

electrically excitable tissue, including neurones. This may be a dose-dependent phenomenon, however, the patient usually presenting with the more typical neurological features before a sufficiently toxic concentration is achieved. Additionally the brain of the elderly or "arteriosclerotic" patient may possibly be predisposed to the development of digoxin-induced convulsions; the previous case report described a 72-year-old man.

Transient cerebral ischaemic episodes may, therefore, only partially account for the blackouts seen in elderly patients taking digoxin, and we recommend that, even when there is no gross disturbance of cardiac rhythm, the serum digoxin concentration be measured to exclude digoxin neurotoxicity.

- 1 Goodman LS, Gilman (eds) A. *Digitalis and allied cardiac glycosides*. In: *The pharmacological basis of therapeutics*. 5th ed. New York: Macmillan Publishing Co, 1975:653-82.
- 2 Douglas EF, White PT, Nelson JW. Three per second spike-wave in digitalis toxicity. *Arch Neurol* 1971;**25**:373-5.
- 3 Lely AH, van Enter CHJ. Non-cardiac symptoms of digitalis intoxication. *Am Heart J* 1972;**83**:149-52.
- 4 Sarangi A, Tripathy N, Lall D, Patnaik BC, Swain AK. Study of serum digoxin status in digitoxicity by radioimmunoassay. *Am Heart J* 1980;**99**:289-93.
- 5 Bertler A, Anderson KE, Wethrell G. Concentration of digoxin in choroid plexus. *Lancet* 1973;ii:1453.

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## "Home brew" compared with commercial preparation for enteral feeding

Enteral feeding is the most appropriate route for administering protein and energy to malnourished patients when the gastrointestinal tract is capable of normal absorption.<sup>1</sup> The enteral route is safer and considerably cheaper than total parenteral nutrition.<sup>2</sup> Enteral feeding is well tolerated provided it can be delivered by continuous slow nasogastric or nasoduodenal infusion, thereby avoiding the problems of hyperosmolar diarrhoea and the reluctance by some convalescent patients to take a liquid diet by mouth. Commercially available enteral solutions are expensive, however, and it has been argued that a liquid diet of similar protein and energy content can be prepared by most diet kitchens. We compared a blenderised diet based on milk albumin hydrolysate, Caloreen, and Prosparol ("home brew") with a commercially available enteral preparation containing the same protein and calorie content (Isocal) in 28 patients requiring nutritional treatment after major gastrointestinal surgery. Method of treatment was determined by numbered randomisation cards.

### Patients, methods, and results

Any patient unable or unwilling to take nutrients by mouth after a major gastrointestinal operation associated with complications was admitted to the study. Patients who required jejunostomy feeds or intermittent positive pressure ventilation were excluded. Indications for feeding included: gastrectomy complicated by wound dehiscence; abscess or a duodenal fistula (n = 8); reconstructive gastric operations in patients malnourished before operation (n = 10); resection for colorectal carcinoma complicated by fistula or abscess (n = 6); and resection for inflammatory bowel disease associated with intra-abdominal sepsis (n = 4). Nutritional treatment was given for at least seven days by fine-bore nasogastric tube positioned under radiographic control. During the first 48 hours the tube feed was diluted and administered at increasing volume until the patient was able to tolerate the full strength solution at a rate of 125 ml per hour.<sup>3</sup> Fifteen patients received Isocal and 13 the "home brew" (table). Diarrhoea occurred in nine patients, two after Isocal, but one had antibiotic-associated colitis and the other a pelvic abscess. Two of the seven patients with diarrhoea receiving the "home brew" had a pelvic abscess but in the remaining five patients the intestinal disturbance was so severe that the enteral feeding had to be discontinued.

### Comparison of commercial feed and "Home Brew" enteral feeding

	Commercial feed (Isocal) (n = 15)	"Home brew" (n = 13)
Severe diarrhoea	2	7
Pelvic abscess	1	2
Antibiotic associated colitis	1	
Infected solution		4
No cause identified		1
Obstructed fine bore tube		6

Cultures of the solutions in these patients yielded yeasts in three and *Staphylococcus aureus* in one. Intermittent obstruction of the fine-bore tube was a problem in six patients who were given the "home brew" but in none receiving Isocal.

### Comment

Our observations cast doubt on the safety and efficacy of liquid diets prepared in hospital. Contamination by yeasts and staphylococcus occurred at weekends when the materials had been prepared earlier and stored on the wards. Fine-bore feeding tubes often became obstructed by the locally prepared solutions and in some patients the fine-bore tube had to be replaced by a conventional nasogastric tube, which was unpleasant for the patients. The study was discontinued because the nurses found the locally prepared solutions difficult to administer at a constant rate of infusion, and because of the risks of infection observed in the study. We believe, therefore, that commercially available liquid diets are safer and easier to handle if fine-bore enteral feeding is to be used for patients requiring nutritional support after major gastrointestinal operations.

<sup>1</sup> Russell RI. Elemental diets. *Gut* 1975;**16**:68-79.

<sup>2</sup> Blackett RL, Bakran A, Bradley LA, Halsall A, Hill GL, McMahon MJ. A prospective study of subclavian vein catheters used exclusively for the purpose of intravenous feeding. *Br J Surg* 1978;**65**:393-5.

<sup>3</sup> Sagar S, Harland P, Shields R. Early postoperative feeding with elemental diet. *Br Med J* 1979;ii:293-5.

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## Gastrointestinal haemorrhage and benoxaprofen

Benoxaprofen is a non-steroidal anti-inflammatory agent similar to naproxen and ibuprofen but which has a lower incidence of gastrointestinal disturbance<sup>1</sup> and produces less gastric microbleeding.<sup>2</sup> During three months three patients who had been receiving benoxaprofen were admitted to a general medical unit with gastrointestinal haemorrhage associated with peptic ulceration.

### Case reports

*Case 1*—A 76-year-old woman was admitted three weeks after starting benoxaprofen 600 mg daily for osteoarthritis, mainly in her right leg. She had no past history of dyspepsia and no family history of peptic ulceration. Within a week of taking the drug she began to feel nauseated and on the day of admission had a large haematemesis. She was seriously ill and the haemoglobin concentration was 8.0 g/dl. Endoscopy showed multiple ulcers in the duodenum and a large gastric ulcer. Despite resuscitative measures, including blood transfusion, she deteriorated further; abdominal films showed pneumoperitoneum. At an emergency operation the duodenal ulcer was seen to have perforated and the peritoneal cavity contained 2 l of bile-stained fluid. The perforation was sealed but she failed to improve and died on the eighth postoperative day.

*Case 2*—A 76-year-old woman was admitted six weeks after starting benoxaprofen 600 mg daily for osteoarthritis. She had no past history of dyspepsia. Within two weeks of taking the drug she complained of nausea