pared with 61% of vagotomy and drainage patients. In the gastrectomy group only 30% gained weight compared with 54% of the other group.

In the vagotomy and drainage group the results were similar after either truncal or selective vagotomy and after either pyloroplasty or gastrojejunostomy. True dumping as distinct from small-stomach syndrome is rare in patients on a rice diet, and was seen less often in the vagotomy and pyloroplasty patients than after vagotomy and gastrojejunostomy or gastrectomy.—I am, etc.,

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¹ Tovey, F. I., *British Journal of Surgery*, 1969, **56**, 281.

Fatal Hepatic Necrosis and Halothane

SIR,—As it is still debated¹ whether halothane is hepatotoxic or not, we would like briefly to report two cases.

A woman, 55 years old, had been operated on five years before for varicose veins under thiopentone-halothane-N₂O-O₂ anaesthesia with pethidine and atropine as premedication. On the present occasion biopsy was performed for a breast tumour under the same anaesthetic. As cancer was found, radical mastectomy was performed nine days later under thiopentone-suxamethonium-pethidine-halothane-N₂O-O₂ anaesthesia with pethidine and atropine as premedication. Fever was not noticed between the operations, but her temperature was taken on the day before the second operation only, and was then 37.4°C. She had fever, 38.9°C, on the first three days after the second operation and jaundice was noticed on the fourth, when the temperature had begun to fall. She developed liver insufficiency and died 28 days after the second operation. Necropsy revealed massive centrilobular liver necrosis (liver weight 950 g), acute pancreatic necrosis, cholaemic nephrosis, and haemorrhagic diathesis. No metastases were found.

The second patient, a woman 54 years old, was operated on for varicose veins of both legs with stripping and ligature in two stages with four days' interval between them, both operations being performed under thiopentone-halothane-N₂O-O₂ anaesthesia with pethidine and atropine as premedication. Between the operations she was febrile (maximum 37.7°C). On the fifth day after the second operation her temperature was 40.7°C, and jaundice was noticed on the ninth day. She developed liver insufficiency and died on the 17th day after the second operation. Necropsy showed massive centrilobular liver necrosis with congestion (liver weight 1,570 g), acute pancreatic necrosis, cholaemic nephrosis, pulmonary oedema, and haemorrhagic diathesis with multiple erosions of the stomach.

No contacts with jaundiced persons were known. The first patient was given 450 ml blood during her mastectomy. Of pertinent drugs, the first patient had been taking meprobamate, paracetamol, and cyclopenthiiazide fairly recently. The second patient had had hydrochlorothiazide and a multivitamin preparation with caffeine.

Cholestatic jaundice has been reported following meprobamate treatment.^{2,3} Overdosage of paracetamol has occasionally resulted in fatal liver necrosis,⁴ and this can also be produced in rats with large doses.⁵

Liver damage following cyclopenthiiazide does not seem to be described. The related substance chlorothiazide is well known to be able to precipitate liver coma in patients with cirrhosis. It has been reported occasionally to produce severe hepatic injury, with necrosis⁶ and cholestatic jaundice.^{6,7}

Neither of the patients had eosinophilia. The only morphological material available was from the necropsies. Electron microscopy of the livers showed extensive autolysis, and there were no possibilities to distinguish possible pathognomonic changes in the mitochondria.⁸ Examination for Au-antigen was not possible at that time (1966), and no serum is preserved.

The Swedish Adverse Drug Committee considered the relationship between the repeated halothane anaesthetics and the fatal hepatic necroses to be established (*säkerställd*) in these two cases.⁹ We are inclined to agree. The finding of acute pancreatic necrosis in cases of fatal hepatic necrosis ascribed to halothane has been reported previously.¹⁰—I am, etc.,

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Banana and L-Dopa

SIR,—Upper alimentary side effects of L-dopa therapy are common. Dr. D. Riddoch (1 January, p. 53) described a patient with gastritis, probably due to this drug. Others have noticed anorexia,¹ nausea, vomiting, complications in coexistent peptic ulcers,² and an increased consumption of sweets with a subsequent rise in the dental caries rate.³ The vomiting of liquorice-coloured material has also been reported,⁴ and one such patient was recently encountered who produced this symptom whenever he swallowed a banana in addition to his levodopa tablet.

This phenomenon prompted the following experiments. Powdered levodopa was mixed with banana, banana plus tap water, banana plus saliva, and banana plus vomitus at room temperature. In all cases the following colour changes resulted—a faint pink, followed by a bright brown, then a dark brown, then a grey, and, finally, a liquorice-like black. The colour changes started very rapidly but the speed of the complete series of changes seemed to depend on the surface used for the experiment—being over within minutes on a scalpel blade, slower on a wooden spatula, but taking several hours in a plastic container. Such colour changes did not occur in the absence of levodopa.

Serotonin is present in banana and human brain tissue⁵ but no significant colour changes resulted when levodopa was mixed with serotonin creatinine sulphate. The

above colour changes also occurred when powdered L-dopa was mixed with pieces of grape and plum. It seems possible that certain enzyme systems present in some fruits cause chemical degradation changes in levodopa, and it may be that the metal in the scalpel blade catalyzed such a reaction.—I am, etc.,

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Fibrin Degradation Products in Hypoxic Full-term Neonates

SIR,—In their article entitled "Coagulation Defects in Hypoxic Full-term Newborn Infants" Dr. M. A. Chadd and other (27 November 1971, p. 516) reported, among other things, a significant correlation between a low Apgar score (≤ 5) and raised levels of fibrin degradation products (F.D.P.). During the last few years we have been especially interested in fibrinolysis in newborns.¹ We have assayed F.D.P. with Niléhn's immunochemical method² in serum from blood collected in tubes containing aminocaproic acid. This method demonstrates F.D.P. down to a concentration of 5 µg/ml, and comprehensive investigations in adults at this laboratory² have shown that F.D.P. are never demonstrable in health and that, when present, they always denote disease. In our studies only levels of >10 µg/ml were accepted as being of pathological significance ("F.D.P.-positive").

We have examined 154 infants with gestational ages of 25 to 42 weeks. They were studied for F.D.P. during the first 48 hours of life. Sixty-four of the infants who had Apgar scores³ of 7-10 at 10 minutes and remained healthy afterwards were assigned to one group (H-group) while the remaining 90 with Apgar scores of less than 7 at 10 minutes and with later firm symptoms of idiopathic respiratory distress syndrome or other, mainly respiratory, symptoms were assigned to another group (S-group).

Forty of the infants were F.D.P.-positive, (11-300 µg/ml)—36 in the S-group, but only four in the H-group. The higher incidence of F.D.P.-positive cases in the S-group was studied from various angles. The occurrence of F.D.P. in the infants did not appear to vary with the presence or absence of complications of pregnancy or delivery. F.D.P. were more common in the infants with idiopathic respiratory distress syndrome than in those with other respiratory symptoms. The Table relates F.D.P. to the Apgar scores at 1 and 10 minutes using generally accepted limits³ for the various score groups. F.D.P. were significantly more common in infants with a score of 0-3 at 1 minute than in those with a higher score at that time. At 10 minutes the frequency of F.D.P.-positive cases decreased with increasing Apgar score. Determination of the arterial pH and of the blood gases (umbilical catheter) did not reveal any significant correlation between hypoxia/acidosis and F.D.P.