economic advantage has been shown in our study, the greatest benefit must be of more time for the patient who requires this, whether for further investigation or treatment.

The conventional arrangements for follow-up of patients from hospital may be inappropriate for the asymptomatic patient who does not require clinical measurement or hospital investigative facilities. The success of this investigation suggests that a system of reply-paid cards can provide an efficient and realistic method of review. If applied selectively this system could have enormous potential advantage for patients, staff, and the National Health Service.

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Injuries to boys who scramble

There has recently been an increasing interest in motorcycle scrambling among the young. This sport may be begun at 6 years of age, and since it needs a vehicle 24 times more prone to road accidents than cars,¹ people are understandably concerned about the dangers. In the light of the fact that accidents account for more deaths in those aged over 1 than any other single cause² parents' concern for their children's safety seems justified.

A previous study looked at patients injured during motorcycle scrambles who were referred direct to a casualty department.³ I studied the number of incidents occurring at scrambles, the type of injury sustained, and the effect of having a medical officer on the course.

Methods and results

During the 1978 season I attended each of the twelve scrambles held around Tyneside with a fully equipped team from the St John Ambulance Brigade. The organisers specified that each competitor had to wear full safety equipment, including braced gloves and boots, shoulder pads, and face guards. At each event the casualties treated by St John Ambulancemen or the doctor and those sent to hospital were noted.

There were 24 races at each event, with an average of 25 competitors per race. Their ages ranged from 6 to 16 years, with most being 10 to 14. Although an average of four casualties were treated during each race by the St John Ambulancemen, most had superficial injuries and the doctor had to be called to only a small proportion of the accidents—once in every 83 rider races. Many of the casualties had only bruises or sprains, and from 5760 rider races only 13 patients needed to be referred to a casualty department for radiography. This gave a hospital referral rate of 1 per 443 rider races. Four boys had a definite fracture of the radius or ulnar, three a fracture of the tibia or fibula, and three a possible fracture of the tibia or fibula. One boy had fractured metacarpals, one a fractured femur, one a dislocated shoulder, and one haemarthrosis of the knee.

Comment

Leg injuries predominated—a finding consistent with those of studies of motorcycle road accidents.⁴ Hand and wrist injuries made up the remainder. (One boy had fractures of leg and wrist.) A casualty rate of 1 per 443 rider races does not seem excessive and certainly does not make it the most dangerous of sports provided all adequate safety precautions have been taken, as in this case. Motor sport in general is

covered by strict regulations on safety, which demand the presence of a doctor and ambulance at all races and practices. The youth scrambles are not required to follow these Royal Automobile Club regulations, and it is up to the organising committee to decide on an adequate first-aid policy. This study shows that the presence of a skilled first-aid team and doctor can help to reduce the number of cases referred to casualty departments as well as providing on-the-spot help should a major accident occur.

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Sodium in peritoneal dialysis solutions

We would like to point out a possible problem during the use of peritoneal dialysis solutions.

Clinical features and investigations

At this hospital we routinely use 10-litre plastic containers of peritoneal dialysis solutions containing anhydrous dextrose 1.36% w/v and a declared approximate ionic concentration of sodium 141 mmol(mEq)/l with other electrolytes (Difusor, Boots). Recently four of our patients receiving peritoneal dialysis, three on a long-term programme and one in acute renal failure, developed hypertension, cerebral oedema, and deterioration in general health immediately after dialysis. They were hospital inpatients and were under strict fluid and dietary control. Serum sodium concentrations before dialysis were 136-141 mmol/l, and the patients were observed to be well. When the patients were hypertensive, serum sodium concentrations of 149-150 mmol/l were recorded, and this was not due to dehydration.

Measurement of the sodium content of the dialysis solutions showed concentrations of 146-148 mmol/l, although the label stated "approximately 141 mmol/l." Patients who showed adverse effects when dialysed against sodium concentrations of 146-148 mmol/l showed no such effects when dialysed with fluids of sodium concentration 140-144 mmol/l. We obtained, from the manufacturers, the exact sodium contents of 20 recent batches of peritoneal dialysis and haemodialysis fluids (see table). Of the 20 batches of peritoneal dialysis fluid examined, seven contained 146-148 mmol/l of sodium.

Variation from stated sodium content in 20 batches of peritoneal dialysis solutions and 20 batches of dialysis solutions

Variation by (mmol/l):	-2	-1	0	+1	+2	+3	+4	+5	+6	+7
No of peritoneal dialysis solutions:		1	1		6	4	1	5	1	1
No of haemodialysis solutions*:	2	4	7	6	1					

*Haemodialysis fluid is supplied as a concentrate and does depend on accurate dilution to obtain predicted amount of sodium per litre.

Comment

Swales¹ reported similar adverse effects with the dialysis of hyponatraemic patients, in which only small amounts of fluid were removed. He postulated that appreciable amounts of sodium could move along the concentration gradient between the peritoneal dialysis fluid (141 mmol/l) and the patient's serum (in the reported case 125 mmol/l) and cause acute pulmonary oedema. A similar concentration gradient would exist in our patients, where the dialysis fluid sodium concentration was 148 mmol/l and the patients' serum sodium concentration 136 mmol/l.

The sodium content of the peritoneal dialysis fluid is controlled according to *British Pharmaceutical Codex* limits, which allow a variation of $\pm 5\%$ on the stated level. This means that a nominal sodium content of 141 mmol/l may be between 134 and 148 mmol/l

and still be labelled "approximately 141 mmol/l" and comply with the BPC standard. Another variant of Difusor is stated to contain approximately 130 mmol/l of sodium, and a 5% variation would allow a range of 123.5 to 136.5 mmol/l.

The BPC limits for sodium content of haemodialysis solutions are $\pm 3\%$, and the manufacturers of our haemodialysis solutions work to limits of ± 3 mmol/l, which is equivalent to 2.16% on a sodium content of 139 mmol/l. We appreciate the difficulties encountered in manufacturing to narrow limits and possible problems with moisture loss on storage but think that a variation of 5% on the sodium content of peritoneal dialysis fluid is too wide. We would suggest that the *British Pharmaceutical Codex* limits be reduced to ± 3 mmol/l.

¹ Swales, J D, *British Medical Journal*, 1967, **3**, 345.

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Sicca syndrome associated with idiopathic haemochromatosis

The sicca syndrome in association with idiopathic haemochromatosis has not been reported. In the case described here bromhexine produced rapid objective as well as symptomatic improvement.

Case report

A 57-year-old housewife had complained of lethargy, dry mouth and eyes, dysphagia, and vague aches and pains in the extremities for about seven years. She had lost 12 kg in weight in four years. The menopause had occurred at the age of 49 years. Alcohol intake had been minimal and she had had no regular medication. She was admitted to hospital for further assessment after she developed congestive cardiac failure.

On examination she was wasted (weight 53 kg) and pigmented, with dry skin and mucous membranes and brittle nails. There was no adenopathy or salivary gland enlargement. The only abnormal clinical signs were a forceful, prominent left ventricular impulse, a fourth heart sound, and hepatomegaly. The liver edge was firm, slightly tender, and palpable 5 cm below the right costal margin. Investigations confirmed idiopathic haemochromatosis with hepatic, cardiac, and pancreatic involvement. Serum iron concentration was 33.5 $\mu\text{mol/l}$ (187.3 $\mu\text{g}/100$ ml), with 78% saturation, and serum ferritin concentration 5000 $\mu\text{g/l}$. Apart from minor abnormalities in liver function tests, the results of other relevant laboratory investigations were normal. Liver biopsy showed cirrhotic change with heavy iron deposition in hepatic cells, macrophages, and bile duct epithelium. ECG showed sinus rhythm and low voltage standard leads with T wave inversion in leads V2-V5. Diabetes mellitus was confirmed and satisfactorily controlled with carbohydrate restriction and 5 mg glibenclamide each morning. The results of lacrimal and salivary gland function tests were: Schirmer test nil (normal > 10 mm); resting mixed salivary flow rate 0.41 g/5 min (normal 1.35-9.4 g/5 min¹); stimulated parotid flow rate 1.0 g/gland/10 min (normal > 5 g/gland/10 min²). A labial gland biopsy specimen showed glandular acini as well as ductal epithelium heavily stained with iron (figure). The most changed minor salivary glands showed complete loss of acini, striking dilatation of the ducts, mild lymphocytic infiltration in one or two areas, and replacement fibrosis where formerly there were acini. The histological changes were thought to result from the haemochromatosis.

The patient was given bromhexine 8 mg three times daily by mouth. She reported an improvement in her sicca symptoms within a matter of hours, and later commented that she had produced tears for the first time in several years. After six weeks the Schirmer test was 4 mm, the mixed salivary flow rate 0.60 g/5 min, and the stimulated parotid flow rate 2.06 g/gland/10 min.

Comment

Idiopathic haemochromatosis is an uncommon hereditary condition in which an excessive quantity of iron is absorbed and deposited in the tissues over many years. The presenting features are usually hepatic, pancreatic, or cardiac, with or without skin pigmentation. Functional impairment of the pituitary, adrenal, and testis is well recognised but impairment of salivary and lacrimal function does not seem to have been reported. Our patient's dry eyes and mouth

Haemosiderin deposits (arrows) in salivary duct epithelium. (Perl's stain. $\times 50$.)

suggested Sjögren's syndrome, but the histological changes were consistent with heavy iron deposition secondary to idiopathic haemochromatosis. Bromhexine increases sputum volume and decreases viscosity in some patients with chronic bronchitis by, it is suggested, increasing lysosome activity and increasing secretion of enzymes capable of hydrolysing the mucopolysaccharide fibril structure of mucus.³ Frost-Larsen *et al*⁴ recommended it for the lacrimal symptoms of Sjögren's syndrome. Xerostomia did not appear to be improved but objective tests of salivary function were not carried out. Our patient's rapid symptomatic improvement in both lacrimal and salivary function was later objectively confirmed.

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² Mason, D K, *et al*, *Annals of the Rheumatic Diseases*, 1967, **26**, 311.

³ *Drug and Therapeutics Bulletin*, 1971, **9**, 91.

⁴ Frost-Larsen, K, Isager, H, and Manthorpe, R, *British Medical Journal*, 1978, **1**, 1579.

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Incidence of nausea and vomiting with cytotoxic chemotherapy: a prospective randomised trial of antiemetics

Toxic side effects, particularly nausea and vomiting, of chemotherapy for malignant disease are distressing and may cause patients to refuse treatment. Surprisingly, therefore, little is known about the pattern of these symptoms and the efficacy of antiemetic treatment.¹

This study aimed at defining the incidence, severity, and duration of nausea and vomiting in patients receiving chemotherapy and to evaluate antiemetic preparations.

Patients, methods, and results

The patients studied were women with stage II breast cancer receiving adjuvant cyclophosphamide (300 mg/m²), methotrexate (40 mg/m²), and 5-fluorouracil (600 mg/m²) by intravenous bolus injection as outpatients. They were randomly allocated to receive one of the following preparations starting two hours before the chemotherapy and continuing for five days. (1) a placebo (ascorbic acid 50 mg thrice daily); (2) metoclopramide 10 mg thrice daily; (3) cyclizine 50 mg thrice daily; (4) fluphenazine 2 mg daily; or (5) fluphenazine 1.5 mg and nortriptyline 30 mg daily. The incidence, severity, and duration of nausea and vomiting were recorded at 12-hour intervals for five days by a self-administered questionnaire.

Nausea and vomiting in patients receiving the placebo occurred in 19