a similar process is involved in the development of NE.

Lawrence and Walker suggested that EN was initiated by the B toxin of *Clostridium welchii* type C in the intestinal lumen and noted that it almost always followed a meal including meat. Normally the toxin is extremely susceptible to proteolysis, but in the presence of low protein levels resulting from a low-protein diet and the presence of heat-stable trypsin inhibitors the toxin is undestroyed.

Your leading article states that NE occurs only in a bowel that has been colonised by bacteria, that it is less common if the food is human rather than cows' milk, and that it is commoner in preterm babies. Preterm babies have lower levels of digestive enzymes and of immunoglobulin than full-term babies. Cows' milk provides a larger protein substrate than human milk,² does not provide the immunoglobulins of human milk, and may be contaminated with bacteria. Considering these factors it is possible that NE of small babies is caused by a toxin liberated by gas-forming organisms entering the lumen in contaminated milk which is undestroyed because of a deficiency of proteolytic enzymes.

Further investigation may demonstrate an abnormally low level of proteolytic activity in the stools of affected babies. If the hypothesis proves correct active immunisation with a toxoid prepared from the toxin and given to susceptible babies may prevent NE.

C D LUND

Yau Tong Community Health Centre,
United Christian Medical Service,
Kwun Tong, Hong Kong

¹ Lawrence, G, and Walker, P D, *Lancet*, 1976, **1**, 125.
² Hutchison, J H, in *Practical Paediatric Problems*, 4th edn. London, Lloyd Luke, 1975.

Management of severe acute asthma

SIR,—I have read with interest your leading article (8 April, p 873) on the management of severe acute asthma and would like to record our experience of death in bronchial asthma. We have had no deaths in hospital during the past ten years.

The patients receive 200 mg hydrocortisone four hourly intravenously together with intravenous salbutamol 5 or 10 µg per minute or aminophylline 1 g per 24 hours. Oxygen and antibiotics are given if required. We do lose one or two patients per year from our asthma population through death at home. The patients are mostly young, between the ages of 15 and 40, and the clinical story is almost invariably the same: overwhelming asthma develops within a very short period of time, usually within one to two hours, often less, and the patient dies before medical help, including the family practitioner, arrives. As far as one can gather the patient seems unaware of the severity of the condition until he or she is beyond reach of help.

Our latest patient who died, some weeks ago, was a woman aged 31, who had had relatively mild asthma for many years, did not require continuous steroid therapy, and relied only on an occasional inhalation of salbutamol from a pressurised inhaler. On the morning of death she woke a little breathless. Within half an hour she was found accidentally on the kitchen floor by a neighbour, and she died before the family practitioner could be called. We have tried for many years to predict this

sort of occurrence and have been totally unable to do so.

If death in bronchial asthma, particularly in children, adolescents, and young adults, is to be reduced multicentre trials of therapy would seem to be needed and large numbers of asthmatic patients studied.

P HOWARD

Department of Respiratory Diseases,
University of Sheffield,
Lodge Moor Hospital,
Sheffield

SIR,—In your leading article on the management of severe acute asthma (8 April, p 873) you very rightly discuss tracheal intubation and mechanical ventilation. However, I am surprised that you do not also advocate bronchoscopy and either pulmonary lavage or, using the flexible fiberoptic bronchoscope, "syringing" of the bronchi in order to remove inspissated plugs of mucus. The effect of this procedure on desperately ill patients is most gratifying, with an immediate improvement in ventilation and a return of the blood gases towards normal. I would say that any unit responsible for treating severe acute asthma should have the facility to perform either pulmonary lavage or bronchial syringing, via the appropriate bronchoscope.

B H BASS

Good Hope General Hospital,
Sutton Coldfield, West Midlands

Stricture of oesophagus associated with ankylosing spondylitis

SIR,—Readers of the paper by Mr V John and others (25 February, p 479) concerning a patient with rheumatoid stricture of the oesophagus may be interested in the following case history.

A 58-year-old housewife presented with progressive dysphagia of one month's duration. Fiberoptic oesophagoscopy revealed a 4-cm irregular stricture beginning at 22 cm from the incisor teeth. Repeated cytological and histological studies indicated a benign cause, the consistent feature being that of a submucosal chronic inflammatory process. The patient did not have a hiatus hernia, nor was gastro-oesophageal reflux demonstrable. The possibility of a columnar-epithelium-lined oesophagus was excluded, as was local extrinsic disease, by means of chest x-ray and bronchoscopy.

This patient has suffered from ankylosing spondylitis for more than 30 years and thus, in the absence of any of the recognised causes of benign oesophageal stricture, one is led to conclude that her stricture is a rare manifestation of the joint disease. There do not appear to have been any other reports of an association of this kind. The only gut-linked association with ankylosing spondylitis is, of course, ulcerative colitis, a condition not present in this patient.

Management of the stricture entailed repeated dilatation with Eder-Puestow dilators. Limited dilatation, however, required an unusual degree of force and the benefits of each dilatation were transient—within three or four days the patient could swallow only liquids. Oesophageal resection was contemplated, but the presence of severe dorsal kyphosis made surgery of this magnitude impracticable. Thus the next step merely involved forcible dilatation under general

anaesthesia to 45 Charrière. Two months have since elapsed without the need for further dilatation. The patient is able to swallow normally and recent endoscopic assessment of the previously strictured zone has demonstrated an intact mucosal lining.

A M HAY

General Hospital,
Northampton

Fluorouracil cardiotoxicity

SIR,—The paper by Dr A Pottage and others (4 March, p 547) lends some support to our suspicion that 5-fluorouracil (5-FU) cardiotoxicity occurs more commonly than is believed. The authors proposed to look for ECG changes in patients asymptomatic after 5-FU. It would also be interesting to monitor cardiac enzymes.

In an earlier article,¹ among the several mechanisms we suggested to account for 5-FU cardiotoxicity was the involvement of a vasoactive component in the reaction. Therefore if there were a vasoconstrictive phase and/or direct damage or inflammation involving blood vessels (promoting thrombus formation) one could predict that the added insult of radiotherapy to the heart, also inducing small vessel thrombosis, might increase the incidence of 5-FU toxicity. It is well known that the combination of doxorubicin and myocardial irradiation probably exerts a cumulative cardiotoxic effect.^{2,3} However, the mechanisms involved may be different. These facts may explain the relatively high incidence of cardiotoxicity observed by Dr Pottage and his colleagues in their series.

We would not lightly dismiss the likelihood of other mechanisms causing 5-FU cardiotoxicity. We still cannot fully account for the possible protective effect of corticosteroids which we reported¹ and which, unfortunately, was not assessed by Dr Pottage and his colleagues.

We would like to suggest that there may be a cumulative cardiotoxic effect when 5-FU is used with other cytotoxics and/or irradiation of the myocardium as in treatment with doxorubicin + 5-FU + radiotherapy.

D P MIKHAILIDIS

Royal Marsden Hospital,
London SW3

D S GILLET

Grobby Road Hospital,
Leicester

D LANG-STEVENSON

Whipps Cross Hospital,
London E11

¹ Lang-Stevenson, D, Mikhailidis, D P, and Gillett, D S, *Lancet*, 1977, **2**, 406.

² Prout, M N, et al, *Cancer*, 1977, **39**, 62.

³ Gilladoga, A C, et al, *Cancer*, 1976, **37**, 1070.

Continued effects of black light treatment of psoriasis

SIR,—Both psoralen DNA-monoadducts and DNA-interstrand crosslinks produced by light (320-380 nm) contribute to the lethal and chromosomal effects associated with the photochemotherapy of psoriasis.¹⁻⁵ There is good biological evidence that psoralen DNA-monoadducts in bacterial and mammalian cells can be converted to the more lethal DNA cross-links, in the absence of psoralen not already covalently bound to DNA as