

CLINICAL VIGNETTE

A Case of Iron Overload

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A 49-year-old male presents with findings of elevated iron levels on outside lab testing. He is an avid triathlete, competing in iron man level triathlons several times a year. He denies any episodes of abdominal pain, changes in bowel habits, skin changes, or changes in exercise tolerance. He noted no performance enhancing medication use, and he denies any previous transfusions. He has no history of liver disease, and he recently underwent echocardiography which showed normal ejection fraction without evidence of cardiomegaly. He reports regular alcohol intake, sometimes to excess. Family history was not significant for liver disease, hemoglobinopathies, or hemochromatosis.

He underwent evaluation for an executive physical at an outside facility, which included ferritin and iron studies. These revealed a ferritin level of 321 ng/ml (normal 10-210 ng/ml) and an iron saturation of 55%. The patient's hemoglobin and hematocrit were 14.2 g/dl and 41.7% with normal red blood cell indices. Liver function testing at that time showed a mild transaminitis without elevation in total or direct bilirubin.

His examination revealed a fit 49-year-old with a blood pressure of 100/70, pulse of 58, and temperature of 36.8 °C with a body mass index of 23kg /m². His sclerae were nonicteric, and iris exam was normal. Cardiac exam revealed no abnormalities, abdominal exam showed no hepatosplenomegaly and there was no peripheral edema and no skin pigment changes.

Review of outside echocardiogram showed no abnormality, abdominal ultrasound revealed mild steatohepatitis. Genetic testing returned negative for HFE mutations. He declined liver biopsy.

This case presents the dilemma of identifying the source of iron overload. The patient clearly has iron overload based on an elevation in ferritin and transferrin saturation. Levels over 45% in men and 35% in premenopausal women are diagnostic for iron overload. While the vast majority of cases of overload are due to excessive transfusions or hemochromatosis, several other conditions can result in excess iron.¹ Often 2 or more of these conditions will result in elevations in total body iron. Other conditions which result in increased iron absorption include alcoholic and viral liver disease.² The mechanism by which these conditions cause elevation in iron absorption is reduction in hepcidin production. Hepsidine is an important regulatory protein for iron absorption from the intestine. Additionally, in thalassemias and sideroblastic anemia, early destruction of immature red blood cells results in increased iron deposition.

Lastly, large amounts of exogenous iron intake have been reported as a source of iron overload.

This patient's extremely high level of exercise performance leads to the question of association between elite athletic endeavor and iron overload. Several studies have shown that elite athletes have an increased incidence of iron overload. One study of 127 male marathon runners found 15% incidence of iron overload.³ Female marathon runners had a much lower iron overload rate at 4.7%. Additionally, a study of 1000 professional male cyclists revealed iron overload in 45% of samples tested.⁴ Interviews revealed a majority of the cyclists were using exogenous iron supplementation. Interestingly, there were also increased rates of hereditary hemochromatosis (HFE) genetic mutations in elite athletes. A Spanish longitudinal study of 65 highly trained athletes, found a high prevalence of HFE gene mutations (49.2%) compared with sedentary controls (33.5%).⁵

After several follow-up visits, our patient admitted to taking oral iron supplementation over the preceding several years. After phlebotomy and discontinuation of his iron supplementation as well as reduction of alcohol intake, his iron studies normalized. This case reinforces the importance of testing for iron overload among elite athletes, as they may be at increased risk for both exogenous sources of iron overload as well as having an increased genetic predisposition towards hereditary hemochromatosis.

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