Coronary Involvement Findings on Chest HRCT in COVID-19 Patients

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Editorial

Acute respiratory disease from SARS-CoV-2 (COVID-19) or coronavirus disease 2019 is an infectious, mainly respiratory disease caused by a virus named SARS-CoV-2, which belongs to the Coronaviridae family of the order Nidovirales. The new SARS-CoV-2 coronavirus was first identified in Wuhan in December 2019 and it is the cause of the ongoing worldwide pandemic in 2020. The most well-known manifestation of the virus is acute SARS-CoV-2 respiratory disease (COVID-19) which has an extremely high intra-hospital mortality rate (48%). However, recent data suggests that myocardial injury is also an important manifestation of SARS-CoV-2 infection. There is a prognostic correlation between troponin levels (TnI) (representing acute myocardial injury) and fatal outcome in patients with COVID-19, which has been highlighted in recent Chinese reports.

The underlying mechanism linking COVID-19 to myocardial injury has not yet been demonstrated yet, but the recent description of Coronavirus in the myocardium in autopsy, although only in a case report, suggests some patients with COVID-19 may develop an infective myocarditis from secondary localization of the virus. Another potential underlying mechanism of myocardial damage in COVID-19 patients may cardiac damage secondary to other causes, among which the high inflammatory burden making coronary plaques more vulnerable.

Another possible mechanism responsible for myocardial injury is the formation of thrombi and coronary (macro) or microvascular occlusion, also a possible effect of hyperacute inflammation, which has been shown to be involved in chronic and acute coronary syndromes. Routine screening CT for the identification of COVID-19 pneumonia is currently not recommended by most radiology societies. However, the number of CTs performed in persons under investigation for COVID-19 has increased. High-resolution computed tomography (HRCT) without the use of intravenous contrast material can support the diagnosis of COVID-19 pneumonitis.

In view of these important data on myocardial injury in COVID-19 patients, given the central role of computed tomography in this setting, further new key information could be derived from the use of this examination, with regard to coronary and cardia assessment.

A useful parameter to be investigated is for example the presence of pre-existing coronary artery disease, through the assessment of coronary calcium (coronary calcium score-CAC). CAC plays a very important role in the stratification of cardiovascular risk. Many studies have shown a significant correlation between CAC and the incidence of major cardiovascular events (CV death, non-fatal MI) but also for all-cause death. This parameter could also be predictive of mortality in COVID-19 patients, due to plaque disruption, malignant arrhythmias and demand-supply mismatch mechanism, secondary to chronic, pre-existing CAD in this case.

The coronary calcium score can be measured reliably even in non-ECG, non-triggered HRCT using ultra-fast scans, and this makes the method easy to be use even in an emergency setting such as the current one, allowing it's the CACS assessment in the same exam, which is mainly performed to collect clinical information on the involvement of lung in the suspected or confirmed COVID-19 patient.

Additional information can also be extracted in the future from simple HRCT scans, such as peri-coronary fat attenuation, a potentially useful variable for greater understanding of the grade of coronary inflammatory involvement in covid-19 patients. HRCT is a here to stay in the clinical management of COVID-19, but also for future research.