Individual Research Project Presentations Day 10th June 2024, Kent and Medway Medical School.

Effects of exercise on autonomic function and quality of life in chronic liver disease (CLD) in Two Randomised Controlled Trials.

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Abstract

Background: The leading cause of death in patients with elevated liver fat is cardiovascular disease (CVD), particularly exacerbated by excessive alcohol consumption. Autonomic dysfunction correlates with increased CVD morbidity, mortality, and diminished health related quality of life (HRQL). It is hypothesised that exercise will improve cardiac autonomic function (CAF) and HRQL in metabolic dysfunction and excessive alcohol consumption (MetALD) and Metabolic Dysfunction- Associated Steatohepatitis (MASH) patients.

Methods: Data on CAF and HRQL were collected from two randomised controlled trials (RCTs): RCT 1: MetALD (n=27) and RCT 2: (Krag and Rinella, 2024) MASH patients (n=24). Hepatic and extra- hepatic variables, such as liver fat, body composition, and metabolic and liver function markers were evaluated. Patients in each RCT underwent screened and then randomised to 12-weeks of exercise or standard care. Baseline and post 12-weeks assessments of all measured were conducted.

Results: Exercise led to significant improvements in beat variables, systolic blood pressure, stroke volume and stroke volume index, in MetALD patients, with a time by treatment interaction. Conversely, no significant changes in MASH beat variables were noted. In the MetALD exercise group, significant within-group changes and a time by treatment interaction were noted, contrasting with the MASH patients. High frequency R to R interval (HFnu-RRI) % significantly decreased in exercising MetALD patients. While no significant changes were observed in MASH patients, all CAF variables improved. Exercise resulted in a 38% vs. 37% reduction in fatigue index scores (FIS), and a 13% vs 10% increase in chronic liver disease scores for MetALD and MASH patients, respectively. Associations were observed between fat mass and chronic liver disease scores and FIS, and between FIS and cardiac outcomes. MASH patients exhibited greater improvements in CAF compared to MetALD patients, whereas MetALD patients exhibited greater HRQL improvements. Liver fat decreased significantly in MASH patients but not in those MetALD. Body composition measures improved significantly in both RCTs, while metabolic and other outcomes did not differ

significantly post-exercise. All patients allocated to the exercise group completed all 36 exercise sessions with no adverse events.

Conclusions: These findings demonstrate exercises potential to enhance CAF, improve HRQL and reduce fatigue in well-characterised MetALD and MASH patients, thus rejecting the null hypothesis. This comprehensive approach aligns with the biopsychosocial model, essential for effective clinical management. Recognising the importance of a patient-centred approach, considerations should include exercise intensity and type, with acknowledgement that exercise may not be suitable for all patients. Further research is warranted to understand the dual effects of metabolic dysfunction and alcohol on clinical outcomes in MetALD patients.

Keywords: Fatty-Liver | Exercise | Inflammation | Health-Related-Quality-Of-Life

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