**Supplementary Table 1.** Summary of the main characteristics and outcomes of clinical studies performed in patients with cirrhosis and/or sarcopenia.

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| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Cohort** | **Study design** | **Intervention** | **Treatment length** | **Main outcomes** | **Main results** |
| Alemán-Mateo *et al*, 832012 | 40 sarcopenic elderly patients | RCT (vs placebo) | Ricotta cheese supplementation (210 g/day) | 3 months | - Muscle mass: DEXA (TASM)  - Muscle strength: handgrip | Improvement in muscle strength |
| Maharshi *et al*, 98  2015 | 120 cirrhotic patients with encephalopathy | RCT (vs placebo) | Nutritional therapy: 30-35 Kcal/kg/day, 1.0–1.5 g vegetable protein/kg/day | 6 months | - Hepatic encephalopathy  - Quality of life: HRQoL | Reversal of encephalopathy and increase in HRQoL questionnaire |
| Tsien *et al*,101  2011 | 107 cirrhotic patients | Systematic review | Administration of late-night snacks from 140 to 710 kcal | From 1 day to 2 years | - Mortality and other clinical adverse events  - Muscle mass: anthropometry, BMI (FM, FFM)  - Nutritional indices | Augmented glucose utilization after late-night snacks |
| Tsien *et al*, 102  2018 | 14 well-compensated, alcoholic cirrhotic patients | RCT (vs placebo) | Single oral administration of BCAA mixture enriched with leucine | One single oral dose | - Histological | Histological finding of reversing the impaired mTOR1 signalling pathways |
| Chen *et al*, 103  2019 | 431 cirrhotic patients (also with HCC) | Meta-analysis | Administration of late-night snacks (from 3.6 g e 13.5 g proteins snack) | From 2 weeks to 12 months | - Child Pugh score | Reduction of clinical events and improvement of Child Pugh |
| Marchesini *et al*, 104  2003 | 174 advanced cirrhotic patients | RCT | Administration of oral supplementation of BCAA compared with supplementation of L-ALB and M-DXT | 6 months | - Mortality, hospitalization and other adverse clinical events | Reduction of clinical events |
| Gluud1 *et al*, 105  2015 | 827 cirrhotic patients with encephalopathy | Systematic review | Any administration of oral form of BCAA, irrespective of dose | Not specified | - Mortality, encephalopathy and other adverse clinical events | No effect on mortality, but reduction of encephalopathy |
| Muto *et al*, 106  2005 | 646 decompensated cirrhotic patients | RCT (vs placebo) | Specific diet (25-35 Kcal/kg, 1-1.4 g protein/kg) with 4 g of BCAA | 2 years | - Hepatic failure, rupture of oesophageal or gastric varices, development of liver cancer, death | Reduction of clinical events |
| Lattanzi *et al*, 110  2021 | 27 cirrhotic patients | RCT (vs placebo) | Oral administration of HMB 3 g/day | 12 weeks | - Muscle mass: BIA and quadriceps ultrasound  - Muscle function: 6-MWT, chair stand test | Significant improvement in muscle function and mass (ultrasound) |
| Dewey *et al*, 114  2012 | 587 patients with advanced  cancer and a reported 5% weight loss | Systematic review | Oral fish oil supplementation (with EPA), or oral fish oil supplementation regardless of  type versus active matched control (without EPA) | Not specified | - Weight gain  - Muscle mass (BIA)  - Median survival | Only in one study observed significant increase in survival |
| Remelli *et al*, 115  2019 | 409 frail or sarcopenic older people or institutionalized or osteoporotic woman | Systematic review | From 800 UI to 4.000 UI/die of vitamin D | From 6 moths to 2 years | - Muscle mass: (BIA and DEXA)  - Muscle function and performance: 6-MWT, chair stand test: gait speed | Improvement in physical performance and strength, no improvement in muscle mass |
| Villareal *et al*, 97  2011 | 107 obese older adults | RCT (vs placebo) | Hypocaloric diet and specific physical training exercise | 52 weeks | - Physical performance: the modified Physical Performance Test | The Physical Performance Test increased |
| Balachandran *et al*, 84 2014 | 21 sarcopenic obese patients | RCT | High speed circuit training vs traditional strength hypertrophy | 15 weeks | - Muscle mass: BIA (SMI)  - Muscle strength: handgrip  - Muscle performance: gait speed | The High speed circuit training group showed significant better performance and strength |
| De Liao *et al*, 85  2018 | 56 sarcopenic older obese female patients | RCT (vs placebo) | Specific training exercise | 12 weeks | - Muscle mass: SMI, LMI, AMI by DEXA  - Muscle strength: handgrip and Buckinx’s method  - Physical capacity assessment: FFR, SLS, GS, TUG, TRC | Increase in muscle mass and physical capacity |
| Debette-Gratien *et al*, 86  2014 | 13 cirrhotic patients awaiting for liver transplantation | Pilot study | Specific training exercise | 12 weeks | - Physical performance: aerobic capacity, 6-MWT, maximal power  - Muscular strength: “GLOBUS” system, Italy  - Quality of life | Physical performance and muscular strength increased.  Quality of life trend to improvement. |
| Zenith *et al*, 87  2014 | 20 compensated cirrhotic patients | Prospective pilot study | Specific training exercise | 8 weeks | - Physical performance: aerobic capacity endurance, 6-MWT  - Muscle mass: anthropometric, ultrasound (Average feather index, Average compression index) | Significant increase in physical performance endurance, mass and strength |
| Kruger *et al*, 88  2018 | 40 compensated cirrhotic patients | RCT (vs placebo) | Specific training exercise | 8 weeks | - Physical performance: aerobic capacity endurance, 6-MWT  - Muscle mass: anthropometry, ultrasound (average feather index)  - Quality of life | Significant increase in muscle performance and mass |
| Grgic1 *et al*, 94  2018 | 509 healthy  adults without chronic or musculoskeletal disease | Systematic review | Aerobic and resistance training protocols | From 8 to 36 weeks | - Muscle mass: (histology, TC, RM, ultrasound) | Aerobic training does not promote the same skeletal muscle hypertrophy as resistance training |
| Romàn *et al*, 109  2014 | 20 cirrhotic patients with history of at least one decompensation | Randomized pilot study | Specific exercise training | for 12 weeks | - Exercise Capacity: 6-MWT, 2-MST  - Muscle mass: anthropometry  - Quality of life: HRQoL | Improvement in the exercise capacity, muscle mass and in some questionnaire HRQoL domains |

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