Editorial for "Cardiac Magnetic Resonance Imaging Findings in 2,954 COVID-19 Adult Survivors: A Comprehensive Systematic Review"

The ongoing global coronavirus (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continues to be a subject of particular interest to the scientific community as novel comorbidities and postacute sequelae of SARS-CoV-2 infection are discovered.[1] Although COVID-19 patients present largely with respiratory symptoms, new studies have demonstrated a notable prevalence of cardiovascular comorbidities in hospitalized patients.[2] Cardiovascular manifestations including but not limited to myocardial injury, acute heart failure, arrhythmias, myocarditis, pericardial disease, as well as thromboembolic events have been documented in recent literature.[3]

In a study performed by Shi et al, cardiac comorbidities were found to occur in approximately 20% of hospitalized patients and were associated with worse patient outcomes.[4,5] Standard cardiac imaging modalities such as transthoracic echocardiography (TTE), computed tomography (CT), and cardiac magnetic resonance (CMR) have been used to diagnose and monitor cardiac complications in COVID-19 patients.[6] CMR has the unique ability to reveal critical information about cardiac function and morphology, in addition to assessment and quantification of myocardial tissue composition.[2,7]

The American Heart Association recommends CMR as a reproducible, high-resolution technique for use in clinical practice to diagnose a broad array of cardiac conditions such as myocarditis, coronary artery disease, myocardial infarction/scar, pericardial disease, and more.[8] The acquired CMR sequences of acute-phase edema and late gadolinium enhancement were proven to be essential to establish CMR as an ideal imaging technique for use in detecting cardiac injury in COVID-19 patients.[9]

In this issue of JMRI, Hassani et al. report on recent studies that have employed CMR to determine the extent of cardiac sequelae present in COVID-19 survivors by attempting to systematically review and summarize the main findings.[10] The study included adult COVID-19 out/in-patients at the post-acute infective phase and had received a cardiac evaluation by CMR. The authors collectively analyzed 22 published manuscripts consisting of 10 case studies and 12 cohort studies that met the inclusion criteria, providing data on 2954 patients with only three studies designed prospectively. This systematic review again collated the evidence on cardiac involvement in recovered COVID-19 patients, including edema, fibrosis, pericarditis, myocarditis, albeit with a spectrum of disease severity during the acute phase.

This study exhibited an explicitly reproducible methodology including clearly defined eligibility and inclusion criteria. An assessment of the validity of the included studies' findings was critiqued with reference to selection bias, infrequent small sample sizes but most importantly the lack of baseline CMR. The authors admittedly recognized how a meta-analysis would be impractical due to the heterogenous patient population, follow-up periods, and varying imaging diagnostic thresholds. Given such limitations, the authors again discuss the increased odds of contracting and testing positive for COVID-19 in patients with pre-existing CMR abnormalities, independent of cardiovascular risk factors.[10] Also, the authors suggest that cardiac manifestations diagnosed following recovery may actually reflect a pre-existing cardiac condition rather than a cardiac abnormality related to COVID-19. As all the included studies for this systematic review did not acquire a baseline CMR prior to SARS-CoV-2 seropositivity, it is important to keep this caveat in mind to avoid erroneous interpretations of the observations.

Despite the relatively young and healthy patients' population, in this review, a considerable degree of cardiac involvement was noted following mild infection. Additionally, eight of the 22 studies selected for review included an athlete population, which likewise exhibited evidence of cardiac injury, particularly myocardial inflammation.[9] This finding presents a noteworthy contribution to the production and revision of return-to-play guidelines, which has been of recent interest since the detection of cardiac sequelae following mild or even asymptomatic COVID-19 infection in athletes.[9]

Further statistical analysis of study findings could perhaps aid in elucidating the degree to which the athletes and young patients are affected by cardiac manifestations of COVID-19. As newly proposed mechanisms for cardiac injury are published, it would equally be of interest to include them in future discussions of postacute cardiac sequelae as it relates to the assessment and management of COVID-19 infection and recovery. Ultimately, this may allow for new informed therapeutic plans and develop new strategies for CMR surveillance.

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