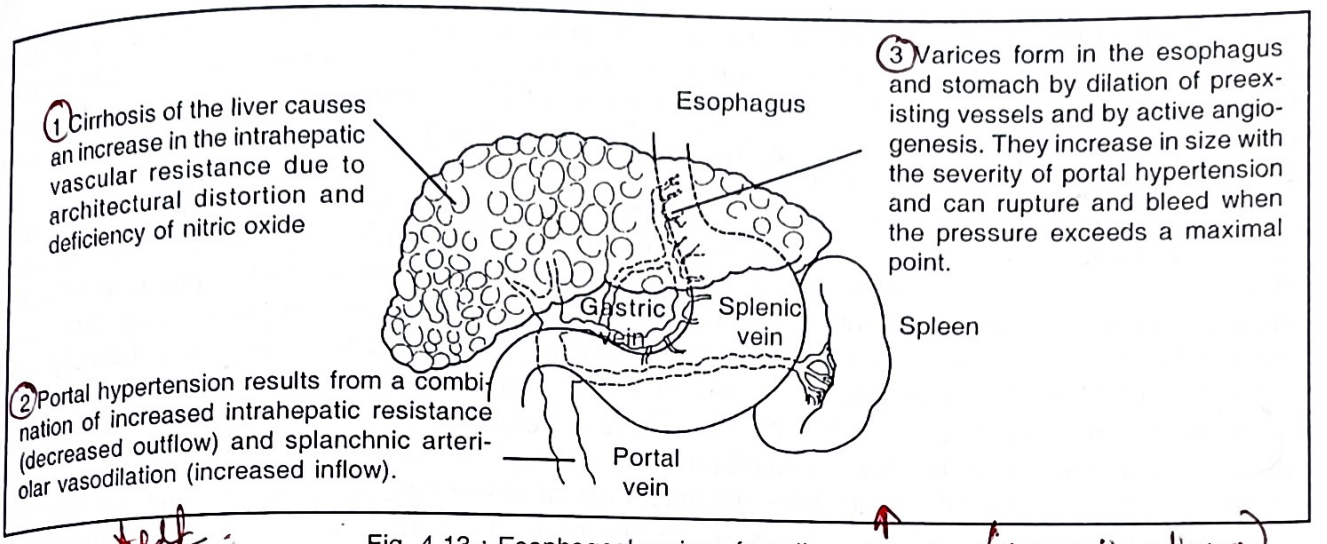

Fig. 4.13 : Esophageal varices from liver cirrhosis.

Nutritional Management of Liver Cirrhosis

A High calorie high carbohydrate, moderate protein and low fat diet is recommended for patient with liver cirrhosis with additional vitamin and mineral supplemenlation. Such a diet helps to regenerate liver tissue and also help to prevent the complications such as ascites. Since in the acute condition, anorexia is found, the food should be given to normal diet, according to the stage of the disease and recovery. Judicious use of spices and condiments are required to stimulate appetite. High calorie and protein beverages should be given in between meals. The diet should be planned for each patient according to the degree of malnutrition and tolerance level of the patient.

The nutrient modifications in liver cirrhosis include :

Energy : Energy requirements are varied among patients of liver cirrhosis. Most of the cirrhotic patients with end stage liver disease (ESLD) and without ascites require about 120% to 140% of the resting energy expenditure (REE). If ascitic, infection or malabsoption is present or if nutritional repletion increased to the requirement of energy should be incresed to 150% to 175% of REE. This equals to about 25 to 30 kcal per kilogram of body weight, estimated dry body with should be used in calculation to prevent over feeding. To ensure optimal intake in malnourished patients and reducing complication and prolonging survial, oral nutritional supplements of tube feeding may found effective.

Carbohydrates : To ascertain to carbohydrate need is challenging because of the deterioration in liver function, which plays the primary role in carbohydrate matabolism. Liver failure reduces glucose production and peripheral utilzation of glucose. In liver cirhosis, gluconeogenisis is decreased with prreference to lipid and amino acid for energy. Depending on the stages of liver damage, about 300 to 400 gram carbohybrate per day is adequate to prevent protein catalabolism.

Protein : Proteins should be recommended judiciously. Cirrhosis has long been though of as a catabolic disease with increased protein break down and inadequate resynthesis, resulting in depletion of visceral protein stores and muscle wasting. In uncomplicated hepatitis or cirrhosis without encephalopathy, protein range from 0.8 to 1 g/kg of dry weight per day to achieve nitrogen balance. To promote nitrogen accumulation or positive balance, at least 1.2 to 1,3 per kilo gram of body weight per day is needed. In acute stress conditions such as alcoholic hepatitis or decompensated disease (sepsis infection, gastro intestinal bleeding, severe ascites), at least 1.5 g or protein per kilogram per day should be given.

Fats : In cirrhosis, the plasma free fatty acid, glycerol, and ketone bodies levels are elevated in fasting condition. The body prefers lipids as energy source and lipolysis is increased with active

mobilization of lipid deposits, but the not capacity of lipid deposits, but the not capacity to store exogenos lipid is not impaired. Hence, a diet comprising 25% to 40% of calories as fat is recommended in liver cirrhosis. A moderate intake of fat with the substitution of medium chain triglycerides (MCTs) are recommended as they are readily absorbed in the intestinal villi and do not require bile salts for digestion and absorption.

Vitamins : Vitamins supplementation is essential to replenish liver stores and repair tissue damage in patients with liver cirrhosis. This is due to the intimate role of liver in nutrient transport, storage and metabolism, and for the side effects of drug administered. Deficiency of pyridoxine, thiamins, or vitamin B_{12} may cause neuropathy. Folic acid or vitamin B_{12} deficiency can cause macrocytic anaemia. Impaired dark adaptation can be found due to vitamin A deficiency, and hepatic osteodystrophy or osteopenia can develop from vitamin D deficiency.

Supplementation of fat soluble vitamin, in water soluble forms in necessary. Intravenous or intramuscular vitamin K is often administered for 3 days to rule out vitamin K deficiency as a causes of prolonged prothrombin time. Deficiencies of water soluble vitamins such as thiamine, pyridoxine, vitamin B_{12}, folate, and niacin are common in alcoholic liver diseases. Large doses (100mg) of thiamine are given for a limited period if deficiency is suspected.

Minerals : Serum calcium, magnesium, and zine levels are decreased in cirrhosis due to malabsorption associated with steatorrhaea. Therefore, the patients should take supplements of these minerals at least at the of recommended intake.

Restriction of sodium is essential if oedema and ascites are present. Sodium restriction up to 500 mg/day is advised if ascites is present and generally increased to 2 g/day diuretics. Emphasis should be given on intake of low sodium foods and avoidance of table salt or salt in food preparation. But an extremely restricted low sodium foods can affect the palatability and also increase the risk to hyponatremia.

Fluids : If sodium restriction is enough to correct oedema and ascites, then fluids should not be severely restricted, about 1500ml of fluid per day is given. Fluid requirement is estimated as per the previous day urinary output coupled with the insensible losses (perspiration, breath, faeces etc) which normally accounts to 500 ml/day as well as fluid lost through diarrhoea or vomiting; if present.

Dietary fiber : To prevent haemorrhage from varices in advanced cirrhosis, fiber intake should be restricted.

Table 4.33 : Foods to be Premitted and Excluded in Liver Cirrhosis.

Permitted Foods	Excluded Foods
Bread (wheat), rice, maize, jowar, bajra, breakfast cereals, pasta, and other refined cereals such as maida, semolina. Toned milk, and toned milk porducts such as curd, panner. Washed and splitted pulses and beans Sugar, jaggery, honey, jam or murabba, jellies Lean meat, egg white, fish o chicken Fats like, butter, cream Potatoes, sweet potatoes or yam Beverages, lemonade fruit juices.	Organ meat, egg yolk Fried foods Whole pulses and fiber rich cereals like oats, barley. Extra salt and baking soda, preseveal foods and foods containing salt like papads, churney, pickles.

Table 4.34 : Sample Menu Plan for an Adults Suffering From Lives Cirrhosis
[Energy - 2000 kcal and protein - 60g]

Meal Time	Vegetarian	Non-Vegetarion
Early Morning	Tea - 1 Cup Biscluts - 2	Tea - 1cup Biscuits - 2
Breakfast	Skim milk - 1 Glass Sandwich (with cheese) - 2 Cheese slices - 2 slices Semolina porridge - 1 serving Seasonal fruits - 1	Skim milk - 1 Glass or Egg wheite - 2 Semolina porridge - 1 serving Sandwich (with cheese) - 2 Seasonal fruits - 1
Morning	Sweet Lassi or Fruit juice or Tender coconut water or Lime juice	Fruit juice or Sweet lassi or Tender coconut water or Lime water
Lunch	Cooked rice - 1 seving Splitted dhal - 1 bowl With calcium caseinate - 4 tapoons Cooked vegetables - 1 serving Curd - 1cup Fruit - 1	Cooked rice - 1 seving Splitted dhal - 1 bowl With calcium caseinate - 4 tapoons Tender vegetables - 1 serving Curd - 1cup Fruit - 1
Evening Snacks	Sandwiches (with cheese) - 2 Fruit juice - 1 glass	Sandwiches (with cheese) - 2 Fruit juice - 1 glass
Dinner		Same as lunch