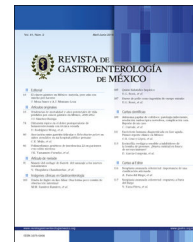




REVISTA DE GASTROENTEROLOGÍA DE MÉXICO

www.elsevier.es/rgmx



EDITORIAL

Association of physical frailty and quality of food consumption in patients with HCV-related liver disease



Asociación de la fragilidad física y la calidad del consumo de alimentos en pacientes con enfermedad hepática relacionada con hepatitis C

Physical frailty is a biological syndrome characterized by a cumulative decline in physiologic reserve, including loss of muscle strength and contractility, which leads to impaired physical function and increased vulnerability to adverse clinical outcomes.¹ This multifactorial condition arises from deterioration across several physiological aspects, most notably the musculoskeletal, cardiovascular, and immune systems.^{2–4} Frailty is one of the most prevalent manifestations of cirrhosis and significantly contributes to adverse clinical outcomes, particularly increased morbidity and mortality.⁵ According to the widely established Fried frailty phenotype, physical frailty is characterized by exhaustion, reduced grip strength, slow gait speed, and low physical activity; individuals meeting three or more of these criteria are classified as frail.²

Among individuals with cirrhosis listed for liver transplantation, frailty has been independently linked to greater waitlist mortality and more frequent unplanned hospitalizations.⁶

A recent meta-analysis demonstrated that the pooled prevalence of frailty in patients with cirrhosis is 27% (95% CI 21–33%), and when compared with non-frail patients, frail patients tend to be male, older, and have a lower body mass index and poor liver function.⁷

Despite its clinical importance, the pathophysiology of frailty in cirrhosis is not yet fully understood.¹

Currently, the primary tool for assessing frailty in cirrhosis is the Liver Frailty Index (LFI), a validated and objective measure incorporating handgrip strength, timed chair stands (5 repetitions), and balance testing (side-by-side, semi-tandem, and tandem holds). The LFI classifies patients as

robust (LFI < 3.2), pre-frail (LFI 3.2 to < 4.5), or frail (LFI ≥ 4.5). Additional frailty assessments used in cirrhosis include the Short Physical Performance Battery (SPPB), which evaluates gait speed, balance, and chair stands; as well as self-reported functional tools such as the Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). While ADLs assess a patient's ability to perform basic self-care, IADLs measure more complex daily functions, such as meal preparation or managing finances. Notably, limitations in ADLs are strong predictors of mortality in patients with cirrhosis.⁶

Similarly, malnutrition is a frequent complication of cirrhosis and has a significant impact on disease severity, affecting approximately 20% of patients with compensated liver disease and up to 80% of those with decompensated disease.^{8,9} In patients with cirrhosis, malnutrition is a major driver of sarcopenia, a central component of physical frailty.^{10,11} Although frailty has been investigated across different causes of cirrhosis, existing studies largely evaluate individuals with established cirrhosis, and data in patients with HCV-related chronic liver disease remain scarce (Table 1).

In this issue of the *Revista de Gastroenterología de México*, Vázquez-Rodríguez et al.¹² provide information on frailty and dietary intake quality in patients with chronic HCV infection, as well as the association between demographic, clinical, and anthropometric variables. In this study, the authors evaluated 52 patients with HCV infection, of whom 60% had cirrhosis, primarily compensated disease (Child-Pugh A and B). Frailty was assessed using the LFI, and none of the participants were classified as robust; more than 80% were pre-frail, and 19% were frail. The mean handgrip strength was 25.5 ± 11.1 kg, indicating moderate weakness in this cohort. Nutritional status was evaluated using triceps skinfold thickness (TSF) and mid-arm muscle circumference (MAMC), which demonstrated a greater prevalence of reduced muscle mass compared with decreased fat stores.

☆ See related content at DOI: <http://10.1016/j.rgmxen.2025.12.009>, Motamedrad, M. Association of physical frailty and quality of food-consumption in patients with HCV-related liver disease *Rev Gastroenterol Mex.* 2026;91:1–4.

Table 1 Cohort studies reporting frailty rates in patients with chronic liver disease.

Study	Number of patients	Frequency of HCV	Frailty prevalence and type of assessment	Main findings
Tandon et al., 2016 ¹⁴	300 patients with cirrhosis	34%	30% Frail Clinical Frailty Scale >4	<i>Ascites</i> (28%): 52% in frail vs. 22% in non-frail (p < 0.001)
Cron et al., 2016 ¹⁵	542 patients with ESLD referred for LT	NA	43% Frail Five-component Fried Frailty Index ≥ 3	<i>Ascites</i> (52%): 63% in frail vs. 55% in non-frail (p = 0.08) <i>Hepatic Encephalopathy</i> (41%): 51% in frail vs. 39% in non-frail (p = 0.003)
Lai et al., 2018 ⁴	529 patients with cirrhosis	38%	No prevalence reported (Continuous Index) LFI (grip, chair stands, balance)	<i>Ascites</i> (34%): Mild/Moderate (27%)
Xu et al., 2021 ¹⁶	1,623 patients with cirrhosis	22%	27.8% Frail LFI; Robust (LFI < 3.2) Pre-frail (LFI 3.2– 4.3) Frail (LFI > 4.4)	<i>Proportion of frailty differed by cirrhosis etiology:</i> MASH (32%), ALD (31%), Cryptogenic, alpha-1-antitrypsin, Wilson's disease, haemochromatosis' (31%), HCV (22%) <i>Waitlist mortality:</i> LFI was associated with a 5% increased risk of waitlist mortality per 0.1 unit (95% CI 1.04-1.07)
Wang et al., 2022 ¹⁷	822 patients with cirrhosis	18.4%	No prevalence reported LFI; Robust (LFI < 3.2), Pre-frail (LFI 3.2– 4.5), Frail (LFI > 4.5)	<i>Risk of mortality:</i> Frail vs. robust: (HR, 3.97; 95% CI, 2.26– 6.97; p < 0.001) Frail vs. pre-frail: (HR, 2.50; 95% CI, 1.83–3.43; p < 0.001). <i>Risk of unplanned hospitalizations:</i> Frail vs. robust: (HR, 2.88; 95% CI, 2.08– 3.98; p < 0.001) Frail vs. pre-frail: (HR, 2.33; 95% CI, 1.86–2.91; p < 0.001)
Panezai et al., 2023 ¹⁸	274 patients with HCV	100%	39% Frail LFI (grip, chair stands, balance)	<i>Liver disease severity scoring systems:</i> LFI was correlated with MELD (r = 0.278) (p < 0.001), MELD-Na score (r = 0.41) (p < 0.001), and CTP score (r = 0.325) (p < 0.001).
Vázquez-Rodríguez et al., 2025 ¹²	52 patients with HCV infection	100%	~ 80% were "pre-frail" LFI; Robust (LFI < 3.2), Pre-frail (LFI 3.2– 4.4), Frail (LFI > 4.4)	Poorer diet quality and higher frailty (LFI) are associated. Mean arm muscle circumference (MAMC) and LFI are correlated (r = -0.577, p = 0.008).

ALD: Alcohol-associated liver disease; CTP: Child-Turcotte-Pugh; ESLD: end-stage liver disease; HCV: hepatitis C virus; HR: hazard ratio; LFI: Liver Frailty Index; LT: liver transplantation; MASH: Metabolic dysfunction-associated steatohepatitis; MELD: model for end-stage liver disease; NA: not available; 95% CI: 95% confidence interval.

Dietary quality, assessed using the Mini-ECCA v.2, revealed that fewer than 10% of individuals met criteria for a healthy diet.

The study by Vázquez-Rodríguez et al. is particularly relevant because it highlights the high frequency of physical frailty in Hispanic individuals with HCV-related liver disease, underscoring the need for systematic frailty screening in this population. In addition, the study demonstrates an association between frailty and poor dietary habits, suggesting a potential modifiable factor in the management of these patients.

Nevertheless, several limitations in this study warrant consideration. The sample size was small, restricting the ability to conduct subgroup analyses, and participants were enrolled from a single center, limiting generalizability. Furthermore, the cross-sectional design precludes establishing a causal relationship between dietary quality and frailty. Finally, muscle mass was not assessed using gold-standard imaging modalities, such as computed tomography (CT), which would have provided a more precise characterization of sarcopenia.¹³

In conclusion, the current study by Vázquez-Rodríguez et al.¹² highlights a high prevalence of frailty among patients with chronic liver disease related to HCV, associated with inadequate dietary intake quality. Furthermore, the positive correlation between anthropometric measures of muscle mass and handgrip strength emphasizes the importance of objective evaluations of muscle mass and strength. However, longitudinal studies with a larger number of patients from different centers are required, to clarify the causal relationship between frailty and dietary intake in HCV-related cirrhosis etiology. Muscle mass evaluation using CT is considered the gold standard method, providing more detailed and precise information, and is recommended for future studies. Such studies could provide insight into how nutritional interventions, dietary optimization, and early muscle mass preservation in different populations might affect the survival, complications, and quality of life of the patients.

Funding

No funding was received for this article.

Conflict of interest

The authors declare no conflict of interest.

References

1. Tandon P, Montano-Loza AJ, Lai JC, et al. Sarcopenia and frailty in decompensated cirrhosis. *J Hepatol.* 2021;75 Suppl 1:S147–62, <http://dx.doi.org/10.1016/j.jhep.2021.01.025>.
2. Ebadi M, Montano-Loza AJ. Sarcopenia and frailty in the prognosis of patients on the liver transplant waiting list. *Liver Transpl.* 2019;25:7–9, <http://dx.doi.org/10.1002/lt.25386>.
3. Elsheikh M, El Sabagh A, Mohamed IB, et al. Frailty in end-stage liver disease: Understanding pathophysiology, tools for assessment, and strategies for management. *World J Gastroenterol.* 2023;29:6028–48, <http://dx.doi.org/10.3748/wjg.v29.i46.6028>.
4. Lai JC, Covinsky KE, McCulloch CE, et al. The liver frailty index improves mortality prediction of the subjective clinician assessment in patients with cirrhosis. *Am J Gastroenterol.* 2018;113:235–42, <http://dx.doi.org/10.1038/ajg.2017.443>.
5. Lai JC, Sonnenday CJ, Tapper EB, et al. Frailty in liver transplantation: an expert opinion statement from the American Society of Transplantation Liver and Intestinal Community of Practice. *Am J Transplant.* 2019;19:1896–906, <http://dx.doi.org/10.1111/ajt.15392>.
6. Lai JC, Rahimi RS, Verna EC, et al. Frailty associated with waitlist mortality independent of ascites and hepatic encephalopathy in a multi-center study. *Gastroenterology.* 2019;156:1675–82, <http://dx.doi.org/10.1053/j.gastro.2019.01.028>.
7. Xie R, Jing X, Yang C. The prevalence and characteristics of frailty in cirrhosis patients: a meta-analysis and systematic review. *Front Med (Lausanne).* 2024;11:1353406, <http://dx.doi.org/10.3389/fmed.2024.1353406>.
8. Mazurak VC, Tandon P, Montano-Loza AJ. Nutrition and the transplant candidate. *Liver Transpl.* 2017;23:1451–64, <http://dx.doi.org/10.1002/lt.24848>.
9. Thandassery RB, Montano-Loza AJ. Role of nutrition and muscle in cirrhosis. *Curr Treat Options Gastroenterol.* 2016;14:257–73, <http://dx.doi.org/10.1007/s11938-016-0093-z>.
10. Ebadi M, Bhanji RA, Mazurak VC, Montano-Loza AJ. Sarcopenia in cirrhosis: from pathogenesis to interventions. *J Gastroenterol.* 2019;54:845–59, <http://dx.doi.org/10.1007/s00535-019-01605-6>.
11. Ebadi M, Montano-Loza AJ. Clinical relevance of skeletal muscle abnormalities in patients with cirrhosis. *Dig Liver Dis.* 2019;51:1493–9, <http://dx.doi.org/10.1016/j.dld.2019.05.034>.
12. Vázquez-Rodríguez D, Rodríguez-Echevarría R, la Mora DA, et al. Frailty and food intake quality in patients with chronic hepatitis C virus (HCV) infection with or without cirrhosis. *Rev Gastroenterol Mee.* 2026;91, <http://dx.doi.org/10.1016/j.rgm.2025.06.01>.
13. Carey EJ, Lai JC, Sonnenday C, et al. A North American Expert Opinion Statement on Sarcopenia in liver transplantation. *Hepatology.* 2019;70:1816–29, <http://dx.doi.org/10.1002/hep.30828>.
14. Tandon P, Tangri N, Thomas L, et al. A rapid bedside screen to predict unplanned hospitalization and death in outpatients with cirrhosis: a prospective evaluation of the clinical frailty scale. *Am J Gastroenterol.* 2016;111:1759–67, <http://dx.doi.org/10.1038/ajg.2016.303>.
15. Cron DC, Friedman JF, Winder GS, et al. Depression and frailty in patients with end-stage liver disease referred for transplant evaluation. *Am J Transplant.* 2016;16:1805–11, <http://dx.doi.org/10.1111/ajt.13639>.
16. Xu CQ, Mohamad Y, Kappus MR, et al. The relationship between frailty and cirrhosis etiology: from the Functional Assessment in Liver Transplantation (FrAILT) Study. *Liver Int.* 2021;41:2467–73, <http://dx.doi.org/10.1111/liv.15006>.
17. Wang S, Whitlock R, Xu C, et al. Frailty is associated with increased risk of cirrhosis disease progression and death. *Hepatology.* 2022;75:600–9, <http://dx.doi.org/10.1002/hep.32157>.
18. Panezai MQ, Taha Yaseen R, Lail G, et al. Correlation of Model for End Stage Liver Disease (MELD), MELD-Sodium (MELD-Na), and Child-Turcotte-Pugh (CTP) Score with frailty in patients with Hepatitis C Virus (HCV) related cirrhosis. *Cureus.* 2023;15:e40574, <http://dx.doi.org/10.7759/cureus.40574>.

M. Motamedrad, A.J. Montano-Loza*
 Division of Gastroenterology & Liver Unit, University of
 Alberta Hospital, Edmonton, Alberta, Canada

* Corresponding author at: Division of Gastroenterology and Liver Unit, 8540 112 Street NW, Zeidler Leducor Centre, University of Alberta, Edmonton, AB, T6G 2X8, Canada. Tel.: (780) 248-1892; Fax: (780) 248-1895.

E-mail address: montanol@ualberta.ca
(A.J. Montano-Loza).