Renal and Cardiovascular Safety Profile of Remdesivir in Severe Covid-19 – From Computational Studies to Clinical Applications

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Background: Final report of Remdesivir phase-3 trial has brought up the clinical evidence of the most potential antiviral for Covid-19, but there is a limited data about its safety profile on renal and cardiovascular system – the two vital organs which are rich in ACE2 receptor besides the lung. The aim of this study is to analyze comprehensively the safety profile of Remdesivir in renal and cardiovascular system.

Methods: A review conducted based on prediction of Remdesivir’s renal and cardiovascular safety profile computationally, as well as from its physico-chemical properties, ex vivo (cell culture), and pre-clinical studies. The results of these studies were then matched with current clinical studies on safety of Remdesivir in renal and cardiovascular system of severe Covid-19.

Results: Remdesivir therapy against SARS-CoV-2 showed no toxicities in renal and cardiovascular system based on computational prediction and ex vivo study, with a concerned of nephrotoxicity arised form its pre-clinical and clinical study. Nephrotoxicity probably due to sulfobutylethyl cyclodextrin excipient. There were adverse events of Remdesivir in clinical setting, including hypotension, hypokalemia, AKI, hepatotoxicity, and gastro-intestinal problems.

Conclusion: Remdesivir is a drug candidates for Covid-19 inpatients acting on inhibition of RdRp which matched renal and cardiovascular safety profile, based on computational, pre-clinical, and clinical studies. Remdesivir considered to be relatively safe in mild renal dysfunction patients with Covid-19, with limited safety data in cardiovascular system. Further clinical study constantly ongoing to analyze the efficacy and safety of Remdesivir while SARS-CoV-2 and the disease have progressed.

Keywords: Remdesivir, safety, renal, cardiovascular, in silico, clinical applications