due to hyperinsulinism. We use it to stabilise blood glucose concentrations and to enable lower concentrations of glucose to be used both preoperatively and perioperatively. Given by regular subcutaneous injection its dosage regimen can be easily titrated against response and its short onset of action enables it to be of use in the emergency management of these patients, such as in the resiting of drips.

There are some theoretical reservations about the long term administration of somatostatin analogue to children as it has profound effects on many other hormones. Until the long term effects of somatostatin analogue are known, the treatment of choice in severe infantile hyperinsulinism should remain surgical, with maximal pancreatectomy. Premedication with somatostatin analogue greatly facilitates blood glucose control during the procedure.

**Discussion**

Somatostatin analogue was effective in the short term management of patients with hypoglycaemia.

**Recurrent pancreatoblastoma with inappropriate adrenocorticotropic hormone secretion**

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**SUMMARY** We describe a boy with recurrent pancreatoblastoma who developed Cushing's syndrome due to inappropriate adrenocorticotropic hormone secretion.

Primary epithelial tumours of the pancreas are rare in childhood. Although islet cell tumours have previously been shown to produce inappropriate secretion of peptide hormones, we believe that this is the first report of a pancreatoblastoma producing adrenocorticotropic hormone and an ectopic hormone syndrome.

**Case report**

A 22 month old boy presented with a firm, non-
Recurrent pancreatoblastoma with inappropriate adrenocorticotropic hormone secretion 1495
tender, asymptomatic abdominal mass of 12 cm
diameter. He was normotensive with a blood
pressure of 112/75 mm Hg, normokalaemic with
a potassium concentration of 3-6 mmol/l, had an
appreciably raised α fetoprotein concentration of
3670 µg/l (normal 2 µg/l), and a normal serum
amylase of <300 IU/l (Phadebas method). An
ultrasound scan showed a mass of mixed echo-
genicity crossing the midline and separate from the
kidneys. Plain abdominal radiography showed the
mass to be focally calcified.

At operation the tumour was found to be arising
from the pancreas, and a subtotal pancreatectomy
was performed. Histological examination showed a
malignant epithelial tumour with areas showing
acinar differentiation, areas of poorly differentiated
cells with frequent mitoses, and squamoid cor-
puscles. Immunoperoxidase methods showed strong
staining for α1 antitrypsin and α fetoprotein, but
were negative for adrenocorticotropic hormone,
neurone specific enolase, and chromogranin. Elec-
tron microscopy confirmed acinar differentiation;
no neurosecretory granules were seen. The appear-
ance was of a pleomorphic pancreatoblastoma.
Tumour was present at the line of resection indicat-
ing incomplete removal.

There was severe postoperative hypokalaemia
(potassium concentration 2-1 mmol/l) despite in-
travenous supplements. The blood glucose re-
mained stable. Treatment was commenced with
actinomycin D and vincristine in cycles of three
weeks, and the serum α fetoprotein concentration
fell to 18 µg/l. After three months the concentration
of serum α fetoprotein rose; computed tomography
and a radionucleide scan using labelled antibody to
α fetoprotein showed a tumour deposit in the
posterior mediastinum. The chemotherapy was
therefore changed to cisplatin/etoposide, ifosfamide/
etoposide, and doxorubicin in cycles of three weeks.
The serum α fetoprotein then fell to normal
concentrations, and treatment was continued for
one year. He remained well off treatment for 18
months.

Three and a half years from first presentation he
developed increasing fatigue, weight gain, and
pigmentation. On examination he had a Cushingoid
appearance, a palpable abdominal mass, and his
blood pressure was 130/80 mm Hg. He was hypoka-
aemic (potassium concentration 2-5 mmol/l), and
had a raised serum α fetoprotein concentration (590
µg/l). The plasma adrenocorticotropic hormone
concentration was 56 pmol/l (normal 2-18 pmol/l)
and the urinary cortisol 2000 nmol/l (normal 55-740
nmol/l). A 24 hour serum cortisol profile showed
loss of diurnal variation. Abdominal ultrasound
examination confirmed the mass arising from the
pancreatic remnant. Chest radiographs showed
several metastases. A computed tomogram of brain
showed no abnormality of the pituitary fossa and
this together with the appreciably raised serum
adrenocorticotropic hormone, skin pigmentation,
hypokalaemia, and lack of response to either
dexamethasone or metyrapone, confirmed the di-
agnosis of inappropriate secretion of adrenocortico-
trrophic hormone. This was recurrent and metastatic
pancreatoblastoma, as shown by the recurrent
pancreatic mass seen on ultrasound examination and
associated with a raised serum α fetoprotein con-
centration, although histological confirmation was not
attempted.

Treatment was resumed with a combination of
vinblastine, carboplatin, etoposide, and bleomycin.
Unfortunately the tumour showed no response to
two courses of chemotherapy, which was therefore
withdrawn. The child died three and a half years
after diagnosis.

Discussion

Primary epithelial tumours of the pancreas are rare
in childhood, and have a biphasic age distribution.
Pancreatoblastoma like other blastomas of child-
hood affects children in the early years of life, has a
slight male predominance,1 and is sometimes associ-
ated with Beckwith-Wiedemann syndrome.2 There
have been two previous reports of pancreatoblas-
toma producing α fetoprotein.3 Another tumour,
unique to late childhood and early adult life, affects
females almost exclusively, and has been given
various names including ductuloacinar adenoma and
papillary-cystic tumour of the pancreas. It usually
follows a benign course.

Pancreatoblastoma can arise in any part of the
pancreas and has distinct histological features in-
cluding undifferentiated areas, acinar differentiation,
squamoid corpuscles, and the absence (by ordinary
light microscopy) of islet cells. Originally thought
to arise only from the ventral pancreas and therefore
not to contain endocrine cells, it is now known that
this tumour may arise in the distal (and therefore
from dorsal) pancreas. The latter type seems to have
a more insidious clinical onset, is non-encapsulated,
and is associated with a worse prognosis.

There have been several reports of islet cell
tumours producing hormones such as adrenocortico-
trrophic hormone, gastrin, glucagon, and growth
hormone releasing hormone,4 but non-islet cell
pancreatic tumours are not associated with in-
appropriate secretion of peptide hormones. Insulin,
gastrin, and somatostatin have been shown by
immunohistochemistry in pancreatoblastoma,5 6 but
we believe that this is the first case of pancreatoblas-
Intestinal disease in cystic fibrosis

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SUMMARY Three children with cystic fibrosis developed steatorrhoea unresponsive to changes in pancreatic supplements. The final diagnoses were chronic giardiasis, stagnant loop syndrome, and Crohn's disease. Refractory intestinal symptoms in cystic fibrosis merit further investigation.

It is still controversial whether the gastrointestinal manifestations of cystic fibrosis are primary or secondary, although recent evidence shows that the basic defect in chloride transport is expressed in the intestinal epithelium. Steatorrhoea, flatulence, abdominal pain, distal intestinal obstruction syndrome, and rectal prolapse are usually improved by adequate pancreatic supplementation, particularly with microsphere preparations. Occasionally, however, high doses of these supplements, with or without H₂ antagonists, are ineffective. This can be caused by incorrect use of the supplements, or poor compliance, but coeliac disease and cow's milk protein intolerance have also been described in association with cystic fibrosis.2 Investigating three children who presented in this way showed further treatable intestinal pathology.

Case reports

Case 1

A 16 year old girl in early puberty complained of varying bowel habit over several months, passing up to five loose stools a day, often containing 'blobs of grease'. She also experienced rectal incontinence with laughter, and frequent abdominal pain after food. Her weight gain was poor, but this could not be explained by her chest disease. Stool microscopy showed fat globules but no parasites. At first poor compliance was suspected. A jejunal biopsy specimen, however, showed *Giardia lamblia* between the villi, and motile trophozoites were seen in the jejunal juice. After a three day course of high dose metronidazole she has been asymptomatic and her weight velocity has increased sharply.

Case 2

A 7 year old boy had steatorrhoea, 8 g/day, despite a low fat diet (25 g/day) and up to 50 pancreatin microsphere capsules per day. His weight was between the 10th and 25th centiles, and height was on the 10th centile. Attempts to introduce a higher fat diet produced abdominal discomfort, distention, flatulence, and gross steatorrhoea. Cimetidine had no effect. As a neonate he had a Bishop Koop resection and ileostomy for meconium ileus, which was closed by clamping at 1 month. A year previously he had been admitted with subacute obstruction, which responded to conservative management. Concentrations of serum iron, plasma ferritin, and vitamin A were low, and prothrombin time, vitamin D, and plasma bile acid concentrations were normal. Xylose absorption and a jejunal biopsy specimen were also normal, but fasting breath hydrogen was increased. Barium enema...