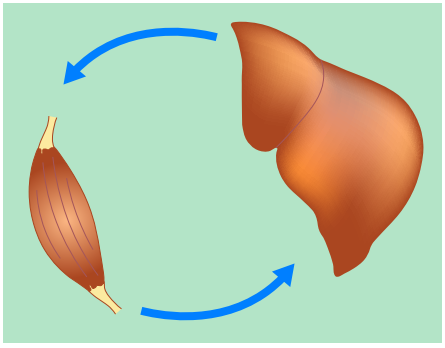
Mistakes in nutrition in chronic liver disease and how to avoid them

Manuela Merli and Lucia Lapenna

Malnutrition frequently occurs in patients who have chronic liver disease and worsens their prognosis. There are multiple causes of malnutrition in the context of cirrhosis: low dietary intake, malabsorption, metabolic alterations and modification of substrate utilisation. Sarcopenia, which is defined by loss of muscle mass and function, is a major component of malnutrition in patients with cirrhosis. Sarcopenia adversely affects the number and severity of complications, quality of life, the outcome of liver transplantation and the overall survival rate of patients with advanced liver disease. Physicians should be aware of the clinical and prognostic relevance of nutritional status, how to promptly recognise malnutrition and sarcopenia in patients with liver cirrhosis and how to appropriately manage these conditions. Here we discuss some mistakes that are frequently made regarding nutrition in chronic liver disease, and we provide evidence and experience-based approaches to avoid them.



Mistake 1 Relying only on body weight and BMI to assess nutrition

Body mass index (BMI) is the most common and well-known nutritional parameter in the general population. However, its use in patients with chronic liver disease may lead to inaccurate nutritional assessment. This is due to specific intrinsic features of patients with cirrhosis. Firstly, many of these patients suffer from fluid overload (mainly ascites, but also peripheral oedema or hydrothorax) that may cause BMI to be overestimated. Secondly, overweight or obese patients with cirrhosis may present with 'sarcopenic obesity', which it is not possible to identify by means of a simple BMI evaluation. In the case of obese patients, you may be concerned about the need to restore a normal body weight through an hypocaloric diet, but, in the presence of sarcopenia, you need also to take care of providing protein and introducing exercise. Therefore, making a nutritional assessment based only on BMI can easily lead to inaccuracies.[1]

How can a complete and adequate assessment for malnutrition be done? Patients with liver disease often undergo a CT scan for different reasons, including to diagnose focal liver lesions and for pretransplant evaluation. Such images, when available, can be used to detect sarcopenia by analysing the total cross-sectional area (cm^2) of abdominal skeletal muscle at L3.[2] Dual-energy X-ray absorptiometry (DEXA) has also been used to evaluate muscle quantity in patients with cirrhosis.[3] Finally, anthropometry (mid-arm muscle circumference or triceps skinfold), tetrapolar bioelectrical impedance analysis (BIA) or handgrip strength are all simple and effective alternative approaches that can reliably detect malnutrition and sarcopenia in chronic liver disease.[3–5]

Mistake 2 Not explaining the importance of nutritional status to patients

Malnutrition and sarcopenia are associated with increased morbidity and mortality in patients with cirrhosis,[6,7] so underestimating their importance in comparison with other complications of chronic liver disease can have negative consequences. It is important to underline that liver impairment results in reduced energy availability and a state of 'accelerated fasting', where energy is derived mainly from the catabolism of adipose and muscles tissues.[8]

Simple messages and phrases should, therefore, be used to explain to patients the importance of nutrition for managing their disease. Possible questions to ask are: "Did you know that when you have liver disease, you may need to increase your calorie intake?"; "Did you know that if you are fasting for 12 hours, this is comparable to a healthy individual starving for 3 days?"; "Did you know that malnutrition may cause you to have longer stays in hospital?"; and, "Did you know that malnutrition can increase complications and decrease survival?".

Mistake 3 Underestimating the prevalence of malnutrition and sarcopenia

The prevalence of sarcopenia in patients who have cirrhosis ranges from 30% to 70%, depending on the diagnostic tools used and the severity of the underlying liver disease,[9] but a malnutrition diagnosis might be missed because the condition can be undetectable in the early stages of liver disease. Furthermore, many factors can hide nutritional alterations in chronic liver disease, for example, some patients may appear overweight or obese despite being, at the same time, muscle depleted.[10,11]

For these reasons, it is helpful to apply a rapid screening approach that is able to identify those patients at risk of malnutrition. As shown in figure 1, patients at risk are those with a low BMI (<18), advanced liver disease (as revealed by a Child–Pugh class C score) or a positive score assessed by the Royal Free Hospital-Nutritional Prioritizing Tool (RFH-NPT). The latter score is based on six questions that assess nutrient intake, weight loss, subcutaneous fat loss, muscle mass loss, fluid accumulation and a decline in the functional status of the liver.[3,12,13] Following this rapid screening approach, a complete nutritional assessment should be performed in all patients at risk (figure 1). This assessment should involve the muscle mass and muscle strength assessments described in Mistake 1, as well as global physical performance assessments, such as the timed up and go test (TUG), which measures the likelihood of falls and the six minute walk test (6MWT), which assesses aerobic capacity and endurance.[14,15]

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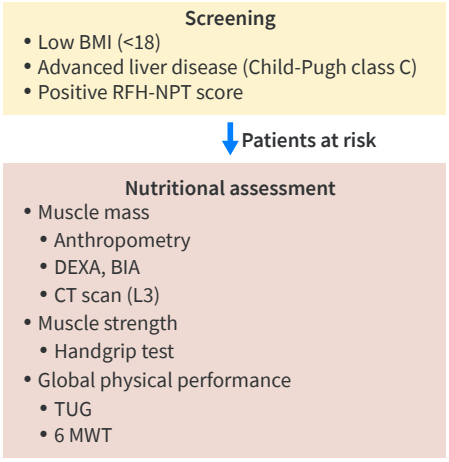

Figure 1 | Rapid nutritional screening can be used to identify patients with chronic liver disease who are 'at risk' of malnutrition and should undergo a nutritional assessment. 6MWT, 6 minute walk test; BIA, bioelectrical impedance analysis; BMI, body mass index; CT, computed tomography; DEXA, dual-energy X-ray absorptiometry; RFH-NPT Royal Free Hospital-Nutritional Prioritizing Tool; TUG, timed up and go test.

Mistake 4 Recommending unjustified dietary restrictions

Both patients and doctors may erroneously believe that some foods are harmful and need to be avoided by those who have liver disease. Since patients with liver disease may spontaneously avoid eating adequately due to symptoms such as dysgeusia, dyspepsia or nausea, it is pointless and detrimental to overload them with complicated dietary prescriptions and restrictions. What is important to emphasize is that no food, other than alcohol, damages the liver or is genuinely contraindicated in patients with chronic liver disease.[3] In most patients, consuming an adequate number of calories and protein is much more important than avoiding specific types of food. Figure 2 summarises the most pertinent recommendations regarding energy and protein intake in patients with cirrhosis, according to international guidelines.[3,16–20]

Mistake 5 Prescribing a low protein diet to prevent hepatic encephalopathy

Hepatic encephalopathy, a decline in brain function linked to severe liver disease, occurs more frequently in malnourished patients with cirrhosis.[3] Furthermore, sarcopenia is an independent risk factor for the development of this complication after transjugular intrahepatic portosystemic shunt (TIPS) placement,[21] a procedure that reduces portal hypertension by creating an artificial shunt between the suprahepatic and portal veins.

In past times, a low-protein diet was recommended for patients with hepatic encephalopathy to limit both the synthesis of ammonia and the deamination of proteins to aromatic amino acids (hyperammonemia and amino acid imbalances have a key role in hepatic encephalopathy). However, at present, international guidelines agree that the general recommendation for optimal daily protein and energy intake should not be lower for patients with cirrhosis and hepatic encephalopathy than for patients with cirrhosis (figure 2).[3,22] Indeed, a low protein diet has been shown to increase protein breakdown which also causes a nitrogen load that may generate ammonia. In addition, it is important to remember that patients who are unable to eat due to hepatic coma should be given the recommended diet by nasogastric tube or parenterally.

Mistake 6 Failing to engage in continuous and multidisciplinary counselling

Frequent nutritional monitoring and counselling is important to ensure that every patient has an adequate nutrient intake (figure 3). To perform this type of therapeutic intervention efficiently, it is important to establish a multidisciplinary nutritional team that involves the hepatologist, dietitians, pharmacists and nurses.[23]
A multidisciplinary team approach, which includes meetings on the importance of nutritional therapy and lifestyle prescriptions, improves survival rates and quality of life for patients.[17] Such an approach should be used whenever possible and novel technologies that facilitate distance counselling should be implemented. Multidisciplinary nutritional care should include monitoring of nutritional status and should provide patients with clear guidance on how to achieve their nutritional goals.[17]

Key recommendations regarding nutrition in patients with cirrhosis

- Advise patients that their optimal daily energy intake should be 30–35 kcal/kg ideal body weight
- Advise patients that their optimal daily protein intake should be 1.2–1.5 g/kg ideal body weight
- Recommend 4–6 meals evenly distributed throughout the day and a late-evening snack to shorten the periods of fasting and minimise protein utilisation
- Encourage the ingestion of a diet rich in vegetables and dairy protein
- Assess the need for supplementary vitamins and trace elements
- Consider enteral (preferentially) or parenteral nutrition for patients who are severely malnourished and/or unable to take adequate nutrition through diet or oral supplementation
- Treat patients who have sarcopenia with an adequate protein intake and a regular moderate exercise programme
- Treat patients with severe obesity with a diet low in calories but higher in protein to prevent muscle depletion, and provide advice on how to change their lifestyle

Figure 2 | Key recommendations regarding nutrition in patients with cirrhosis according to international guidelines.[17,31]

Mistake 7 Forgetting to involve the caregiver

Caregiver burden is high among patients with end-stage liver disease, including those awaiting a liver transplant. It is known that chronic liver disease increases the socioeconomic and emotional burden on a patient's family and this is an important aspect, because a patient's adherence to therapy and their transplant eligibility is dependent on their caregiver's ability to handle these challenges.[24] Even higher caregiver burden is associated with hepatic encephalopathy and cognitive dysfunction.[25]
In the context of nutrition, since the caregiver assists the patient with their food choices and with the preparation of meals, it is essential to give the caregiver adequate support and specific advice to limit, at least, this source of stress.

Mistake 8 Neglecting to adapt the diet when clinical status changes

Variations in nutritional status (such as sarcopenia, malnutrition or obesity) or the occurrence of any complications of chronic liver disease (e.g. ascites, hepatic encephalopathy or diabetes) may require some dietary modification. For example, the development of ascites may require moderate sodium restriction, taking into account that this may lead to reduced energy and protein intake due to poor palatability.[17] Furthermore, a related mistake is paying little attention to nutrition when a patient is hospitalised. Hospital guidelines routinely require patients to fast while waiting for ultrasonography, CT examinations or endoscopic procedures. Indeed, patients with cirrhosis are frequently hypermetabolic and thus in even greater need of energy support. When oral intake needs to be discontinued, intravenous glucose support might be required. In patients who have a low spontaneous food intake, nutritional supplements or enteral nutrition are suggested. Micronutrient deficiency should also be evaluated, identified promptly and treated as necessary.[8]

Mistake 9 Forgetting about sarcopenia in the pre-transplant evaluation

Generally, for patients with cirrhosis who are being evaluated for transplantation, great attention is given to the conventional prognostic scoring systems — Child-Pugh score, MELD (model for end-stage liver disease) score or MeldNa score (an extension of the MELD score that includes serum sodium). However, these scores do not take

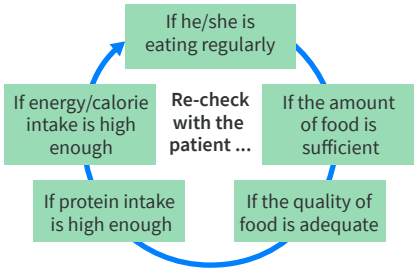

Figure 3 | Continuous nutritional monitoring should be carried out during patient follow-up.

into account a patient's nutritional status. Since malnutrition and sarcopenia are, as previously mentioned, important prognostic factors in liver disease, they need to be considered to better recognise patients at higher risk of waiting list mortality.[26,27] Another useful scoring system is the liver frailty index (LFI). The LFI considers physical frailty and includes three performance-based metrics (grip strength, chair stands and balance testing) that improve risk prediction regarding the mortality of patients on the pre-transplant waiting list.[28]

Mistake 10 Overlooking sarcopenia when selecting patients for TIPS placement

As already mentioned, TIPS placement is a minimally invasive technique that is used to reduce portal pressure and to treat the complications of portal hypertension, such as variceal bleeding or refractory ascites.[29] However, hepatic encephalopathy is an important and disabling complication in patients receiving a TIPS. Together with age, cardiac status, liver dysfunction and renal impairment, sarcopenia should be considered when selecting patients to undergo TIPS placement. Nutritional status should be evaluated in patients before TIPS placement, because sarcopenia increases both the incidence of hepatic encephalopathy[21] and the risk of acute-on-chronic liver failure[30], therefore representing a relative or transient contraindication for TIPS in some patients.

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Your nutrition and chronic liver disease briefing

UEG Week

- 'Diagnosis of malnutrition and sarcopenia' presentation in the 'Diagnosis and treatment of malnutrition' session at UEG Week Virtual 2020 [https://ueg.eu/library/diagnosis-of-malnutrition-and-sarcopenia/239705].
- 'The role of TIPS in cirrhosis' presentation in the 'Complications of cirrhosis' session at UEG Week Virtual 2020 [https://ueg.eu/library/the-role-of-tips-in-cirrhosis/239697].
- 'New approaches to sarcopenia' presentation in the 'Nutrition: What's new in 2020?' session at UEG Week Virtual 2020 [https://ueg.eu/library/new-approaches-to-sarcopenia/235004].
- 'Battling malnutrition in cirrhosis: Diet is key' presentation in the 'Hotspot Symposium: Nutrition and liver' session at UEG Week 2019 [https://ueg.eu/library/battling-malnutrition-in-cirrhosis-diet-is-key/211431].

Standards and Guidelines

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