PRACTICAL THERAPEUTIC DIETETICS

VI. MODIFICATION OF PROTEIN

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DIET IN LIVER DISEASE

For patients with cirrhosis in which diet or alcohol has played a major role in the pathogenesis, a liberal protein intake and abstinence from alcohol usually result in great improvement, and even complete remission of symptoms may occur.

However, caution must be exercised since drastic and immediate protein restriction is essential if hepatic coma becomes evident. Some cirrhotic patients on a high-protein diet develop encephalopathy owing to the presence of ammonia and other protein breakdown products in the circulation. An important symptom of this condition is fluctuating personality change and confusion, and one of the first indications is an abnormal EEG.

When this syndrome becomes apparent protein is reduced to the minimum and then slowly increased over a period of several days till the boundary of the patient's tolerance is reached.

Another cause of the syndrome is K-depletion in these patients, and supplements are necessary if K-depleting diuretics have been used. Sources such as fresh fruit juices and bananas should then be liberally incorporated in the low-protein diet.

If the patient has ascites or oedema, a Na-restricted diet is given; otherwise the Na intake may be normal. The need for a high-protein diet is stressed in the presence of ascites, since much protein is lost to the retained fluid. Oesophageal varices following impairment of the portal circulation necessitate a diet low in roughage, because this may provoke haemorrhage. All hard, crisp and fibrous foods must be avoided and the patient kept on a semi-solid diet (see 'Practical Therapeutic Dietetics, Part I').

Although infective hepatitis and cirrhosis may be correlated with cystine or choline in experimental animals, there is little evidence to indicate that supplementing a balanced high-protein diet with lipotrophic factors or vitamins brings about a more prompt or complete recovery than the diet alone.

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DIET FOR ACUTE RENAL FAILURE

(Acute tubular necrosis, acute cortical necrosis, acute glomerulonephritis.)

1. *Oliguric Phase*

Principles of Management

(*a*) Marked fluid restriction is essential.

(*b*) Protein, sodium, and potassium-free solutions only are permitted.

(*c*) If possible, at least 100 G. of carbohydrate should be provided.

In general, feeding by mouth is preferable to parenteral methods.

Daily fluid intake (Average, 70-kg. patient.) Basic 400-500 ml. for insensible loss. (Occasionally 750 ml. are given, i.e. when fever is present.)

Add to this the volume of:

1. Previous day's urine output.

2. Loss from gastro-intestinal tract (vomiting, diarrhoea, aspiration, fistulae, etc.).

3. Loss from body surface (sweating or exudation).

Fluids allowed

(*A*) Moderately severe cases (daily rise in blood-urea concentration, more than 30 mg. per 100 ml.).

(*a*) 10 – 15% lactose in water

(*b*) Iced carbonated sweetened drinks—ginger beer, cream soda, cola. N.B. *All fresh fruit drinks are forbidden*

(*c*) Black tea sweetened with sugar

Additional calories are desirable and may be provided by:

(*d*) Glucose sweets *ad lib.*

(*e*) Special ice-cream (see 'Recipes')

(*f*) Alcohol in selected cases. Whisky once or twice a day. (This must not be given in the presence of liver disease including carbon tetrachloride poisoning)

(*B*) Mild cases (daily rise in blood-urea concentration less than 30 mg. per 100 ml.).

In addition to the above the following are permitted:

(*a*) Crisp toast (toast melba) with a thin smear of butter with honey or syrup

(*b*) Cornstarch puddings
(*c*) Sago pudding
(*d*) Apple charlotte
} See 'recipes'

2. *Early Diuretic Phase*

Fluid. Fluid intake needs daily adjustment, usually in-

creasing in stepwise fashion to a maximum of 1·5 - 3·0 l./day. Once the diuresis is established and if nausea and vomiting are absent the diet is as for mild cases (see above). Great care must be taken *not* to supplement with sodium and potassium without suitable biochemical control. Usually such supplementation becomes necessary after a variable time. Both $NaHCO_3$ and KCl may be prescribed, but fresh fruit juices are a palatable way of providing the extra K, e.g. orange, pineapple or guava juice. In addition, extracts such as 'marmite', and meat and fish broths are also acceptable as a source of Na and K. According to progress a 10 G. or 20 G. protein diet is instituted.

3. *Late Diuretic Phase*

Once the blood urea is below 150 mg. per 100 ml., a 20 G. protein diet is instituted and increased to 40 G. as soon as possible.

LOW-PROTEIN DIETS

The following sample menus are for patients with either hepatic or renal disease. As the calorie value for all these menus is low they should be supplemented with concentrated sugars (glucose sweets, honey, carbonated beverages) and fats (butter and cream) in an effort to prevent the breakdown of endogenous protein sources. It should be noted that, owing to the prominence of fresh fruit and vegetables in these diets, the potassium intake is high.

10 G. protein diet. Sample menu (contains approximately 1,150 calories.)

Breakfast

Stewed, sweetened apple. 1 portion of fresh fruit, 1 portion of fruit juice, 1 thin slice of white bread, butter and jam. Black tea or coffee with sugar.

Dinner

Small helpings of rice or potato and 2 other vegetables (excluding legumes) with butter. Fresh, baked or canned fruit and cream. Fruit juice.

Supper

Baked tomato stuffed with rice *or* fried tomato and a small portion of chips *or* vegetable pie (made with cooked vegetables mixed with melted butter and covered with a thin layer of potato mashed with butter, no milk). Apple juice. Fruit—fresh, stewed or canned—and cream.

20 G. protein diet. Sample menu (contains approximately 1,200 calories).

Breakfast

2 portions of fruit—fresh, dried, stewed, juice, etc. Porridge, sugar and cream. 1 slice of bread or toast, butter and jam.

Dinner

Medium helping of potato or rice and gravy. Unrestricted helpings of vegetables (excluding legumes) and salad. Fruit juice if desired. Fruit—raw, baked or canned—with cream, if desired.

Supper

Soup made with broth and vegetables only. Low-protein dish such as macaroni mixed with stewed onion and tomato or ½ hardboiled egg and salad. 1 slice of bread or toast, butter and jam. Fruit (canned or stewed with sugar) and cream.

40 G. protein diet. Contains approximately 1,450 calories. Diet same as for 20 G. of protein diet plus the following foods:

(*i*) Small serving meat at dinner (±2 oz.).
(*ii*) ¼ pt. of milk per day.

RECIPES

The following high-calorie foods contain very little protein and are encouraged in the foregoing diets:

Jam, honey, syrup, stewed apples, pineapple juice, sugar, marmalade, apple juice, guava juice, carbonated drinks, glucose sweets.

The following dishes contain minimal quantities of protein and little sodium and potassium; they have a high calorie value:

(*a*) *Ice-cream.* Into 4 oz. of stiffly beaten cream, stir 1 oz. of melted salt-free butter, sugar and synthetic colouring and flavouring. Freeze, stirring at intervals.

(*b*) *Cornstarch pudding.* To 1 pint of boiling water add 1 - 2 oz. of cream, sugar, synthetic colouring and flavouring. Mix 1½ oz. of cornflour or custard powder to a paste with water and thicken the liquid.

(*c*) *Apple charlotte.* Grease a pie-dish and fill to about half an inch with stewed sweetened apple. On top of this, sprinkle a layer of salt-free breadcrumbs and add another half inch of apple. More salt-free breadcrumbs are spread on top and the dish is liberally garnished with pats of salt-free butter and apricot jam.

(*d*) *Sago pudding.* To ½ pint of boiling water, add ½ oz. of cream, 2 teaspoonfuls of sugar, colouring and flavouring. Stir in 1 oz. of sago and cook the mixture until thick, stirring frequently.

When sodium and potassium are not restricted, the following recipes provide variety.

(*e*) *A standard white sauce,* made with 1 - 2 tablespoonfuls of cream to ¾ cup of water instead of milk is invaluable in these diets.

(*i*) Using 2 tablespoonfuls of flour, 2 tablespoonfuls of butter, seasoning, and 1 cup of liquid, this can serve as a basis for 'creamed vegetables' on toast or rice.

(*ii*) With additional parsley and tomato puree, this may be mixed with macaroni, put into a pie-dish, sprinkled with breadcrumbs and baked under the griller for a few minutes. It provides variety as a supper dish.

(*iii*) A thick white sauce (using 4 tablespoonfuls of flour, 2 tablespoonfuls of butter, sugar and 1 cup of liquid) can be mixed with fruit (grated pineapple, canned peaches or dates) and served as a blancmange. In cases where restriction of protein is not minimal, the above mixture can be made with 3 tablespoonfuls of flour and used as a basis for a pie filling. The pie crust can be made with cornflake crumbs mixed with sugar and melted butter.

(*f*) *Fruit-juice mould.* Bring 1 pint fresh fruit juice to boiling point with sugar to taste. Mix 3 tablespoonfuls of custard powder to a paste with cold water and stir in the boiling liquid. Bring the mixture to the boil, mix in pieces of fresh or canned fruit, and allow to set.

HIGH-PROTEIN DIET

This diet is given in cases of protein depletion with hypoalbuminaemia in the following conditions: (*a*) The nephrotic syndrome, (*b*) cirrhosis of the liver, (*c*) malnutrition, (*d*) certain gastro-intestinal disorders, (*e*) certain toxaemias of pregnancy, and (*f*) pre- and postoperative plastic surgery.

The amount of protein given should be approximately 2 G./kg. ideal body weight, occasionally 2·5 G./kg. ideal body weight. In (*a*), (*b*) and (*e*) salt restriction is often required, but since protein and sodium are usually found in the same foods, the lowest practical restriction is 2 G. of sodium chloride. Even so, many high-protein foodstuffs must be excluded in this regime.

If no salt restriction is necessary, a full diet including large helpings of meat, fish, eggs and cheese should be given to the patient. In addition, the patient should consume ½ pint of milk and 1 pint of high-calorie milk (for recipe see 'Practical Therapeutic Dietetics, Part II') daily. The diet will then contain approximately 120 G. of protein. Supplements such as 'procasenol' and 'casilan' may be added to the diet for a higher protein intake. Custard, porridge, milk puddings and cold milk are good vehicles for the protein supplements.

HIGH-PROTEIN, LOW-SALT DIET

The following foods are permitted:

Beverages. 1 - 1½ pints of milk, buttermilk or skimmed milk daily. In the nephrotic syndrome, where the serum-lipid level is high, skimmed milk is preferable. Tea, coffee and carbonated beverages are unrestricted.

Meat, eggs, cheese. Large helpings of all types of fresh meat and fish cooked without salt are emphasized. Salted (e.g. biltong), smoked or canned products are forbidden. Unsalted skimmed-milk and cottage-cheese are permitted; all other cheeses are forbidden.

Bread and cereals. Unsalted bread and matzos, cooked cereals without salt, 'shredded' and 'puffed' wheat.

Fruit and vegetables. All fresh, cooked or frozen vegetables and fruit. Tinned vegetables and dried fruit are forbidden.

Miscellaneous. Herbs, spices, vinegar and all sweetening agents. Salt substitutes are often permitted, i.e. if potassium retention is absent (see also under 'Practical Therapeutic Dietetics, Part III, Restricted Sodium Diet').

SAMPLE MENU

Breakfast

Stewed apple
Porridge with milk from ration and sugar
2 eggs—boiled, scrambled or poached
2 slices unsalted bread and unsalted butter
1 glass milk from daily ration

Dinner

Large helping of unsalted meat—roast, fried or stewed
Potato or rice
Cabbage, pumpkin
Baked custard, made from milk from daily ration and syrup.

Mid-afternoon

Tea with milk and sugar from daily ration

Supper

Large helping fried fish
Chips
Tomato and lettuce salad
Unsalted bread, butter and jam
Tea or coffee with milk from ration

Bedtime Snack

Glass of cocoa with milk from daily ration

Daily Rations

1½ pint of milk
1 oz. of unsalted skimmed-milk cheese

Approximate nutritional values: Protein: 130 G., calories: 2,750.

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