

[EDITORIAL]

COVID-19 and AV block: An Unusual Manifestation

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Since December 2019, there have been many reports regarding the clinical manifestations of novel coronavirus (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which originated in Wuhan, the capital of the Hubei Province of China (1). The World Health Organization declared a COVID-19 pandemic in March 2020, and the whole world began struggling with this new situation (2). While respiratory failure is the main complication seen in COVID-19, patients are at a high risk of suffering multisystem involvement, including pneumonia, coagulation activation, liver dysfunction, renal failure, and cardiac injuries.

Regarding cardiac complications of COVID-19, about 12% of patients with COVID-19 reportedly suffered cardiac injury (3, 4). Such patients have shown substantial heart damage, with elevated serum levels of high-sensitivity troponin I during hospitalization. COVID-19 is believed to gain entry via the angiotensin-converting enzyme 2 (ACE2) receptor, which is abundant in the upper respiratory tract. The ACE2 receptor is also expressed in the endothelium of the arteries and the heart, suggesting that the signaling pathways of ACE2 might play a significant role in direct heart injury. Such involvement may be why hypertension is a risk factor associated with adverse outcomes.

Other cardiac manifestations include decompensated heart failure (5), acute coronary syndrome (6), myocarditis (7), hypertension and hypotension (8). Regarding the spectrum of cardiac arrhythmias associated with COVID-19, we should monitor patients for atrial fibrillation (9), polymorphic tachycardia due to a prolonged QT interval (10), pulseless electrical activity, and atrioventricular (AV) block with myocarditis (11).

Abe et al. reported paroxysmal AV block as a rare complication of COVID-19 infection in a relatively young patient (12). Generally, severe myocarditis due to COVID-19 is suspected to impair the diffuse conduction system, including the AV node, His bundle, and Purkinje system, although

the precise mechanisms underlying the AV block is unclear. However, that patient showed no cardiac involvement on cardiac magnetic resonance imaging (cMRI) or a cardiac biopsy, which is an unusual manifestation. In that particular case, the indication of pacemaker implantation needed to be determined carefully, since 1) the patient was relatively young; 2) the paroxysmal AV block may have been transient during COVID-19 infection; 3) there was no evidence of structural cardiac damage based on his cMRI findings, including no delayed enhancement; and 4) the paroxysmal AV block was likely due to a vagal response.

Paroxysmal AV block is usually classified into three patterns (13), and extrinsic vagal AV (EV-AV) block was suggested according to the telemetry strip on day 10, which showed prolongation of AA intervals just before the paroxysmal AV block. Cardiac pacing may have a reduced efficacy for preventing syncopal recurrence in patients with EV-AV block, since EV-AV block does not progress to chronic AV block in general. However, the authors performed implantation of a permanent pacemaker on day 10, and subsequently, pacemaker recording even after three months from discharge indicated that ventricular pacing was required intermittently. This may be due to sustained autonomic dysfunction induced by COVID-19. We should bear in mind that an impaired autonomic function is a potential complication of COVID-19 infection, with some patients showing bradycardia even while running a fever (14) and ultimately requiring implantation of a pacemaker (15).

The authors state that they have no Conflict of Interest (COI).

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