larger doses for a comparatively longer period to those with normal thyroid activity than to those with hyperthyroid activity. Since this paper was written Cases 2 and 3 have developed myxoedema and have recovered as rapidly as Case 1 did.

Summary

Three cases of angina of effort are reported. Treatment with methylthiouracil was successful in either abolishing or markedly reducing the frequency of attacks. On the whole, comparatively large doses were required. This treatment has possibilities in that patients may be restored to their former earning capacity.

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CHRONIC HEPATITIS TREATED WITH METHIONINE AND CHOLINE

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Experimental studies and clinical observations in recent years have focused attention on the importance of dietetic factors in liver disease. Witts (1947) gives a valuable list of references. Neither the exact effects of these factors nor their value as therapeutic agents have as yet become clearly defined. It seemed interesting, therefore, to study the effects of large doses of methionine and choline as an adjunct to the treatment of a group of patients suffering from chronic hepatitis.

Clinical Material.—Six cases of chronic hepatitis were selected for this study. The salient clinical features of each are presented in Table I. Biochemical tests showed impairment of liver function in each case, and a feature common to all was a low level of the plasma albumin with inversion of the albumin-globulin ratio (Table II).

Method.—The patients were placed on a high-protein diet, which consisted of the national ration supplemented by the extra meat and milk which are authorized for this condition. It is estimated that each patient received a daily intake of 120–150 g. of protein throughout the period under review. Case 6 had been on the diet for the previous

eighteen months, and the other five for only two to four weeks before the course of methionine was started. The dose given was 1 g. five times daily by mouth, increasing on the third day to 3 g. five times daily for six weeks. The methionine was then discontinued and choline chloride in similar doses was prescribed for a further period of three months.

A careful clinical assessment of each case was made immediately before the beginning of treatment and at the end of the courses of methionine and choline. It seemed probable that any real clinical progress would be reflected in an improvement of the plasma albumin level, with a return towards normal of the albumin-globulin ratio (Higgins *et al.*, 1944). Levels of total plasma proteins, plasma albumin, and plasma globulin were consequently estimated at the times of the clinical examinations (Table II).

Results.—No reactions to either of the drugs were observed, but the patients stated that the tastes were extremely unpleasant. In Case 5 the course of choline was abandoned for this reason. No striking clinical changes were observed in any of the patients during the period of treatment. One (Case 5) has since died in cholaemia, one (Case 3) is deteriorating rapidly, and the condition of the other four remains unchanged. There was a small rise in plasma albumin in Cases 3, 4, and 6, a small drop in plasma albumin in Cases 2 and 5, and no appreciable alteration in the plasma albumin of Case 1. It is apparent that there has been no consistent alteration of the biochemical findings attributable to the treatment. These results confirm the view that supplementation of diets already containing adequate amounts of choline and methionine is not likely to be effective (Miller *et al.*, 1947).

Summary

Six patients suffering from chronic hepatitis were treated on a high-protein diet with a supplement of 15 g. of methionine daily for six weeks and choline chloride in the same dose for a further period of three months.

There was no change in the clinical condition of the patients during this time, and the variations in the plasma proteins did not seem to be due to the treatment.

It is a pleasure to acknowledge the help of the Department of Biochemistry and to thank Mr. George Higgins for the plasma protein estimations. We also wish to thank the Medical Research Council for *DL*-methionine.

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TABLE I.—Clinical Features

Case No.	Age	Sex	Duration (Years)	Aetiology	Jaundice	Haemorrhage	Ascites Oedema	Palpable Liver	Palpable Spleen
1	67	F	5	Insidious onset	Intermittent attacks	Epistaxis	Oedema of ankles	4 cm.	2 cm.
2	34	M	10	Infectious hepatitis	" "	"	Nil	2 cm.	Nil
3	54	M	4	Alcoholic history	" "	"	Oedema and ascites	12 cm.	Nil
4	61	M	10	" "	Nil	Nil, but oesophageal varices present	" "	8 cm.	4 cm.
5	60	F	4	Insidious onset	Intermittent attacks	Haematemeses	" "	2 cm.	4 cm.
6	26	F	7	Splenic anaemia	" "	"	Oedema ascites and pleural effusion	Nil	Splenectomy 2 years ago

TABLE II.—Plasma Proteins in Grammes per 100 ml.

Case No.	Before Treatment			After Methionine			After Choline		
	Albumin	Globulin	Total	Albumin	Globulin	Total	Albumin	Globulin	Total
1	3.10	4.17	8.10	3.15	4.10	7.80	3.05	4.00	7.10
2	3.50	3.85	8.00	—	—	—	2.90	4.20	7.70
3	2.40	5.40	8.10	3.20	4.60	8.40	2.80	4.80	8.35
4	2.50	2.90	5.75	3.00	3.70	7.00	3.45	3.07	6.60
5*	2.51	4.79	7.63	2.40	4.40	7.10	1.90	3.69	6.15
6	2.00	4.00	6.35	2.30	4.00	6.50	2.45	3.75	6.25

* Course of choline not completed.