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Commentary

Impact of Nutritional Interventions in Patients with Cirrhosis: A Systematic Review

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DESCRIPTION

Cirrhosis represents the final common pathway of progressive chronic liver diseases and is often accompanied by profound metabolic alterations, protein-calorie malnutrition and sarcopenia. These nutritional disturbances are not merely secondary consequences of liver failure they are actively involved in worsening the course of the disease and impacting both short- and long-term outcomes. As such, the role of nutritional therapy in cirrhosis management has attracted increasing interest in recent years. A growing body of evidence, synthesized in systematic reviews, now supports targeted nutritional interventions as a means to improve prognosis, reduce complications and enhance quality of life.

From a clinical standpoint, malnutrition in cirrhosis is not a niche problem it is a central feature, affecting up to 80% of patients with decompensated disease. This high prevalence is due to a combination of factors, including altered energy metabolism, reduced nutrient intake, early satiety from ascites, gastrointestinal dysfunction and systemic inflammation. Importantly, traditional anthropometric assessments often fail to detect sarcopenia and micronutrient deficiencies, underscoring the need for proactive screening and tailored intervention.

Recent systematic reviews have consolidated findings from randomized trials and cohort studies and a consistent message has emerged: Nutritional interventions in cirrhosis can improve clinically meaningful outcomes. High-protein, energy-dense diets once controversially avoided due to unfounded concerns about hepatic encephalopathy are now encouraged. Protein restriction has been largely abandoned in favor of recommendations targeting 1.2–1.5 g/kg/day of protein intake. Studies reviewed collectively indicate that this approach helps preserve lean muscle mass, reduce ammonia levels and support nitrogen balance without worsening mental status.

One area of focus is the use of Late Evening Snacks (LES) typically rich in complex carbohydrates and proteins as a simple, non-pharmacologic intervention. Multiple trials have demonstrated that LES can suppress overnight fasting-induced catabolism and improve muscle protein synthesis. In a number of systematic reviews, LES was associated with improved metabolic profiles and reductions in sarcopenia-related complications such as frailty and falls. Given its low cost and ease of implementation, this is a practical strategy that is increasingly being adopted in hepatology clinics, especially in high-income countries where dietitians are integrated into multidisciplinary liver care teams.

Branched-Chain Amino Acids (BCAAs) have also garnered attention, particularly in patients with advanced cirrhosis or hepatic encephalopathy. Systematic reviews reveal that BCAA supplementation not only improves nutritional status but may also enhance cognitive function and reduce recurrence of encephalopathy episodes. While evidence on mortality benefit remains inconclusive, their utility as an adjunct to dietary interventions appears to be well-supported.

In terms of micronutrient supplementation, systematic reviews have identified frequent deficiencies in vitamins A, D, E, zinc and selenium among cirrhotic patients. Although randomized controlled trials on specific micronutrient outcomes remain limited, the correction of these deficiencies is considered essential, particularly for immune competence, bone health, and antioxidant defense. Of note, zinc has shown promise in improving hepatic encephalopathy symptoms and ammonia metabolism.

Despite these encouraging findings, significant gaps remain. One of the major limitations in the literature is heterogeneity in intervention types, durations and endpoints, making direct comparisons difficult. Furthermore, most studies are conducted in specialized academic settings and may not reflect real-world adherence or accessibility challenges, particularly outside high-resource environments. Another notable issue is the underrepresentation of patients with coexisting obesity and metabolic syndrome an increasingly common phenotype of cirrhosis in the context of MASLD (metabolic dysfunction-associated steatotic liver disease). The intersection of obesity, muscle wasting and liver dysfunction poses unique challenges that are yet to be comprehensively addressed in nutritional trials.

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As a clinician and researcher working in a high-income setting, I believe that one of the most impactful shifts we can make is to treat nutrition as a core therapy, not an optional adjunct. This requires embedding registered dietitians in herpetology teams, routinely performing nutritional risk assessments and individualizing interventions based on disease stage, comorbidities and patient preferences. Digital tools, such as mobile apps for dietary tracking and remote coaching, are beginning to support this paradigm, making it easier to scale evidence-based nutrition strategies.

CONCLUSION

The evidence from systematic reviews strongly supports the role of nutritional interventions in cirrhosis as a means to improve function, reduce complications and potentially extend survival. Yet the challenge lies in translating this evidence into standard care pathways. In high-income countries where infrastructure and expertise are available, nutrition must be recognized not just as supportive care, but as a frontline treatment modality in chronic liver disease. Going forward, research should focus on refining intervention protocols, understanding patient subgroups and evaluating long-term outcomes. As our understanding of the gut-liver-muscle axis evolves, the integration of nutrition science into hepatology will no longer be optional it will be essential.