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## **Spontaneous Coronary Artery Dissection in a Patient with COVID-19**

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**Running title:** Spontaneous Coronary Artery Dissection in COVID-19

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Severe acute respiratory syndrome coronavirus 2, which causes coronavirus 2019 (COVID-19) has reached a pandemic level. Cardiac injury, defined as an elevated high sensitivity cardiac troponin (hs-TNI), has been reported during COVID-19; it is associated with an increased risk of mortality (1). Several underlying mechanisms are possible: COV-2 myocarditis, acute coronary syndrome type 1 associated with plaque rupture (systemic proinflammatory stimulation and hypercoagulability) or type 2 (mainly related to oxygen mismatch) (2). All these etiologies require a specific diagnosis and appropriate management.

A 55 year-old man with a past medical history of peripheral artery disease was admitted to our hospital for cough and febrile dyspnea with suspected COVID-19. The PCR was positive, and the CT-scan demonstrated bilateral crazy paving. 48 hours after admission, he complained of chest pain. 12-lead ECG demonstrated inverted T waves in inferior leads. Hs-TNI was at 355 ng/L then 570 ng/L three hours later ( $N < 17$  ng/L). Transthoracic echocardiography showed a left ventricular ejection fraction at 60% without wall motion abnormalities, no diastolic dysfunction and a mild mitral regurgitation. Coronary angiogram performed via radial approach demonstrated a chronic total occlusion of the posterior descending artery with epicardial collateral from the left anterior descending artery (Rentrop 3, panel A). In the mid right coronary artery, a spontaneous dissecting coronary hematoma was observed with an intimal tear (panels B and C). Flow grade was Thrombolysis In Myocardial Infarction (TIMI) 3 in the posterolateral artery. Optical coherence tomography (OCT) was performed in the right coronary artery and confirmed the spontaneous dissecting coronary hematoma with an intimal rupture (panels D, E and F). A conservative management was decided. Patient was transferred in medical department with a treatment by aspirin, statins and beta-blockers. A subsequent control of coronary angiogram is planned.

Coronary artery dissection may be related to intraplaque haemorrhage resulting in an intra-adventitial haematoma, spreading longitudinally along the coronary artery dissecting the

tunicae (3). Lessons from the previous coronavirus and influenza epidemics suggested that viral infections can trigger acute coronary syndrome primarily owing to a combination of a significant systemic inflammatory response plus localized vascular inflammation at the arterial plaque level (4). Herein, we report the first case of spontaneous coronary artery dissection in a patient with COVID-19 infection. In this pandemic period, almost all the physicians' attention is captured by the symptoms of COVID-19. This report shows that true acute coronary syndrome can occur in this setting that should be appropriately characterized. Whether specific mechanisms are triggered by this virus requires further scrutiny.

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**FIGURE LEGENDS**

**Figure. Panel A:** coronary angiogram of the left anterior descending artery with epicardial collateral to the posterior descending artery (white arrow)

**Panels B and C:** total chronic occlusion of the posterior descending artery (black arrow), suspected intimal tear in the mid right coronary artery (white arrows)

**Panels D, E and F:** Optical coherence tomography on the proximal (D), middle (E) and distal (F) part of the dissection (white asterisks indicated the false lumen, white arrows showed intimal rupture)

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