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Cardioprotective effects of telbivudine in human parvovirus B19-induced chronic myocarditis

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Chronic myocarditis is an inflammatory condition affecting the heart, most commonly in response to viral infection, with parvovirus B19 (B19) being the most prominent culprit. Currently, there is no specific treatment for B19-induced myocarditis, which often progresses into dilated inflammatory cardiomyopathy. In this study, telbivudine was investigated as a potential treatment for B19-induced myocarditis, being a viral DNA-dependent second strand DNA synthesis inhibitor with anti-inflammatory properties. Telbivudine was investigated in vitro on human microvascular endothelial cells (HMEC-1) and murine cardiomyocytes (HL-1). The experiments revealed that 10ng/ml Telbivudine in B19-infected HMEC-1 resulted in a 1.3-fold ($p=0.01$), 1.6-fold ($p<0.005$), and 2.9-fold ($p<0.0005$) reduction of B19-induced apoptosis, endothelial-to-mesenchymal transition and tenascin C expression, respectively. Moreover, Telbivudine exhibited cardiomyocyte-protective effects on angiotensin–II (Ang-II) stressed HL-1 cardiomyocytes, reducing oxidative stress and hypertrophy. Upon treatment of Ang II stressed HL-1 cardiomyocytes with 10 ng/ml Telbivudine, the percentage of cells positive for reactive oxygen species (ROS) and myosin heavy chain (MYH) was reduced by 1.3-fold ($p<0.001$) and 1.6-fold ($p<0.001$) respectively. Likewise, the gene expression level of MYH-6 was reduced by 1.4-fold ($P<0.01$). Inspired by these findings, four patients with endomyocardial biopsy (EMB)-confirmed B19-associated myocarditis were treated by 600 mg/day Telbivudine for 6 months in a single patient use approach. The treatment correlated with an improved EF by 10% ($p<0.005$) and NYHA class. Moreover, an end of treatment EMB showed a drop in the viral mRNA levels and CD3 cell infiltration. Based on these findings, Telbivudine will be further investigated in an exploratory clinical trial (EudraCT-Number: 2016-004825-17).

Biography

Ahmed Elsanhoury is currently pursuing his second year of PhD at the Charité University Medicine-Berlin. He has a MSc degree in molecular medicine from the Charité University Medicine-Berlin, where he did his MSc thesis at the experimental cardiology lab. He also worked at the German Heart Center-Berlin on a project concerned with PCSK-9 antagonism. He has a bachelor of pharmacy and biotechnology from the Germany University in Cairo. He is hired as assistant lecturer of clinical pharmacy and pharmacology. He published 2 papers in reputed journals and the third paper is currently under review.

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