Iron metabolism in chronic Chagas cardiomyopathy

Metabolismo do ferro na cardiomiopatia chagásica crônica

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Dear Editor,

An intense inflammatory response in individuals infected with Chagas disease (*Trypanosoma cruzi*) is notorious, chronic degenerative disease in which inflammatory events strike one of the major target organs, the heart, with demonstrated cardiometabolic side effects.[1] In fact, according to Pinto[2] and confirmed in other studies, iron deficiency potentiates the infectious process leading to a sharp worsening in the prognosis of patients with this disease.[3] The analysis in patients with heart failure reveals changes in the iron metabolism, which is intrinsic to the pathophysiological mechanism of heart failure.[4] In a complex paradox questioning in a review,Pinto[2] draws attention and leads to hypotheses raised in other studies in which T. Cruzi infection activates an immune cascade. The hormone named hepcidin is stimulated by specific cells in the immune system and thus, participates in the mechanisms regulating iron metabolism[5]. Therefore, the parallel between the iron metabolism described during the inflammatory response runs through the hepcidin-IL-6 axis (pro-inflammatory cytokine). Chagasic patients exhibit systemic dissemination of T. cruzi accompanied by an intense immune response, which allows not only the parasite control but also leads to a massive infiltration of mononuclear cells in the affected tissue, especially in the myocardium, leading to a systemic and local production of cytokines, chemokines, and other inflammatory mediators such as nitric oxide (NO).[6] Interestingly, Pinto[2] reports that iron deficiency leads to a state of immuno-competence making patients susceptible to infection because iron is essential to organic tissues and fluids, acting on cellular energy requirements and metabolism[7]. Therefore, homeostasis has been of fundamental importance regulating the immune system.[8] The importance of iron supplementation in specific groups, such as children and pregnant women, well explained in an article recently published by Pinto,[2] is indeed a necessity to alleviate problems of nutritional deficiency and strengthening the immune system Nanas et al.[9]. Nevertheless, studies report the need for supplementation of iron chelated amino acid in mice infected by T. cruzi to weaken the parasitic infection and promote a small iron storage by the the reticuloendothelial and macrophagocytic systems Rock et al.[10] Hence, in an intracellular parasite infection treated with chelated iron, it would act as a nutritional source for the parasite increasing the parasite load with demonstrated pathogenic effects with the iron being unable to be absorbed by the duodenal region, leading to a cascading effect; to the inhibition of the erythropoietin synthesis and erythropoietic processes Jankonska, ankowska EA, Rozentryt P, Witkowska A, Nowak J, Hartmann O, Ponikows-

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ka B, et al[6]. Studies show that intravenous supplementation with chelated iron administered in patients with Chagasic cardiomyopathy may be a cardio-protective factor leading to improvement in hemoglobin serum levels with significant advantage in functional status of quality of life and survival, functional capacity, and improvement in general prognosis. A recent article by Pinto[2] reports on the increased parasitic susceptibility when malaria patients were supplemented with Nemeth iron [11]. Nevertheless, recent studies draw attention to alternative treatments in order to alleviate the effects of production and action of inflammatory mediators as well as the stock of iron. The treatment in question is the administration of erythropoietin, which according to the authors, is an attractive therapy for infectious and inflammatory diseases.[8]

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