IMPROVEMENT OF OXIDATIVE STRESS AND INFLAMMATORY STATUS IS RELATED TO A BETTER INTRAHEPATIC FAT CONTENT (IFC) AFTER 6 MONTHS OF LIFESTYLE INTERVENTION

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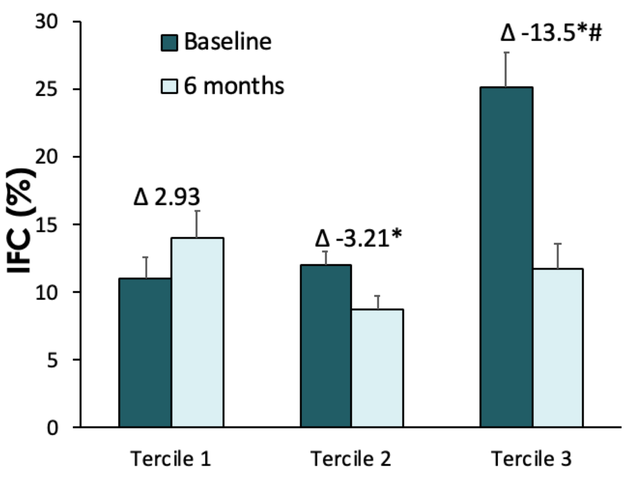
INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) is a disease characterized by the excessive accumulation of lipids in the liver parenchyma, which can progress from simple steatosis to non-alcoholic steatohepatitis (NASH), and finally to cirrhosis and liver carcinoma [1]. 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 [2,3]. 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.

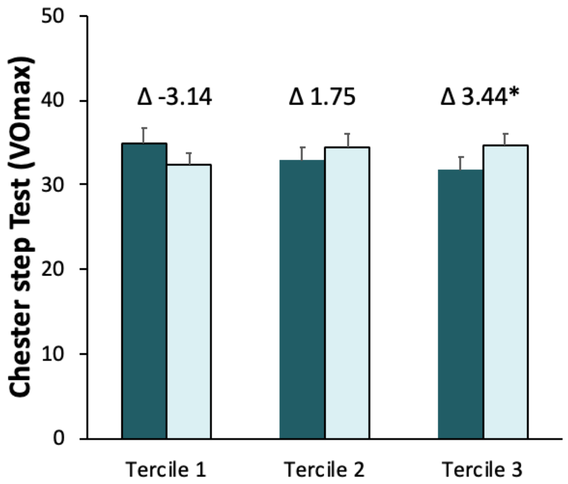
EXPERIMENTAL PROCEDURE

Patients diagnosed with NAFLD (n=60 adults; 40-60 years old) living in the Balearic Islands, Spain were classified in tertiles attending the improvement of IFC measured by Magnetic Resonance Imaging (MRI). Pro/antioxidant and inflammatory biomarkers were determined in plasma of these patients before and after the lifestyle intervention.

Intrahepatic fat content



Chester step Test



One-way ANOVA (p<0.05): *respect to tercile 1; # respect to tercile 2.

Characteristics of participants with NAFLD according to the improvement of intrahepatic fat content (IFC)

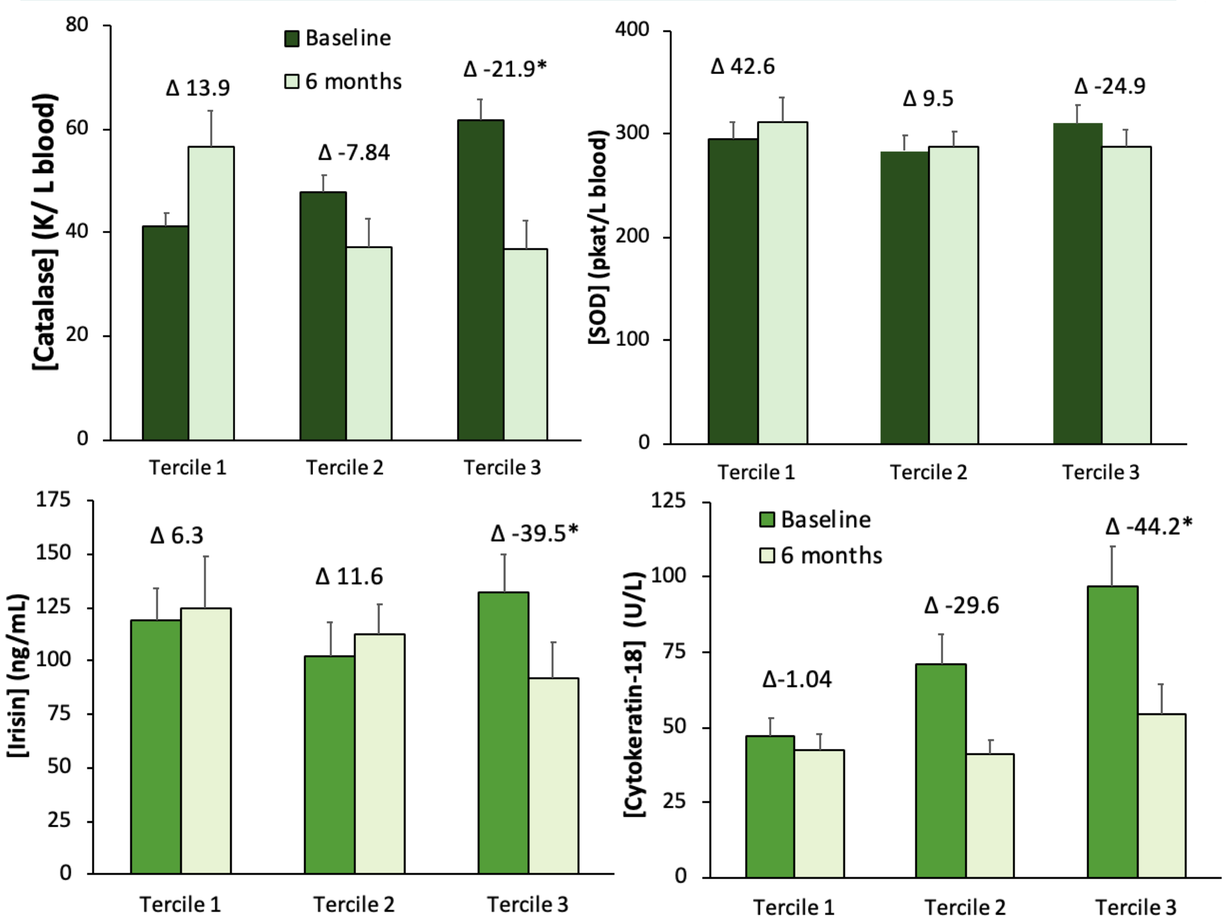
		Tercile 1 (< -0.567) N = 20	Tercile 2 (-0.567 to -7.13) N = 20	Tercile 3 (> -7.13) N = 20	ANOVA
Weight (kg)	Baseline	91.5 ± 3.51	97.8 ± 3.54	93.9 ± 1.82	
	6 months	90.4 ± 3.34	92.7 ± 2.89	87.1 ± 1.91	
	Δ	-1.06 ± 0.751	-5.08 ± 1.05*	-6.79 ± 1.13*	**0.001**
BMI (kg/m²)	Baseline	32.5 ± 0.737	34.4 ± 1.08	34.0 ± 0.604	
	6 months	32.2 ± 0.652	32.7 ± 0.978	31.5 ± 0.512	
	Δ	-0.375 ± 0.262	-1.71 ± 0.340*	-2.51 ± 0.419*	**<0.001**
ALT (U/L)	Baseline	27.9 ± 2.27	32.4 ± 4.13	60.8 ± 13.5	
	6 months	28.7 ± 2.66	24.0 ± 2.04	29.8 ± 2.90	
	Δ	-0.800 ± 1.89	-8.48 ± 3.37	-28.0 ± 11.4*	**0.015**
Triglycerides (mg/dL)	Baseline	178.3 ± 18.8	163.0 ± 12.8	240.2 ± 31.4	
	6 months	232.2 ± 36.8	128.1 ± 7.47	159.4 ± 17.6	
	Δ	53.8 ± 36.6	-46.8 ± 7.82*	-80.8 ± 32.8*	**0.002**
Glucose (mg/dL)	Baseline	109.2 ± 5.26	116.1 ± 9.19	115.1 ± 4.56	
	6 months	110.1 ± 5.74	112.5 ± 9.54	111.7 ± 9.16	
	Δ	0.850 ± 3.99	-2.76 ± 2.39	-3.40 ± 6.19	0.253
HDL-cholesterol (mg/dL)	Baseline	44.1 ± 2.74	42.2 ± 1.90	39.6 ± 1.55	
	6 months	44.7 ± 3.14	45.8 ± 2.38	39.9 ± 1.30	
	Δ	0.950 ± 1.47	4.24 ± 1.15	0.250 ± 1.01	0.054

One-way ANOVA (p<0.05): *respect to tercile 1.

ROS production

One-way ANOVA (p<0.05): *respect to tercile 1.

Oxidative stress and Inflammatory biomarkers



One-way ANOVA (p<0.05): *respect to tercile 1.

RESULTS

The improvement in IFC levels was significantly higher in tertile 3 respect to tertiles 2 and 1. The greatest improvement in IFC is directly related to a better cardiorespiratory fitness determined with the Chester step test. Significant greater reductions in weight, Body Mass Index (BMI), alanine aminotransferase (ALT) and triglycerides were observed in tertile 3 respect to tertile 1 after 6 months of intervention. The improvement in catalase plasma activity and irisin and cytokeratin 18 levels were significantly higher in tertile 3 subjects, whereas no differences were observed in superoxide dismutase activity. Moreover, no significant differences were detected in glucose and cholesterol total levels. An improvement in ROS of PBMCs activated by LPS has been observant at 6 months of lifestyle intervention.

CONCLUSION

The present data shows that the reduction of IFC is associated with an improvement in pro/antioxidant and pro-inflammatory status and a better cardiorespiratory fitness in NAFLD patients.

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