Review Article | Journal of Clinical Cardiology and Research | 2021 Vol.4 S.1

Cardio Care 2021: Therapeutic-Preventive effect of pirfenidone on heart failure due to acute coronavirus 2 (SARS-Cov-2) respiratory infections: A theoretical perspective

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Background:

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a multiple-organ infection. SARS-CoV-2 causes myocarditis, and by direct and non-direct pathological pathways may cause cardiomyopathy. Heart failure (HF) was observed in some patients. Inflammation and fibrosis are key factors of HF. Transforming growth factor-beta (TGF-β) is one factor in which its concentration increased due to SARS-CoV-2 infection. TGF-β activity via TGF-β receptors on cardiomyocyte–cardiac fibroblast may develop HF by activating various cells signaling, which cause fibrosis and hypertrophy of cardiac cells. TGF-β disrupts the cardiac reprogramming mechanism, which is a crucial factor in regenerating cardiac cells. Nuclear factor-kappa-light-chain-enhancer of activated B cells (NF-kB) level raised during SARS-CoV-2 infection. NF-kB by regulation of pro-inflammatory gene prepares the suitable base for myocarditis as well as HF. Reactive oxygen species (ROS) are the third element that is elevated during SARS-CoV-2 infection. ROS by several effects on cells causes hypertrophy and remodeling of cardiac cells.

Therapeutic hypothesis:

Pirfenidone is an antioxidant and anti-fibrotic drug known for the treatment of idiopathic lung fibrosis. Pirfenidone impairs the maturation of TGF-β. Also, it overexpressed peroxisome proliferator-activated receptors (PPARs) alpha (α), gamma (γ), and sirtuin 1 (SIRT1). PPARα and PPARγ have protective roles in cardiac cells, which reduce myocardial injury. Sirtuin 1 (SIRT1) by mitophagy decreases or stops cardiac fibrosis and inflammation. Pirfenidone is a safe drug with the tolerable side effect.

The system proved capable to assess the LA/PAW, RA, LV, RV and PA pressures in sheep following calibration for 6 months and with up to 40% weight gain.

The results were confirmed during ongoing human experiments which are also conducted under the approval of an ethical committee and by obtaining an informed consent from the patients involved, who undergo

Conclusion:

We think pirfenidone can be nominated as a supportive treatment during SARS-CoV-2 infection for protecting or decrease heart injury as well as heart failure. Pirfenidone therapy may reduce the mortality of patients.

Memoir:

Seyed Hooton Hamidi has completed Bachelor of Pharmacy at the age of 23 from Rajiv Gandhi University of Health Sciences. More than 2 years under vision of Sandhya Kadamboor Veethil, he is working on molecular biology of adhesion GPCRs and they roles on cancer. Also, from COVID-19 pandemic, he works on pirfenidone mechanism of action and its possible therapeutic effect as supportive treatment in SARS-CoV-2. Recently he published his first article at pharmacological reports journal.

Foot Note: This work is partly presented at Joint Event on 29th International conference on Cardiology and Cardiovascular Diseases & 36th World Cardiology Conference, September 27, 2021 as Webinar