

solution was given "a urine sample was taken 12 to 24 hours later." The conventional test requires a five hour urine collection with measurement of the percentage dose excreted for each sugar. This test assesses only the permeability of the small intestine as in the colon the sugars are degraded by the colonic flora.<sup>3,4</sup> The results obtained from a urine sample taken between 12 and 24 hours are likely to be affected by the colonic bacteria, especially if no urine collection was performed. Moreover, the group given early enteral feeding had a nasojejunal tube in situ; the test solution is likely to have entered the colon earlier in this group than in the group fed conventionally as gastric stasis will not affect patients fed nasojenually. It could be argued that this in itself could be responsible for the difference in the changes in permeability seen between the two groups. Finally, by not standardising the timing of the urine sample the authors may have introduced potential errors and bias.

S M GABE  
Research fellow  
D B A SILK  
Consultant gastroenterologist

Department of Gastroenterology and Nutrition,  
Central Middlesex Hospital NHS Trust,  
London NW10 7NS

- 1 Carr CS, Ling KDE, Boulos P, Singer M. Randomised trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection. *BMJ* 1996;312:869-71. (6 April.)
- 2 Wicks C, Somasundaram S, Bjarnason I, Menzies IS, Routley D, Potter D, et al. Comparison of enteral feeding and total parenteral nutrition after liver transplantation. *Lancet* 1994;344:837-40.
- 3 Jenkins AP, Nukajam WS, Menzies IS, Creamer B. Simultaneous administration of lactulose and 51Cr-ethylene-diaminetetraacetic acid. A test to distinguish colonic from small intestinal permeability change. *Scand J Gastroenterol* 1992;27:767-73.
- 4 Gibson GR, MacFarlane GT, Cummings JH. Sulphate reducing bacteria and hydrogen metabolism in the human large intestine. *Gut* 1993;34:437-9.

#### Study was not sufficiently rigorous

EDITOR,—Cornelia S Carr and colleagues have added to the evidence that enteral nutrition may be started soon after gastrointestinal surgery.<sup>1</sup> The importance of anticipating the need for postoperative nutritional support cannot be underestimated, particularly when postoperative complications may delay oral intake. The content of this paper fails, however, to support its title and the key points listed.

The nature of the procedures that the patients underwent is not stated; sepsis was scored but the scores are not given. Both factors would influence the degree of postoperative stress and hence the nutritional markers. Moreover, the nature of the surgical procedure might affect the time to the return of gastrointestinal motility and therefore tolerance of enteral nutrition and the incidence of diarrhoea and vomiting. Preoperative nutritional status was not assessed but is surely relevant. It is suggested that the patients fed enterally experienced less morbidity. The complications described were heterogeneous and seem not to have been defined at the start of the study. Enteral feeding is said to have been associated with improved nutritional status, but this is not borne out by the variables reported. It is inappropriate to quote a mean change in skinfold thickness of 0.05 cm, given the lack of precision and wide interobserver and intraobserver variability in anthropomorphic assessment. The assumption that serum albumin concentration is a nutritional marker is incorrect.<sup>2</sup> Finally, the authors imply that the presence of malnutrition was related to the incidence of sepsis in the study by Fong *et al*<sup>3</sup> and that the work of Johnson *et al* suggested that intravenous nutrition prolonged ileus.<sup>4</sup> Neither study supports these statements.

The benefit of early enteral nutrition on outcome after orthopaedic surgery has been

shown.<sup>5</sup> To confirm those findings after gastrointestinal surgery will require more rigorous studies than this.

N J EVERITT  
Senior registrar in surgery

Doncaster Royal Infirmary,  
Doncaster DN2 5LT

- 1 Carr CS, Ling KDE, Boulos P, Singer M. Randomised trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection. *BMJ* 1996;312:869-71. (6 April.)
- 2 O'Keefe SJD, Dicker J. Is plasma albumin concentration the assessment of nutritional status of hospital patients. *Eur J Clin Nutr* 1988;42:41-5.
- 3 Fong Y, Marano MA, Barber A, He W, Moldawer LL, Bushman ED, et al. Total parenteral nutrition and bowel rest modify the metabolic response to endotoxin in humans. *Ann Surg* 1989;210:449-56.
- 4 Johnson L, Copeland E, Dudrick S. Structural and hormonal alterations in the gastrointestinal tract of parenterally fed rats. *Gastroenterology* 1975;68:1177.
- 5 Bastow MD, Rawlings J, Allison SP. Benefits of supplementary tube feeding after fractured neck of femur: a randomised controlled trial. *BMJ* 1983;287:1589-92.

#### Fluid regimen given to control group is increasingly being abandoned

EDITOR,—Having read Cornelia S Carr and colleagues' paper on their trial of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection, I question the fluid regimen given to the control patients, who were kept nil by mouth until the passage of flatus.<sup>1</sup> Such a regimen has been increasingly abandoned because randomised trials have shown that the immediate introduction of oral fluids after laparotomy (including bowel resection) is not associated with a higher rate of complications or fluid and electrolyte imbalances but does improve patients' comfort and allows earlier discharge.<sup>2-4</sup> Gastric activity returns 24 hours after laparotomy, and only about 2% of patients require nasogastric drainage.<sup>5</sup>

The mucosal protection associated with enteral nutrition could have been achieved more simply, cheaply, and comfortably by allowing patients to drink at will in the postoperative period.

SUDIP RAY  
Senior surgical registrar

Frimley Park Hospital,  
Camberley GU16 5UJ

- 1 Carr SC, Ling KDE, Boulos P, Singer M. Randomised trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection. *BMJ* 1996;312:869-70. (6 April.)
- 2 Cook JA, Fraser IA, Sandhu D, Everson NW, Fossard DP. A randomised comparison of two postoperative fluid regimens. *Ann R Coll Surg Engl* 1989;71:67-9.
- 3 Salim AS. Duration of intravenous fluid replacement after abdominal surgery: a prospective randomised study. *Ann R Coll Surg Engl* 1991;73:119-23.
- 4 Ray SA, Rainsbury RM. Patient tolerance of the early introduction of oral fluids after laparotomy. *Ann R Coll Surg Engl* 1993;75:157-60.
- 5 Nathan BN, Pain JA. Nasogastric suction after elective abdominal surgery: a randomised study. *Ann R Coll Surg Engl* 1991;73:291-4.

#### Serum albumin concentration is not a marker of nutritional status

EDITOR,—In their paper on postoperative enteral feeding in patients undergoing bowel resection Cornelia S Carr and colleagues used serum albumin concentrations as one of six markers of nutritional status.<sup>1</sup> Doweiko and Nompoggi and Klein show that although protein energy malnutrition causes a decrease in the rate of synthesis of albumin, this has little impact on albumin concentrations because of albumin's low rate of turnover and large pool size.<sup>2,3</sup> Even during chronic malnutrition, serum albumin concentration is maintained because of a compensatory decrease in the degradation of albumin and transfer of extravascular albumin to the intravascular compartment. Hence the serum albumin concentration changes little in patients with anorexia nervosa.

Although inadequate nutrition may contribute to low serum albumin concentrations in patients in

hospital, the metabolic response to stress—for example, surgery and disease—is a far more important factor. In such "inflammatory stress" states, synthesis of albumin decreases and degradation and transcapillary losses of albumin increase. Disruption of the normal ratio between body compartments alone will change the serum albumin concentration. Hence, in Carr and colleagues' study I would not expect the serum albumin concentration to have differed between the groups fed enterally and conventionally unless their metabolic response to surgery differed.

EMMA CHOJNOWSKA  
Registrar

Department of Anaesthetics,  
Southampton General Hospital,  
Southampton SO16 6YD

- 1 Carr CS, Ling KDE, Boulos P, Singer M. Randomised trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection. *BMJ* 1996;312:869-71. (6 April.)
- 2 Doweiko J, Nompoggi D. Role of albumin in human physiology and pathophysiology. *Journal of Parenteral and Enteral Nutrition* 1991;15:207-11.
- 3 Klein S. The myth of serum albumin as a measure of nutritional status. *Gastroenterology* 1990;99:1845-51.

#### Authors' reply

EDITOR,—As we did not measure intestinal permeability postoperatively before day 5 we cannot exclude the possibility that a rise occurred. Nevertheless, the striking difference at day 5 between the patients managed conventionally and those fed enterally is surely noteworthy. S M Gabe and D B A Silk's figure shows that intestinal permeability had normalised by day 6 in their series of six patients in an intensive therapy unit. The authors do not mention outcome, so they may be interested to learn that in one study intestinal permeability remained increased in non-survivors but returned to normal in survivors of intensive care (T W Evans, Royal Brompton Hospital, personal communication).

We agree that the permeability test assesses small bowel function and absorption, so we fail to see the relevance of colonic bacterial degradation of the sugars. We know of no data showing that this affects either interpretation of the test or the sugar ratio in the urine. The purpose of measuring a ratio of at least two sugars is to circumvent problems related to gastric stasis and other extraneous factors; furthermore, the timing need not be fixed to a conventional five hour collection.<sup>1</sup>

N J Everitt requests more data; unfortunately, space constraints required our original submission to be reduced to a maximum of 1000 words (and this response to a maximum of 400 words). By necessity, details had to be removed—for example, the fact that complications were defined at the outset. We will gladly supply further details on request. Everitt's remarks about two of our references is correct in that they were accidentally transposed, but Everitt reads too much into our study; we did not make any claims regarding benefit (which would require a much larger study) but simply showed safety and efficacy.

Sudip Ray argues for oral fluids to be given immediately after laparotomy; we do not disagree, but old habits die hard and traditional postoperative starvation is still common.

Finally, Emma Chojnowska queries our use of serum albumin concentration as one of six markers of nutritional status; we readily accept that it is better used as a marker of inflammation.

MERVYN SINGER  
Senior lecturer in intensive care medicine  
CORNELIA CARR  
Surgical research fellow

Bloomsbury Institute of Intensive Care Medicine,  
London WC1E 6JJ

- 1 Langkamp-Henken B, Donovan TB, Pate LM, Maull CD, Kudsk KA. Increased intestinal permeability following blunt and penetrating trauma. *Crit Care Med* 1995;23:660-4.