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Commentary

# The Brief Review of Viral Myocarditis and its Treatment

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## DESCRIPTION

Viral myocarditis lead to arrythmia, Dilated Cardiomyopathy (DCM), left ventricular dysfunction, and heart failure. This paper addresses the brief mechanisms of viral myocarditis and its treatment.

Viral myocarditis lead to arrythmia, dilated cardiomyopathy (DCM), left ventricular dysfunction, and heart failure. Viral myocarditis often occurs after viral respiratory infection. The common viruses in viral myocarditis include Adenoviruses (ADV) and Enteroviruses (EV) (such as coxsackie A viruses or coxsackie B viruses and echoviruses); parvovirus B19 (B19V); Human Herpes Virus 6 (HHV6); Epstein-Barr Virus (EBV) and Human Cytomegalovirus (CMV); Human Immunodeficiency Virus (HIV); Hepatitis C Virus (HCV); influenza A virus and influenza B virus; coronavirus including Middle East Respiratory Syndrome Coronavirus (MERS-CoV); Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and SARS-CoV-2 [1,2].

The virus in viral myocarditis lead to direct and indirect cardiac injury. The virus that infects cardiomyocytes induces direct myocardial injury, including cytoskeletal disruption, cardiomyocyte necrosis, cardiomyocyte lysis, apoptosis or autophagy [3]. The loss of cardiomyocytes lead to cardiac dysfunction and dilated cardiomyopathy in the long term. The virus also infects endotheilial cell and cardiac intestial cell, that lead to cardiac dysfuction and arrythmia.

The virus's indirect injury in viral myocarditis include inflammatory cytokines production and secondary autoimmunity. High levels of cytokines, particularly Tumor Necrosis Factor (TNF), IL-1a, IL-1b, IL-2, and Interferon-Gamma (IFN-γ), together with antibodies to viral and cardiac proteins, can further potentiate cardiac damage and compromise systolic function [2].

Treatment of viral myocarditis include antiviral therapy, supportive therapy, immunosuppressive therapy and immunomodulatory therapy.

Antiviral treatment is effective treatment for viral myocarditis, including Interferon (IFN) and special antiviral treatmemnt. Human interferons are antiviral proteins produced by human cells, especially Type 1 IFN (IFN-α, IFN-β, IFNγ). IFN-β effectively cleared the enterovirus or adenovirus with a resultant improvement in Left Ventricle (LV) function [4]. IFN-β-1b treatment lead to effective virus clearance or reduction in the virus load in patients with chronic viral cardiomyopathy. "IFNβ improve enterovirus-positive myocarditis or adenovirus-positive myocarditis viral clearance and survival" [5,6]. In special antiviral treatment,influenza virus treatment include Amantadine, Rimantadine, Zanamivir and Oseltamivir. CMV treatment include Ganciclovir and its oral prodrug valganciclovir, Foscarnet, Cidofovir and Fomivirsen. Herpes Simplex Virus (HSV) infection treatment include Acyclovir and its oral prodrug valaciclovir, Penciclovir and its oral prodrug famciclovir, Idoxuridine, Trifluridine, and Brivudin [7].

Supportive therapy include coenzyme CQ10, trimetazidine and combination therapy with coenzyme CQ10 and trimetazidine [8,9]. "Creatine phosphate sodium treatment can significantly improve the therapeutic effect of patients with viral myocarditis, and can reduce the levels of cTnI and CK-MB, Compared with conventional treatment" [10]. Targeting TRIM29-PERK axis could mitigate viral myocarditis severity [11]. Exercise and meditation is helpful for recovering heart function.

## CONCLUSION

Early diagnosis and treatment viral myocarditis are important to prevent life-threatening, long-term complications and virus persistence of viral myocarditis. Virus vaccine may be effective in prevent viral respiratory infection and viral mycarditis. Some Inflammation cytokines inhibitor may be effective on viral myocarditis in the future.

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