

## Increased iron levels and lipid peroxidation in a Mediterranean population of Spain.

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### Abstract

**BACKGROUND:** Many chronic diseases are adversely affected by elevated iron levels. It has been speculated that this relationship is mediated by increased oxidative stress, due to the ability of iron to generate reactive oxygen species. The aim of this study was to assess the relationship between elevated iron levels and lipid peroxidation in Caucasian adults residing in the north-eastern Mediterranean region of Spain.

**MATERIALS AND METHODS:** This cross-sectional case-control study included 300 subjects: 150 adults displaying elevated iron levels (cases) selected from a representative sample of our general population and 150 age- and sex-matched adults exhibiting normal iron levels (controls). Dietary assessment (3-day food records), iron biomarkers (serum iron, ferritin and transferrin saturation) and lipid profile were determined. Elevated iron levels were defined by high serum ferritin (SF>110 µg/L in women and>200 µg/L in men) and/or transferrin saturation (TS)>45%. Oxidized low-density lipoprotein (oxLDL) plasma levels were measured, and oxLDL/LDL-cholesterol ratio was calculated to estimate lipid peroxidation. Multiple linear regression (MLR) models were applied.

**RESULTS:** Individuals with elevated serum iron levels showed increased oxLDL/LDL ratio, but not oxLDL levels, compared to control subjects (20.92 ± 4.89 U/mmol vs. 19.72 ± 3.573 U/mmol, P = 0.028). These results were further confirmed by the regression models adjusted for demographic characteristics, diet, lipid profile and inflammation. Importantly, higher serum levels of triglycerides, LDL-cholesterol and lower intake of Vitamin E increased lipid peroxidation.

**CONCLUSIONS:** In our general population, we have observed that higher circulating levels of iron, measured by serum ferritin and/or TS, increased lipid peroxidation (measured by oxLDL/LDL ratio).

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**KEYWORDS:** Elevated iron levels; lipid peroxidation; oxLDL/LDL-cholesterol ratio; oxidative stress; oxidized low-density lipoprotein