

## Abstract

# A Greater Reduction in Intrahepatic Fat Content after a Lifestyle Intervention Is Related to a Better Inflammatory and Oxidative Status <sup>†</sup>

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**Abstract:** Non-alcoholic fatty liver disease (NAFLD) is a disease characterized by the excessive accumulation of lipids in the liver parenchyma. To date, there is no effective pharmacological treatment against NAFLD; however, lifestyle modifications, including physical activity and the adoption of healthy eating habits, are therapeutic approaches against this disease. The aim of this study was to evaluate the relationship between the improvement of the intrahepatic fat content (IFC) in patients with NAFLD and metabolic syndrome and biomarkers of oxidative stress and inflammation after 6 months of lifestyle intervention, which included a hypocaloric diet and the promotion of physical activity. Patients diagnosed with NAFLD ( $n = 60$  adults; 40–60 years old) living in the Balearic Islands, Spain were classified in tertiles according to the improvement of IFC measured by Magnetic Resonance Imaging (MRI). Pro/antioxidant and inflammatory biomarkers were determined in plasma before and after the lifestyle intervention. The greatest improvement in IFC was directly related to a better cardiorespiratory fitness, determined with the Chester step test. Significant greater reductions in weight, body mass index, alanine aminotransferase and triglycerides were observed in the group with the greatest improvement in IFC compared to the one that improved the least after the intervention. No significant differences were detected in glucose, cholesterol and in aspartate aminotransferase. Similarly, the reduction in catalase plasma activity, irisin and cytokeratin 18 levels were significantly higher in the group with the highest degree of IFC reduction, whereas no differences were observed in superoxide dismutase activity and in malondialdehyde and protein carbonyl levels. A progressive decrease in reactive oxygen species production by peripheral blood mononuclear cells activated with lipopolysaccharide was observed after the lifestyle intervention. The present data show that a greater reduction in IFC is related to an improvement in pro/antioxidant and pro-inflammatory status and better cardiorespiratory fitness in NAFLD patients.

**Keywords:** NAFLD; intrahepatic fat content; oxidative stress; inflammation; biomarkers

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