that this is biologically active. Breast development seen in the boys might reflect activity of oestrogen secreted by the testis, or could be due to peripheral conversion from androgen.

Growth hormone⁵ and prolactin⁶ concentrations are higher in preterm than term infants after birth and raised follicle stimulating hormone and luteinising hormone concentrations after the first week of life have been reported recently in preterm girls.² It is not possible to know from the present study if there is enhanced pituitary-gonadal activity in girls who are born preterm, but certainly there is no indication of impaired gonadal function. Breast development was seen in two boys only; this may reflect stimulation of the primitive breast bud by

testicular oestrogen or by oestrogen converted peripherally from testosterone. Alternatively, it is possible that testicular androgen secretion may inhibit breast development in boys.

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Salt loss in congenital adrenal hyperplasia due to 11 β -hydroxylase deficiency

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SUMMARY Nine patients with 11 β -hydroxylase deficiency had 13 episodes of gastroenteritis requiring hospital admission and fluid administration. Eight episodes were accompanied by hyponatraemia and salt loss. The salt losing patients were treated with excessive glucocorticoid and those with normal serum sodium concentrations were treated with inadequate glucocorticoid. Excessive glucocorticoid suppressed deoxycorticosteroid secretion, resulting in salt loss.

Five per cent of cases of congenital adrenal hyperplasia are due to 11 β -hydroxylase deficiency.¹ The disease is characterised clinically by virilisation and hypertension.^{2,3} The enzymatic block results in low serum cortisol and aldosterone values and increased concentrations of 11-deoxycortisol and

11-deoxycorticosterone.³⁻⁵ Increased concentrations of 11-deoxycorticosterone are believed to be responsible for sodium retention in these aldosterone deficient patients. We have previously shown that 11-deoxycorticosterone suppression by glucocorticoid treatment results in balanced salt loss.⁶ The present study documents frequent episodes of salt loss in these patients during diarrhoeal disease.

Patients and methods

Data were collected retrospectively from the hospital records of 14 patients with 11 β -hydroxylase deficiency. Thirteen episodes of acute gastroenteritis were found in the records of nine patients. In all 13 episodes, gastroenteritis was severe enough to require hospital admission and intravenous or intragastric administration of fluid. This was given in all

cases as one third isotonic saline in five per cent dextrose.

Values of 11-deoxycortisol were determined by radioimmunoassay (using antibody from Miles-Yeda, Israel) with cross reactivity to cortisol and 17-hydroxyprogesterone of less than 2%, reproducibility of mean (SD) 157(43) nmol/l (5.5(1.5) μ g/dl) (n=19), and intra-assay variability of 3.3%.

Results

Thirteen episodes of gastroenteritis in nine patients with 11 β -hydroxylase deficiency are summarised in the Table. Serum and urine electrolytes and blood pressures shown are those recorded six to 24 hours after hospital admission and initial correction of dehydration. Eight of the episodes were accompanied by hyponatraemia. In five of the hyponatraemic episodes, salt loss could be documented. In cases where serum 11-deoxycortisol was measured, high concentrations were found in the normonatraemic and suppressed values in the hyponatraemic patients. Hypertension was documented in four of five patients with normal serum sodium concentrations. Blood pressures were within normal range in all eight episodes of hyponatraemia.

The five patients with normal concentrations of serum sodium were given a relatively small dose of steroids during acute disease. In six of the eight episodes of gastroenteritis with hyponatraemia, the patients were given an excessive dose of glucocorticoid.

Discussion

In agreement with reports from other labora-

tories,³⁻⁵ we have previously described marginal salt retention in patients with 11 β -hydroxylase deficiency under dexamethasone suppression and a low salt diet.⁶ This was achieved with maximal stimulation of plasma renin activity and an increase of serum and urinary aldosterone, which was, however, significantly lower than normal controls. Based on these results, we predicted that during acute illness, especially when electrolyte imbalance was suspected, these patients would be prone to salt loss.

The results of the present retrospective study confirmed our prediction. Eight of the diarrhoeal episodes were accompanied by hyponatraemia. Salt loss was documented in five, and 11-deoxycortisol was suppressed, indicating a suppressive dose of a glucocorticoid which, presumably, had suppressed 11-deoxycorticosterone secretion as well. This was also evident from the normal blood pressure in this group of patients. In contrast, salt retention and normal serum sodium concentrations were achieved when the glucocorticoid dose was insufficient for the state of stress. Presumably, 11-deoxycorticosterone was insufficiently suppressed and delivered some mineralocorticoid activity. This was evident from the hypertension and high 11-deoxycortisol concentration.

Adequate sodium intake needs to be ensured and the addition of a mineralocorticoid should be considered in the treatment of patients with 11 β -hydroxylase deficiency when electrolyte imbalance is documented.

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Table Summary of results in 13 episodes of gastroenteritis in nine patients with 11 β -hydroxylase deficiency

Patient No	Age (yrs)	Blood urea (mmol(mEq)/l)	Serum Na* (mmol(mEq)/l)	Serum K* (mmol(mEq)/l)	Urine Na (mmol(mEq)/l)	Blood pressure (mm Hg)	11-deoxy-cortisol (nmol/l†)	Treatment (hydrocortisone equivalent dose‡)
1	0.1	6.7	133	6.3	ND	ND	ND	100 mg/m ² /day§
	4	7.8	129	5.1	64	80/60	<4	200 mg/m ² /day§
	0.75	8.4	137	4.8	ND	120/ND	ND	ND
2	0.2	6.7	124	5.0	54	80/ND	ND	35 mg/m ² /day**
3	0.2	ND	132	6.4	ND	90/ND	ND	200 mg/m ² /day††
4	3	4.2	132	4.7	82	110/60	<4	160 mg/m ² /day††
	3	25	130	4.8	ND	100/65	ND	136 mg/m ² /day††
	4	ND	129	5.0	120	90/55	<4	550 mg/m ² /day
5	1.5	ND	140	5.4	ND	150/90	ND	25 mg/m ² /day
6	11	ND	128	5.5	180	90/55	<4	25 mg/m ² /day
7	0.5	3.2	137	4.5	40	90/70	71	12 mg/m ² /day
8	5	6.1	138	3.6	36	160/50	63	20 mg/m ² /day
9	6	ND	135	4.5	45	110/90	100	10 mg/m ² /day

ND=not done.

*Determined 6-24 hours after admission and initial correction of dehydration.

†Normal for this laboratory <20 nmol(mEq)/l.

‡Conversion ratios: §prednisone 5:1, **cortisone acetate 1:1, ††dexamethasone 80:1.

Conversion-SI to traditional units: 11-deoxycortisol 1 nmol/l≈0.035 μ g/dl.

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Congenital hepatic fibrosis—unusual presentations

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SUMMARY Two children with congenital hepatic fibrosis presented atypically: one with prolonged fever and hepatomegaly associated with a giant intrahepatic biliary cyst and a second with ascites at an early age despite normal serum albumin concentrations.

Congenital hepatic fibrosis usually presents within the first two decades of life, with hepatosplenomegaly and gastrointestinal bleeding due to portal hypertension and normal or near normal liver function tests. We present two children with unusual presentations of this disorder; the first with complications associated with a large intrahepatic biliary cyst and the second with ascites.

Patients

Case 1. A 9 year old Moslem boy, previously healthy, was admitted with a three month history of prolonged fever and abdominal enlargement. He had been treated elsewhere with antibiotics, with no improvement except a decrease in fever.

On examination the child was lively, without jaundice or fever. The abdomen was enlarged with increased venous markings. The liver was palpable nine cm and the spleen two cm below the costal margins with no evidence of ascites. Otherwise the physical examination was unremarkable. Laboratory tests on admission showed a moderately increased erythrocyte sedimentation rate, and a normal complete blood count. All liver function tests

were within normal limits, as were serum urea and creatinine, coagulation tests, bone marrow smears, sweat test, urine analysis, and serological screening for parasites.

Renal ultrasound study showed increased echogenicity of pyramidal regions and intravenous pyelogram showed homogenous enlargement of both kidneys with normal collecting systems. A liver-spleen technetium sulfur colloid scan showed gross enlargement of both organs, with a large round defect of the right hepatic lobe. Hepatic ultrasound showed a cystic formation with septae (Fig. 1). A HIDA (Tc-99m-dimethyl-imino-diacetic acid) biliary excretion study showed concentration of the labelled material within the cyst thus proving connection with the biliary tree (Fig. 2). Portal

Fig. 1 Ultrasound scan of the liver (case 1) showing a large septate cyst in the right lobe.