ADVANCES IN HEPATOLOGY

Current Developments in the Treatment of Hepatitis and Hepatobiliary Disease

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Frailty, Sarcopenia, and Nutrition in Patients With Cirrhosis

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G&H Why is it important to identify frailty and sarcopenia in patients with cirrhosis?

JL Frailty and sarcopenia are unfortunately prevalent in patients with cirrhosis. Up to 1 in 5 patients with cirrhosis meet criteria for frailty, and up to 3 in 4 meet criteria for sarcopenia. In patients with cirrhosis, frailty and sarcopenia are strongly associated with risk of death in excess of the extent of liver dysfunction or portal hypertensive complications, making it essential for clinicians who care for these patients to routinely assess for either or both of these conditions.

G&H How can frailty and sarcopenia be best measured in patients who have cirrhosis?

JL There are a number of ways to measure muscle health, a term that encompasses both frailty (muscle function) and sarcopenia (muscle mass). Metrics of frailty that have been studied in patients with cirrhosis include the Fried Frailty Index and the Clinical Frail Scale. There are other commonly used scales such as the Karnofsky Performance Status (KPS) scale and the Activities of Daily Living (ADL) scale, which do not measure frailty per se but capture components related to the frail phenotype. The Liver Frailty Index is the only frailty metric developed specifically for patients with cirrhosis and consists of performance-based tests that can be feasibly performed repeatedly in the ambulatory setting.

When it comes to measuring muscle mass, the most widely studied metric in Western countries is the skeletal muscle index, calculated from a measure of total abdominal muscle mass on computed tomography scan.

G&H Is there racial or ethnic variation in the development and presentation of sarcopenia and frailty?

JL In terms of sarcopenia, there are racial and ethnic differences in the amount of muscle mass that an individual has. Some racial and ethnic groups have more or less muscle mass than other groups. This variation has been better characterized in the general population; it has not yet been well characterized in patients with cirrhosis. That is mainly because even the largest cohorts of patients with cirrhosis that study sarcopenia do not have sufficient numbers to subgroup patients by racial and ethnic groups. This is an important area for future study.

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In terms of frailty, clinically relevant differences by racial/ethnic groups have not been consistently observed.

G&H What management strategies can help reverse or prevent frailty and sarcopenia in patients with cirrhosis?

JL Studies have shown that exercise- and nutrition-based interventions can improve muscle health. I recommend that patients with cirrhosis who display early signs of impaired muscle health consume an adequate amount of protein (0.5-0.7 g per pound of body weight per day) in conjunction with regular exercise, including both aerobic exercise and strength training. Resistance exercise is essential for muscle strengthening while aerobic exercise is essential for maintaining cardiorespiratory fitness. Many studies have shown that improvements in frailty and muscle mass are associated with lower mortality in patients with cirrhosis. For example, improvements in the Liver Frailty Index are associated with improved clinically relevant outcomes such as mortality.

However, one of the greatest barriers to improving muscle health is that often patients with cirrhosis are being advised to focus on these nutritional and physical activity–based interventions when their frailty or sarcopenia is quite advanced. At that point, I would argue that it is very difficult for patients to consume sufficient protein when food does not taste the same, as well as exercise and do weight training when being exhausted from decompensated liver disease. That is why it is so important for patients with advanced liver disease to know that frailty and sarcopenia are prevalent conditions that they are at higher risk of developing. That way, they can initiate some of these nutritional and physical activity–based interventions earlier on to preserve their muscle strength and activity levels to slow or even prevent the progression of sarcopenia and frailty.

G&H How does malnutrition relate to the constructs of frailty and sarcopenia?

JL Malnutrition, frailty, and sarcopenia are interrelated constructs. Malnutrition represents the imbalance of nutrients, which causes measurable effects on the body that, in turn, can lead to adverse outcomes. Frailty is the phenotypic representation of impaired muscle function, and sarcopenia is the phenotypic representation of impaired muscle mass. Malnutrition is a dominant factor—but not the only one—contributing to frailty and sarcopenia in patients with cirrhosis. These conditions are highly correlated constructs because an individual who has malnutrition is much more likely to have sarcopenia and frailty and, vice versa, someone who has sarcopenia and frailty is much more likely to have malnutrition as the etiology of their sarcopenia and frailty. However, although the overlap of these constructs is very high, they are not completely synonymous. Someone can be malnourished without being sarcopenic and frail, and someone can be sarcopenic and frail without being malnourished. Because malnutrition is often a major driver of the development of sarcopenia as well as frailty, it is very important to screen for malnutrition.

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G&H What are the recommendations for fluid and dietary intake in patients who have cirrhosis?

JL For patients with cirrhosis, particularly those who have decompensated cirrhosis, I recommend the avoidance of excess water intake because patients who have advanced cirrhosis can have an impaired ability to manage excess water. Thus, although it is important to be hydrated, these patients do not need to emphasize excess hydration.

Another recommendation for patients with advanced cirrhosis is to consider a low-sodium diet, ideally less than 2000 mg of sodium per day. However, food palatability should be taken into consideration. If a patient has difficulty taking in sufficient calories because they cannot tolerate a low-sodium diet from a palatability perspective, then it is reasonable to relax the sodium restriction. In general, though, palatability issues mainly occur when patients have decompensated cirrhosis. In my experience, most individuals with well-compensated cirrhosis eat sufficient calories and do not have an issue with underfeeding.

As already mentioned, it is also important for patients with advanced cirrhosis to take in sufficient protein, at a recommendation of 0.5 to 0.7 g of protein per pound of body weight per day.

G&H When is nutritional supplementation necessary?

JL Nutritional supplementation is necessary when an individual cannot meet their micronutrient, caloric, or protein needs with regular food alone. If patients with cirrhosis just cannot eat, or they do not feel like eating, then nutritional supplementation can be beneficial. In general, however, I encourage my patients to try to obtain their calories and protein through a diverse diet with regular food. In addition, for patients with decompensated cirrhosis, taking a multivitamin is a reasonable recommendation, in my opinion.

G&H Do you have any other recommendations or tips for helping patients with cirrhosis improve their nutritional status?

JL For a patient with cirrhosis, and this also applies to any patient with liver disease, I encourage dietary diversity. I like to tell my patients to "eat the rainbow"; in other words, they should strive to consume foods of a variety of natural colors, ideally through plants and spices (eg, tomatoes [red], carrots [orange], bananas [yellow], kale [green], blueberries [blue], eggplant [purple]). Patients should also try to reduce their consumption of ultra-processed foods, instead leaning more toward foods from whole-food sources to increase the likelihood that all of their micronutrient needs are met. Another recommendation is to aim for consuming 30 plants per week, which also emphasizes diversity and helps ensure a fairly adequate range of micronutrient intake. This not only includes whole fruits and vegetables, but spices (eg, black pepper, oregano, thyme), nuts/seeds, legumes (eg, beans, peas), and whole grains (eg, brown rice, wheat germ, oats).

G&H What do you recommend if patients with cirrhosis are trying to lose weight?

JL If patients with cirrhosis are trying to lose weight through caloric restriction, they should ensure that they are maintaining the recommended 0.5 to 0.7 g of protein per pound of body weight per day. At the same time, it is essential that they engage in muscle resistance exercises to help reduce the degree of muscle loss that inevitably comes with caloric restriction and weight loss.

G&H What are the priorities of research?

JL The most important area of research is the development of pragmatic interventions that optimize adherence and are feasible to implement in clinical practice within our health care system. It is easy for doctors to tell patients to eat more protein and exercise more, but those recommendations are very hard to follow, especially long term, in real-life practice. Also important is the development of pharmacotherapies targeted at improving and/or preserving muscle health. Partnering with industry to develop pharmacotherapies targeting frailty and sarcopenia is the future.

Disclosures

Dr Lai has received an educational/travel grant from Nestle Nutrition Institute, and has served on the advisory board of and as a consultant to Novo Nordisk, on the advisory board of Boehringer Ingelheim, and as a consultant to Genfit.

Suggested Reading

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