Immunopharmacological Approach of Carvedilol in Chronic Chagas Heart Disease

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Dear Editor,

Evidence suggests that approximately 12 million individuals in Latin America are infected with *Trypanosoma cruzi* and present Chagas disease[1]. Even though the disease was described more than 100 years ago, chemotherapy directed against its etiological agent is restricted to two compounds which are only effective in the acute phase of the disease[1], benznidazole and nifurtimox. Within this context, chronic Chagas heart disease (CHCD) lacks immunopharmacological studies, given that its pathogenesis involves an imbalance in the host's immune system. In the chronic phase, CHCD is associated with increased oxidative stress with intense and extensive inflammation and fibrosis in the myocardium, with consequent autonomic dysfunction and production of antibodies directed to the myocytes, beta adrenergic receptors, and neurons[1-3]. Rocha et al[1] demonstrate in their study that patients who develop CHCD present increased levels of TNF-alpha and CCL-2 when compared with individuals with the indeterminate form of Chagas disease[1]. A parallel then may be drawn with studies conducted by Yue et al. who reported that the production of superoxide anions occurs from activation of the NADPH system promoted by proinflammatory cytokines, in particular, TNF-alpha[4]. In fact, studies suggest that the antioxidant effects of carvedilol are very effective in the treatment of patients with CHCD. In addition to that, the presence of carbazole groups and hydroxylated metabolites in the molecular structure confers to carvedilol a high antioxidant activity[2,3]. Studies highlight the ability of carvedilol to act as a transition metal when donating electrons to reactive oxygen species (ROS) and reactive nitrogen species (RNS) in an attempt to neutralize the effects of oxidative damage caused by *T. cruzi* in the acute phase, which persist until the chronic phase[4]. Budni et al[3] in their study confirm this hypothesis showing that before a therapeutic intervention with carvedilol, patients with cardiac involvement showed high levels of oxidative markers, whereas patients who received an intervention with carvedilol showed increased levels of nitric oxide (NO) and adenosine deaminase (ADA), important supporting elements in oxidative defense and improvement of immune response[3,4]. Therefore, studies are needed to identify treatments able to prevent cardiac damage caused by this infection and to offer tools to improve survival and provide a better quality of life to affected individuals.

Keywords

Chagas Cardiomyopathy; Adenosine Desaminase/drug effects; Antioxidants; Drug-Related Side Effects and Adverses Reactions.

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