Is There A Link Between Ferritin And Cardiac Function In Anorexic Adolescents?

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1. Introduction.

Very little is carried out on iron and hematological status in AN patients. Normal serum iron and elevated serum ferritin concentration were the most relevant results seen in few studies based on small cohorts of AN patients. In cardiological literature an overload of iron stores raises the risk of ischemic heart disease. Because concentrations of serum ferritin are directly proportional to intracellular ferritin concentrations, it is considered to be the best clinical measure of body iron stores and we used this parameter in our study. Iron overload has been found to increase vascular oxidative stress and accelerate arterial thrombosis by promotion of oxidized low-density lipoprotein and direct endothelial injury.

2. Aim.

The aim of this study was to compare in the acute state of undernutrition in anorexics, biochemical, endocrine and cardiac parameters between female anorexic adolescents with a high ferritin and a normal ferritin.

3. Patients and Methods.

- Prospective design
- N=311 adolescent girls (9.8-17.87 years)
- Period: Sept 2002 - Dec 2012
- DSM-IV criteria (American Psychiatric Association, 1994)
- Admission: complete clinical examination, 2-D-Doppler echocardiography (Vivid 7, GE, Horten, Norway), 12 lead ECG, Blood samples were drawn for: BUN, creatinine, electrolytes, cholesterol, thyroid hormones, insulin growth factor-I, iron, ferritin, zinc, hemoglobin, hematocrite, leukocytes, fibrinogen and liver tests.
- ECG: QT intervals lead II, corrected for the heart rate using Bazett formula (QTc=QT/√RR), QTc dispersion was calculated
- ECG: voltage of T wave in V4 and R wave in V6
- Echocardiography: left ventricular diame.ions on M-mode measurements in the short axis at the level of the mitral leaflets. Devereaux formula (LVM) and corrected usinf the formula of de Simone (LVMc= LVM/height 2.7: 1992).
- Body mass index (kg/m²) was calculated and curves and centiles were used as reported by Rolland-Cachera et al. (1991).


- Clinical/biochemical electrocardiographic and echocardiographic characteristics for patients with normal and high ferritin were compared.
- Variables: mean ± standard deviation
- Cut-off ferritin > 137 ng/ml
- Variables compared by a 2 tailed P value
- Analysing data SPSS 13.0 (SPSS inc)
- Differences significant p < 0.05

5. Results.

In total we identified a high ferritin level > 137 ng/ml in 82 of the 311 in the anorexic girls (26%).

Risk factors for developing a high ferritin are:

- BMI: 14.41 ± 1.59 kg/m²; HR: 56.01 ± 16.36 bpm
- LVM height 2.7; 23.99 ± 5.25 g/m²; cholesterol: 192.65 ± 50.70 mg/dl; AST: 31.58 ± 12.11 U/L; ALT: 43.93 ± 47.67 U/L; IGF-1: 113.16 ± 74.97 ng/ml and FT3: 3.08 ± 1.80 pmol/L.

The euthyroid sick syndrome was found in 33% of the patients with high ferritin versus 18.3% in the normal ferritin group.

6. Conclusions.

A higher ferritin level is correlated with a higher cholesterol level and lower FT3 level.

Both parameters are cardiovascular risk factors for atherosclerosis. Further research is needed.

References.