

Nutritional Issues In Advanced Liver Disease

Corrie Clark, RDN, LD



Objectives

- List specific points to keep in mind when assessing the nutritional status of patients with advanced liver disease.
- Describe the management and nutritional care for nonalcoholic fatty liver disease (NAFLD).
- Describe the nutrition-related problems with cirrhosis and liver transplantation.
- Describe medical complications and nutritional implications of advanced liver disease.

Nutrition Assessment of Advanced Liver Disease Patients

- Fluid overload interferes with accurate BMI and weight.
- Albumin, prealbumin and transferrin data can be misleading due to edema.
- Anthropometric measurements can be misleading in the presence of edema.
- Handgrip strength or use of a Bioelectrical Impedance Analysis (BIA) is correlated with better outcomes.
- Evaluation of recent oral intake remains one of the most valuable components of nutrition assessment.

Nonalcoholic Fatty Liver Disease (NAFLD)

- Most common cause of advanced liver disease.
- Risk factors: obesity, metabolic syndrome, insulin resistance.
- Nonalcoholic steatohepatitis (NASH)

Management of NAFLD

- Lifestyle modifications – diet and exercise.
- Surgical weight loss interventions – gastric bypass, gastric sleeve or banding.
- Diabetes medications

Diabetes Medications Used to Treat Nonalcoholic Fatty Liver Disease (NAFLD)

<i>Type of Medication</i>	<i>Comments</i>	<i>Adverse Effects</i>
Thiazolidinediones	<ul style="list-style-type: none"> • Most studied type of diabetes medication used for NAFLD • Show biochemical and histological benefit in NAFLD 	<ul style="list-style-type: none"> • Weight gain • Decreased bone mineral density • Increased triglycerides • Increased rates of cardiovascular events • Complications and exacerbation of congestive heart failure
Metformin	<ul style="list-style-type: none"> • Biochemical, but no histological benefit as monotherapy • Cannot use if creatinine >1.5 mg/dL 	<ul style="list-style-type: none"> • Diarrhea • Lactic acidosis
Incretin mimetics	<ul style="list-style-type: none"> • Studies ongoing, but no proven histological benefit 	<ul style="list-style-type: none"> • Nausea • Delayed gastric emptying

Source: Data are from reference 3.

Nutritional Care of NAFLD

- Saturated fat limited to less than 10% of total calories.
- Replace carbohydrates and saturated fats with monounsaturated fats.
- Omega-3 fatty acids verses Omega-6 fatty acids.
- Limit refined sugars and sugar-sweetened beverages (concentrated sweets).
- Moderate amounts of lean protein (animal and plant-based protein).
- Vitamin E – 400-800 IU.

Cirrhosis and Liver Transplantation

- Malnutrition
- Vitamin and mineral deficiencies
- Osteoporosis

Cirrhosis and Liver Transplantation – Malnutrition

- 20-80% of patients with cirrhosis experience malnutrition.
 - Nausea and early satiety
 - Hypermetabolic state
 - Reduced glucose storage (in alcohol-induced cirrhosis)
 - Insufficient intake of protein and energy
- 53% of patients waiting for liver transplantation are malnourished.

Cirrhosis and Liver Transplantation – Vitamin and Mineral Deficiencies

Micronutrient Deficiencies Associated with Cirrhosis

Potential Deficiency	Notes
Zinc	<ul style="list-style-type: none"> Replacement may be helpful in managing hepatic encephalopathy.
Selenium	
Magnesium	
Water-soluble vitamins (B complex, Vitamin C, thiamin)	<ul style="list-style-type: none"> Deficiency is particularly common in alcoholic liver disease.
Fat-soluble vitamins	<ul style="list-style-type: none"> Deficiency occurs particularly in cholestatic liver disease such as primary biliary cirrhosis.
Vitamin A (retinol)	<ul style="list-style-type: none"> Deficiency is a risk factor for hepatocellular carcinoma and fulminant hepatic failure (ie, ito cell hyperplasia).
Vitamin D	<ul style="list-style-type: none"> Deficiency occurs in two-thirds of patients with cirrhosis and 96% of patients awaiting liver transplant.
Vitamin E	<ul style="list-style-type: none"> Deficiency occurs particularly in cholestatic and alcoholic liver disease.
Vitamin K	

Cirrhosis and Liver Transplantation – Osteoporosis

- 12-55% prevalence in patients with cirrhosis
 - Risk factors:
 - Vitamin K deficiency
 - Vitamin D deficiency
 - Excess alcohol intake
 - Reduced serum testosterone levels
 - Corticosteroids
- 15-27% prevalence after liver transplantation
- Noncirrhotic biliary disease and primary biliary cirrhosis, hemochromatosis and excessive alcohol intake in the absence of cirrhosis.

Cirrhosis and Liver Transplantation – Osteoporosis (cont.)

- Treatment:
 - One gram of calcium plus 800 IU vitamin D (plus emphasis on foods containing calcium and vitamin D)
 - Bisphosphonates
 - Physical activity
 - Vitamin K (if deficient)
 - Second-line treatments – hormone replacement therapy
 - Biannual bone density tests, regardless of whether patient is treated for osteoporosis

Cirrhosis and Liver Transplantation – Other Nutrition-Related Problems for Cirrhosis Patients

- Edema and ascites – limit sodium to 2gm/day.
- Hypoglycemia – consume small frequent meals including a bedtime/evening snack, which includes both carbohydrate and protein. Oral liquid nutritional supplements as needed.
- Septicemia – avoid raw seafood (molluscan shellfish, oysters).

Medical Complications and Nutritional Implications of Advanced Liver Disease

- Pancreatic insufficiency – MCT oil, safflower oil, fat-soluble (D, E, A, and K) vitamin supplements and pancreatic enzymes.
- Hepatic Encephalopathy – provided adequate medications (lactulose or rifaximin), and optimize protein to as much as the patient is able to tolerate.
 - 0.8gm protein/kg body weight.
 - Branched-chained amino acids (BCAAs, ie., leucine, isoleucine and valine) may be beneficial.

Medical Complications and Nutritional Implications of Advanced Liver Disease (cont.)

- Alcoholic Hepatitis – general daily guidelines are 1.2-1.5gm protein/kg of body weight and 35-40kcal/kg of body weight.
- Acute Liver Failure – catabolic state with a heightened metabolic demand for energy, protein, glucose, thiamin and pyridoxine.
 - Metabolic requirements are 20% to 30% higher.
 - May benefit from early initiation of enteral nutrition support to help decrease protein catabolism.
 - Initial feeds: 20-25kcal/kg body weight/day.
 - Recovery phase: 30kcal/kg body weight/day.

Take Home Points

- Nutrition-related disorders, especially protein-calorie malnutrition and micronutrient deficiencies, are common in patients with advanced liver disease. Therefore, aggressive nutrition management is pertinent to their overall medical care.
- Protein and energy requirements are elevated, but most advanced liver disease patients are underfed due to fears of protein intoxication.

References

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