Comment

Sweet described a dermatosis characterised by tender erythematous plaques and a dense dermal, perivascular infiltrate consisting predominantly of polymorphonuclear leucocytes often with nuclear dust.¹ Patients with Sweet's syndrome have leucocytosis of peripheral blood and usually a concurrent fever. Other systemic features include a raised erythrocyte sedimentation rate, arthritis, myalgia, and ocular signs.²

Infection may be an aetiological factor, and the onset is often preceded by an upper respiratory tract infection. In 10% of patients acute myeloid or myelomonocytic leukaemia is present,³ and Sweet's syndrome has also been recorded in patients with subacute lupus erythematosus, Sjögren's syndrome, and subacute thyroid disease. Its occurrence with ulcerative colitis has been reported in three patients, including one of Sweet's original patients.¹⁴ Crohn's

disease and ulcerative colitis may be similar clinically, especially if Crohn's disease is confined to the distal colon. In our patients the diagnosis was firmly established by histological examination of bowel that had been resected.

Although concurrence of Sweet's syndrome and Crohn's disease may be coincidental, the presence of the syndrome in two patients with active Crohn's disease suggests a causal link.

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Correction of severe hyponatraemia by continuous arteriovenous haemofiltration before liver transplantation

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Profound hyponatraemia is often encountered in end stage liver disease. Rapid correction increases the risk of precipitating central pontine myelinolysis¹: one such case associated with rapid correction during liver transplantation has been described.² We describe the use of continuous arteriovenous haemofiltration to correct severe hyponatraemia slowly before liver transplantation in two patients with end stage liver disease.

Patients, methods, and results

Case 1—A 43 year old man with acute Budd-Chiari syndrome was referred for liver transplantation. Serum sodium concentration on admission was 119 mmol/l (normal range 134-146); despite a restricted fluid intake (500 ml/day) this fell over 10 days to 112 mmol/l, by which time urine output had declined to <10 ml/hour. A Quinton-Scribner arteriovenous shunt was inserted into the right ankle under local anaesthesia. Continuous arteriovenous haemofiltration was started with a Gambro AV55 haemofiltration kit (Gambro Lundia, Sweden). Heparin was infused into the arterial arm of the haemofilter at 500 units/hour. Fluid was removed by the haemofilter at a variable rate (50-100 ml/hour) and isotonic saline was infused into a peripheral vein at the same rate. Haemofiltration was continued for five days, and serum sodium concentration rose to 129 mmol/l (see figure). Orthotopic liver transplantation was performed 24 days after admission. Serum sodium concentration before operation was 128 mmol/l, rising to 141 mmol/l during the operation and remaining in the normal range afterwards. No rebound hyponatraemia or neurological sequelae were observed. The patient remained well 13 months after operation.

Case 2—A 34 year old woman with acute on chronic Budd-Chiari syndrome was referred for liver transplantation. Serum sodium concentration had fallen

despite fluid restriction and stopping of diuretics and was 100 mmol/l on admission, with urinary sodium concentration <10 mmol/l. Urinary output was <5 ml/hour. A Quinton-Scribner arteriovenous shunt was inserted into the left ankle under local anaesthesia. Intravenous infusion of colloids and inotropes ensured that blood pressure was adequate to start continuous arteriovenous haemofiltration with a Gambro AV55 haemofiltration kit. Heparin was infused into the arterial arm of the haemofilter at 1000 units/hour. Fluid was removed at a variable rate, and isotonic saline was infused into a peripheral vein at the same rate. By the fifth day, when orthotopic liver transplantation was performed, serum sodium concentration had steadily risen to 129 mmol/l. There were no postoperative neurological complications, and serum sodium concentration remained within the normal range. The patient remained well 10 months after operation.

Comment

Hyponatraemia complicating hepatic insufficiency results chiefly from the kidney's intense conservation of water and sodium, resulting in an inability to produce dilute urine. This may be exacerbated by the use of intravenous fluids, particularly dextrose solutions, to maintain euglycaemia. Spontaneous hyponatraemia is considered to indicate a poor prognosis.³

Treatment of dilutional hyponatraemia by fluid and salt restriction may suffice in patients whose urine output is adequate. In oliguric patients a fixed intake of fluid may prove inadequate and hyponatraemia progressively worsen. When water was removed by

Serum sodium concentration before liver transplantation (day 24). Continuous arteriovenous haemofiltration (shaded area) was started on day 10 and continued to day 15

peritoneal dialysis in advanced liver disease complicated by hyponatraemia no improvement in renal function or hepatic encephalopathy was seen.⁴ Thirteen of the 16 patients in this series died, two from complications of the peritoneal dialysis technique.

Arteriovenous haemofiltration is an extracorporeal technique which allows removal of fluid, electrolytes, and small to medium sized molecules by plasma ultrafiltration.⁵ A single filter used for several days allows continuous readjustment of fluid and electrolyte treatment. Clotting of the filter during periods of hypotension in the patient was the only problem encountered during filtration.

Continuous arteriovenous haemofiltration combined with infusion of isotonic saline is of value in correcting severe hyponatraemia in patients with established hepatorenal syndrome who urgently

require liver transplantation. Failure to correct hyponatraemia before operation may precipitate central pontine myelinolysis. Using continuous arteriovenous haemofiltration to correct hyponatraemia safely allowed successful liver transplantation without neurological sequelae.

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Inflammatory cells in the airways in mild asthma

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The possibility that hyperresponsiveness of the airways in asthma might be related to inflammation of the airways has been of increasing interest recently.¹ Post-mortem examination of patients who died of acute asthma showed inflammatory changes in the bronchial mucous membrane, but little information is available on the histology of the airways in mild asthma. We therefore examined specimens of bronchial mucous membrane taken from patients with mild asthma and airway hyperresponsiveness and from healthy controls without airway hyperresponsiveness.

Patients, methods, and results

Approval was obtained from the ethical committee of St Bartholomew's Hospital. We studied 10 asthmatic volunteers (three men; mean age 26.4 years (range 21-39) and nine healthy volunteers (five men; mean age 24 years (range 20-32)). Only the asthmatic subjects were atopic as judged by one or more positive responses on skin prick tests to five common inhalant allergens. All the subjects with asthma (but none without asthma) showed airway hyperresponsiveness to inhaled methacholine, defined as a provocation dose necessary to produce a 20% fall in forced expiratory volume in one second of $<8 \mu\text{mol}$.² None of the

subjects with asthma required corticosteroids; four took inhaled salbutamol every day and six took it less frequently. All subjects were non-smokers.

Fibreoptic bronchoscopy was performed and cup forceps used to take up to four biopsy specimens of the mucous membrane from the right upper and right middle lobe carina. One adequate specimen was immediately fixed in Carnoy's solution for staining with α -naphthol AS-D chloroacetate esterase for mast cells and neutrophils and another was fixed in formaldehyde and stained with Chromotrope 2R (BDH Chemicals) for eosinophils.

The subjects with asthma had significantly more mast cells in the lamina propria (median 24 v 0; $p<0.05$). They also had more eosinophils, but the difference was not significant, and the number of neutrophils was similar in each group (figure). Healthy and asthmatic subjects did not differ significantly in counts of epithelial cells, and the magnitude of bronchial hyperresponsiveness was not correlated with the numbers of mast cells, eosinophils, or neutrophils in the epithelium or lamina propria.

Comment

This study showed greater numbers of mast cells in the airway mucosa of patients with mild atopic asthma and airway hyperresponsiveness than in people without asthma. As atopy is associated with airway hyperresponsiveness³ the increase in the number of mast cells might relate to either atopy or hyperresponsiveness, or both. Although recent reviews on the pathogenesis of asthma emphasise the putative importance of the mast cell,⁴ there have been few supporting histological data. In previous studies airway tissue obtained from patients with asthma at bronchoscopy was fixed in formaldehyde or glutaraldehyde, which have been shown to inhibit the staining of mast cells of the mucosal type, which predominate in the human respiratory tract. This may account for the failure of previous studies to find increased numbers of mast cells in the airway mucosa of patients with asthma. We stained mast cells in tissue fixed in Carnoy's solution, which is recommended for the study of mucosal type mast cells.

Eosinophils may produce bronchial damage by the release of toxic proteins such as major basic protein. The number of eosinophils was not significantly higher in our asthmatic subjects, but deposits of major basic protein have been shown in the absence of increased numbers of eosinophils.⁵

The influx of neutrophils into the airways might play a part in the development of bronchial hyperresponsiveness.¹ In our study the number of neutrophils in the bronchial mucous membrane was similar in

Cell counts per mm² of tissue section of lamina propria of bronchial mucous membrane in 10 subjects with asthma and nine subjects without asthma. One value for eosinophils in healthy subjects is missing. Subjects with asthma had significantly more mast cells ($p<0.05$)