Malignancy and the Small Intestinal Mucosa

SIR,—I was interested to read Dr. B. Creamer's article (5 December, p. 1435). My colleagues and I have studied, by jejunal biopsy, 16 cases of malignant disease not obviously affecting the small intestine and the results have been briefly reported.¹ Eight of the patients had leukaemia, three suffered from lymphosarcoma, and five had malignancy of the large bowel. No abnormality was found in any of the biopsy specimens.—I am, etc.,

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Management of Respiratory Failure

SIR,—It is disappointing to find an authority as eminent as Dr. E. J. M. Campbell (21 November, p. 1328) seeming to suggest that Dr. Hutchison and his colleagues exaggerate the problems of respiratory failure. It is true that the majority of patients survive with low concentrations of oxygen, antibiotics, and a minimum of laboratory investigation but this is of no consolation and less help in the problem of a severely ill patient. If many hospitals cannot provide adequate laboratory support for the treatment of these patients, still more are unable to provide adequate facilities for treatment by tracheostomy and mechanical respiration—a method which has unsolved difficulties of its own.¹ This argument justified neither position but supports efforts like that of Hutchison and his colleagues to improve our understanding of the problems in the area of treatment that lies between these two extremes.

There seem to be three factors which are generally agreed to be of importance—namely, hypoxia, hypercapnia, and acidosis. Hypoxia was the first of these problems to receive attention, but we do not yet know at what critical level of oxygen pressure physiological mechanisms begin to fail. My own unpublished observations in 90 patients led me to accept tentatively an arterial P_{O_2} of 40 mm., as Dr. Campbell did, as the minimum "safe" level, but Hutchison and his co-workers' discussion of this question very clearly illustrates the point that this figure is purely arbitrary and based on an impression. Serious hypoxia produces a metabolic acidosis due to the accumulation of lactic acid. This is most clearly seen in circulatory arrest where the buffer base diminishes rapidly within minutes of the event. Patients with chronic hypercapnia develop a compensatory metabolic alkalosis, and the buffer base is normally elevated. This may often mean that a patient who has a normal buffer base when first seen in an exacerbation already has a concealed metabolic acidosis. Hypercapnia produces an acidosis with an additive effect to that of hypoxia. From some unpublished observations it seems that individuals respond differently at different times to the same high levels of CO_2 pressure and this appears to be explained on differences in the actual pH on the different occasions.

The metabolic component of the acidosis of respiratory failure has been largely ignored until the publication from Edinburgh. The next logical step in treatment seems to be a direct attack on this acidosis. Dr. Hutchison and his colleagues did this in their Case 7 but in view of their reference to Huckabee's work² it seems odd that they should have chosen to use sodium lactate in an attempt to buffer an acidosis due to lactic acid, and odder still that they should be disappointed with its poor effect. The blood buffer base that is most severely depleted in these situations is bicarbonate and it seems sensible to give this substance parenterally to make good the deficit.³ Relief of the acidosis in this way lightens the cortical depression and, like respiratory stimulants, improves ventilation, with a resulting steady fall in the P_{CO_2} .⁴

Experience of bicarbonate buffering in 10 patients with very severe respiratory acidosis suggests that this is a worth-while addition to treatment.⁵

In summary, the Edinburgh workers have made a valuable contribution to this difficult and confusing problem. I support their contention that frequent monitoring of the arterial P_{O_2} and acid-base studies is essential for adequate treatment in the patient with severe respiratory failure. I would urge them and Dr. Campbell, as well as any others interested in the problem, to try to assess the value of bicarbonate buffering when severe acidosis is present.—I am, etc.,

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³ Addis, G. J., Thomson, W. S. T., and Welch, J. D., *Lancet*, 1964, 2, 223.
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Thyrotoxicosis in Childhood

SIR,—As the person who introduced serum protein-bound iodine estimations to the Staffordshire General Infirmary, I agree with Dr. F. J. Pick (21 November, p. 1329) when he says that this investigation should be more widely available. In a small way I have endeavoured to give a somewhat similar, though unofficial, service since I moved to the London area in 1963.

But I would disagree with him on two points in his letter. Firstly, the determination is of limited value in pregnancy. Whereas the occasional subnormal result suggests co-existent hypothyroidism, no significance can be attached to readings of from 7 to 10 $\mu g. %$, since figures in this range are commonplace in pregnancies uncomplicated by thyroid disease.

Secondly, after contrast radiography not all P.B.I. readings are so unusually high as to be obvious. The following are P.B.I. readings of blood specimens taken before, one month, and two months after cholecystography in three individuals with normal gall-bladder function.

Patient	Before (P.B.I.; $\mu g. %$)	1 Month After (P.B.I.; $\mu g. %$)	2 Months After (P.B.I.; $\mu g. %$)
1	4.7	8.4	5.1
2	4.7	14.3	7.4
3	4.7	9.9	6.6

Without knowledge of these cholecystograms having been carried out all three individuals after one month, and one individual after two months, would (biochemically) have been wrongly assessed as thyrotoxic.—I am, etc.,

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Aneurysm of the Hepatic Artery

SIR,—Aneurysms of the hepatic artery are rare.¹ They may produce a variety of effects which depends upon the situation of the aneurysm. This is an account of rupture of an aneurysm on the right branch of the hepatic artery.

A woman aged 77 was admitted because of severe intermittent pain in the back and abdomen which had been present for three days. Her urine had become dark in colour three weeks before admission when she had colicky pain in the right hypochondrium which lasted for seven days. She was jaundiced and febrile; the right hypochondrium and the lumbar regions were tender and Murphy's sign was positive. Abnormal findings on investigation were a plasma bilirubin of 8.8 mg./100 ml., serum alkaline phosphatase 25 King-Armstrong Units, and a serum glutamic pyruvic transaminase of 187 units.

On the morning on her fourth day in hospital she collapsed with a low blood-pressure and complained of severe upper abdominal pain. At laparotomy 3 litres of blood clot and fluid were found. This appeared to have arisen through a tear in the wall of a large subcapsular haematoma on the superior surface of the right lobe of the liver. The tear was stitched but bleeding continued until, finally, the hepatic artery was ligated. The gall-bladder was found to contain stones and pale green bile. Her blood-pressure fell again the next morning and she died.

Necropsy was performed 24 hours after death. The peritoneal cavity contained 600 ml. of fluid blood. The cut surface of the liver showed a fresh haematoma which was continuous with the subcapsular haematoma at the site of the tear. Adjacent to this an oval aneurysm (0.7 × 0.4 cm.) was found attached to the right main branch of the hepatic artery. Histologically the wall of the aneurysm consisted in some parts of arterial adventitia with blood clot separating it from the media. In other areas the wall consisted of full thickness of artery wall showing sharply defined areas of fibrinoid necrosis. There was moderate diffuse intimal fibroelastic thickening but no other evidence of arterial disease in this or adjacent vessels.

The rarity of aneurysms of the hepatic artery contrasts with the splenic artery, where aneurysms are common, and may partly be explained by the lack of surrounding support of the latter vessel.

In this case the histological appearance of segmental fibrinoid necrosis with adjacent, largely normal vessel wall, suggests that the artery first weakened, dilated, and then burst. The initiating factor is not clear. There was no evidence of inflammation in the wall of the aneurysm nor of medial damage in the surviving segments of artery.

The effects of rupture of such aneurysms are varied and often startling. Of Dwight and Ratcliffe's 70 cases 30 burst into the peritoneal cavity, and an almost equal number ruptured into the gall-bladder or bile ducts, producing intestinal haemorrhage. Patients often survive rupture of the aneurysm into the biliary system or gut, but