



Multi-modality imaging of inflammation and ischemia for assessment of myocardial injury in Covid-19

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INTRODUCTION

Coronavirus disease-2019 (Covid-19) is associated with cardiovascular manifestations including type 2 myocardial injury, acute coronary syndromes, and acute/fulminant myocarditis, contributing to an overall worse prognosis.

CASE SUMMARY

A 69-year-old woman with a history of hypertension presented with dyspnea and chest pain at the peak of Covid-19 pandemic. ECG revealed left-bundle-branch block (long-standing) (Figure 1) and chest pain quickly resolved with medical therapy. Polymerase chain reaction (PCR) assay was positive for Covid-19. Chest CT revealed bilateral ground-glass opacities consistent with Covid-19 (Figure 1). Peak troponin was 40 ng/ml (< 0.02 ng/ml). Echocardiography revealed septal, anterior, and apical hypokinesis. Lopinavir-ritonavir, dual anti-platelet therapy, statin, losartan, and beta-blocker were started. She had an overall uncomplicated course of Covid-19. Due to complete resolution of pain and active Covid-19,

angiography was deferred for when she was deemed non-infective.

To assess for myocarditis versus myocardial infarction/injury, on admission day 7, ¹⁸F-DG-PET with 18-h fasting protocol was performed showing avid uptake in septum, anterior wall, and apex (Figure 2). A subsequent ^{99m}Tc-MIBI-SPECT revealed rest perfusion defects in the same segments (Figure 2) (stress imaging not performed due to possible infarct).

While segmental FDG uptake (due to inflammation) with matching perfusion defects (due to inflammatory microvascular dysfunction) are typical for myocarditis,¹ in this context secondary to Covid-19 shown to cause myocarditis and cardiac microvascular involvement²; acute inflammatory response to myocardial infarction precipitated by Covid-19 may generate a similar pattern.³ This perfusion-metabolism mismatch should not be misinterpreted with myocardial uptake indicating myocardial viability in an ischemic left anterior descending (LAD) artery territory since the prolonged fasting protocol suppresses myocardial glucose uptake.³

Angiography performed when the patient became PCR negative with resolution of pulmonary involvement revealed severe LAD artery disease (Figure 3), confirming anterior wall infarction precipitated by Covid-19 that was treated with percutaneous coronary intervention.

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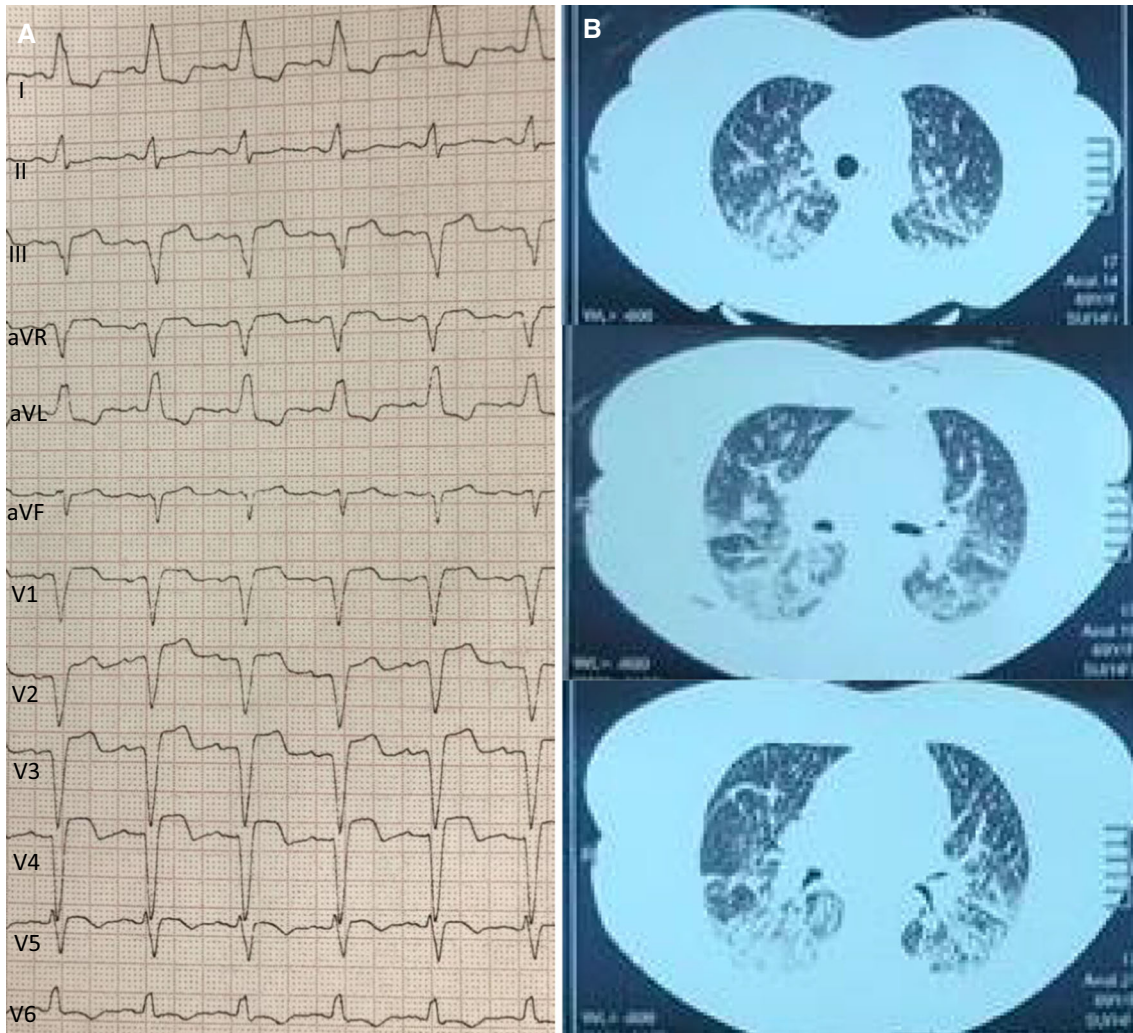


Figure 1. Initial investigations. **A** ECG revealed left-bundle-branch block pattern (old) with anteroseptal Q waves. **B** Chest computed tomography revealed multilobar ground-glass opacities consistent with Covid-19.

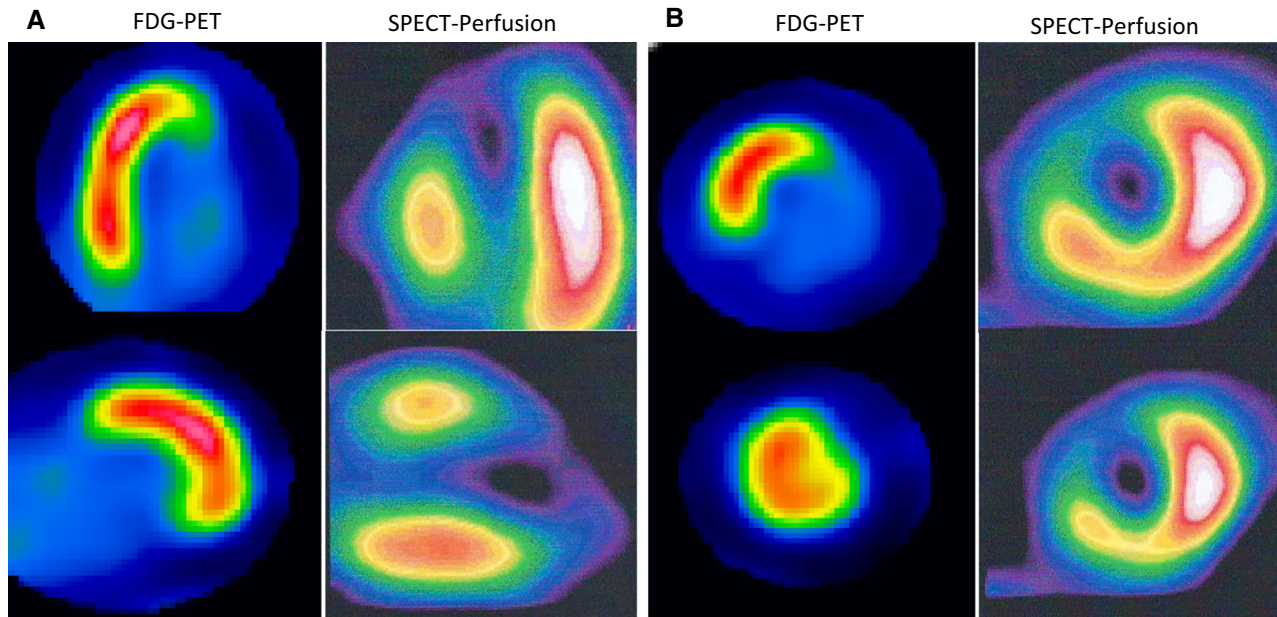


Figure 2. Cardiac ^{18}F FDG-PET and $^{99\text{m}}\text{Tc}$ -MIBI-SPECT perfusion imaging. Horizontal long-axis, vertical and short-axis slices show avid FDG uptake in the septum, anterior wall, anteroseptal, and apical segments and suppression of FDG uptake in the rest of myocardium, with matching segmental defects on the rest SPECT perfusion images.

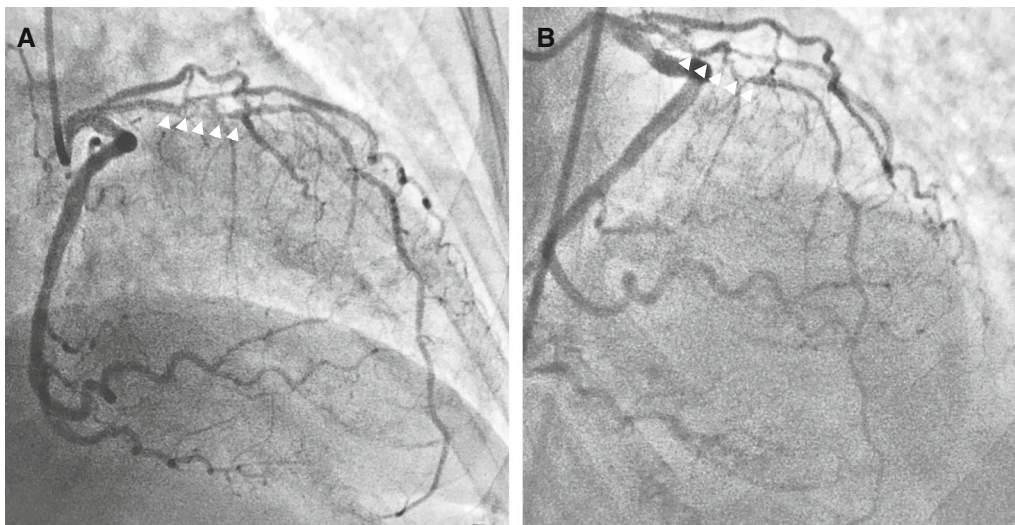


Figure 3. Coronary angiography. Severe stenosis in the mid-segment of the left anterior descending artery (arrowheads) in bifurcation with a diagonal branch in the right anterior oblique and anterior-posterior cranial projections.

Disclosures

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