



HANDGRIP STRENGTH AS A SCREENING TOOL FOR SARCOPENIA IN CHRONIC LIVER DISEASE: A CASE-CONTROL STUDY FROM NORTH INDIA

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ABSTRACT

Background: Sarcopenia is highly prevalent in chronic liver disease (CLD) and contributes to decompensation, hospitalization, and mortality. Handgrip strength (HGS), a simple bedside measure, is now considered the primary criterion for sarcopenia by EWGSOP2. **Aim:** To compare HGS between CLD patients and healthy controls, examine its association with disease severity, and estimate prevalence of low HGS using Indian cut-offs. **Methods:** In this hospital-based cross-sectional study, 100 consecutive CLD patients and 100 age- and sex-matched controls were enrolled. HGS was measured using a calibrated dynamometer under standardized conditions. Low HGS was defined as <27 kg (men) and <16 kg (women) per INASL consensus. **Results:** Mean HGS was significantly lower in CLD patients compared with controls (26.6 ± 7.9 vs 35.9 ± 5.4 kg, $p < 0.001$). Overall, 47% of cases had low HGS versus 5% of controls ($\chi^2 = 43.69$, $p < 3.9 \times 10^{-11}$). The prevalence increased stepwise with worsening liver function (CTP-A: 5.6%, CTP-B: 31.6%, CTP-C: 77.3%). **Conclusion:** Nearly half of CLD patients exhibit clinically significant weakness. HGS is a feasible, low-cost screening tool that should be routinely incorporated into CLD assessment.

KEYWORDS :

INTRODUCTION

Chronic liver disease (CLD) is frequently complicated by malnutrition, sarcopenia, and frailty, all of which drive decompensation, hospitalization, and mortality. Muscle strength—more than muscle mass—best captures functional impairment and clinical risk; the EWGSOP2 consensus explicitly prioritizes low muscle strength as the primary criterion for sarcopenia, with HGS the preferred bedside assessment [1-3]. Lower HGS correlates with worse nutrition, complications, and survival, and adds prognostic value beyond MELD and CTP scores [4-7]. Most cut-offs for sarcopenia are derived from non-Indian cohorts; recent Indian studies have proposed population-specific reference values for muscle mass and strength, including HGS [10-12]. This study aimed to compare HGS in CLD patients and matched controls, explore its association with disease severity, and determine the prevalence of low HGS using Indian context-appropriate thresholds.

MATERIALS AND METHODS

Design & Setting: Hospital-based cross-sectional study conducted at the Department of Gastroenterology, NIMS Hospital, Jaipur.

Population: 100 consecutive adults with established CLD (compensated or decompensated) and 100 healthy age- and sex-matched controls.

Exclusion: Acute-on-chronic liver failure, sepsis, neuromuscular disorders, severe osteoarthritis, recent upper limb surgery/fracture, cardiopulmonary limitations, pregnancy, inability to consent.

Measurements: Demographics, BMI, etiology, prior decompensations.

Disease Severity: Child–Turcotte–Pugh (CTP) class, MELD–Na score. HGS measured with a Hand-held dynamometer; three maximal trials per hand, best of dominant hand recorded.

Definition Of Low HGS: <27 kg in men, <16 kg in women (INASL consensus). [13]

RESULTS

Baseline Characteristics: Mean BMI was lower in cases than controls (22.39 vs 23.78 kg/m²).

Handgrip Strength: Mean HGS was significantly reduced in cases compared with controls (26.6 ± 7.9 vs 35.9 ± 5.4 kg, $p < 0.001$).

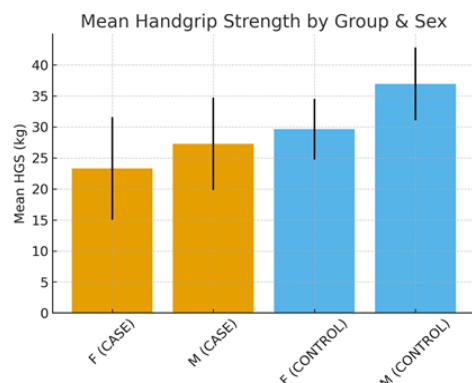


Figure 1. Mean HGS (kg) by group and sex with SD error bars.

Prevalence Of Low HGS: Low HGS was seen in 47% of cases versus 5% of controls ($p < 0.001$).

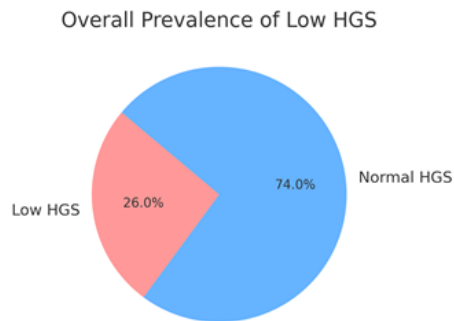


Figure 2. Pie chart of overall prevalence of low HGS.

Association With Disease Severity: Prevalence of low HGS increased with CTP class (A: 5.6%, B: 31.6%, C: 77.3%).

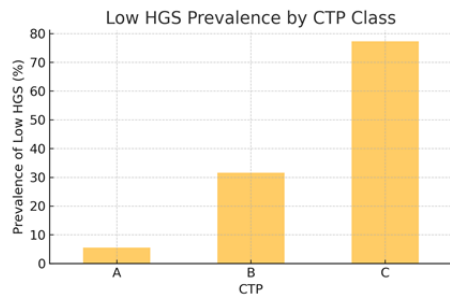


Figure 3. Prevalence of low HGS across CTP classes.

DISCUSSION

This study demonstrates a high prevalence of sarcopenic weakness in Indian CLD patients, corroborating global evidence that muscle strength is a key prognostic marker. Hanai et al. [4] showed that reduced HGS predicted poor survival independent of MELD score, and Nishikawa et al. [7] confirmed its association with decompensation and mortality in a multicenter Japanese cohort. Our findings align with these data and extend them to an Indian population using locally relevant cut-offs [10-12]. The progressive decline in HGS with increasing CTP class supports the concept that sarcopenia is both a marker and a driver of liver disease progression [6]. Given its feasibility, reproducibility, and predictive validity, HGS should be considered a 'vital sign' in CLD care.

CONCLUSION

Nearly one in two patients with CLD had low HGS, with prevalence rising sharply in advanced cirrhosis. HGS is a reliable, low-cost, bedside screening tool for sarcopenia and should be incorporated into routine CLD assessment.

Recommendations

- Routine HGS screening in CLD clinics.
- Early nutritional and exercise interventions for patients with low HGS.
- Longitudinal monitoring of HGS to track disease trajectory.
- Multicentric prospective studies to evaluate HGS as a predictor of survival.

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