

Successful Treatment of COVID-related STEMI with Anti-thrombotic Medical Management

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Case Presentation

A 49 year old male with a history of hypertension, dyslipidemia, pre-diabetes, and obesity was transferred from an outside hospital for cardiogenic shock. One week prior, he presented to the outside facility with acute shortness of breath and fever and had tested positive for COVID-19. After isolating himself in a motel for a few days, he presented again to the outside facility after recurrence of shortness of breath. He was started on antibiotic therapy and given supportive care. The following day, he developed worsening shortness of breath with diaphoresis, and ST changes were observed on telemetry. An EKG showed diffuse ST elevations, more pronounced in leads V2-V6. Urgent cardiac catheterization was performed and revealed a large saddle thrombus involving the left main at its trifurcation into the LAD, ramus intermedius, and left circumflex arteries in a left dominant system. There was complete occlusion in the distal LAD. An echocardiogram showed reduced left ventricular systolic function with ejection fraction of 15%. An intra-aortic balloon pump was placed, heparin and tirofiban drips were started, and he was transferred to our facility for higher level of care. On arrival, he was normotensive, maintaining normal oxygen saturation on room air, and without any symptoms.

Investigatory Studies

Labwork showed troponin of 113.4 ng/mL, pro-BNP of 1492 pg/mL, D-dimer 4.6 ug/mL, Ferritin 738 ng/mL, CRP 4.48 mg/dL, and LDH 1583 IU/L. A chest X-ray revealed bilateral fluffy infiltrates consistent with COVID pneumonia. Repeat echocardiogram demonstrated left ventricular ejection fraction of 20-25% with a layered left ventricular apical thrombus.

Imaging



Chest X-ray consistent with COVID pneumonia



Initial catheterization with distal left main saddle thrombus



Follow up catheterization with resolution of saddle thrombus

Management

The patient was continued on heparin and tirofiban and started on aspirin, clopidogrel, metoprolol, lisinopril, atorvastatin, and ezetimibe. The intra-aortic balloon pump was eventually removed. A repeat echocardiogram showed improvement of ejection fraction to 30-35% with a small pericardial effusion and persistent apical thrombus.

Regarding treatment of COVID-19, he was given supportive care only as he was not deemed a candidate for either Remdesivir or convalescent plasma therapy. Antibiotics were not continued as he was afebrile and without leukocytosis.

Four days after admission, the patient developed a left MCA ischemic stroke. Tirofiban was discontinued and metoprolol and lisinopril were temporarily held for permissive hypertension. Unfractionated heparin and dual antiplatelet therapy was continued.

His neurological status improved over time. Repeat cardiac catheterization was performed and showed near complete resolution of the saddle thrombus while the distal LAD remained occluded.

Discussion

Cardiovascular complications occur frequently in patients with COVID-19, including ST-elevation myocardial infarction (STEMI). Here we present a case of STEMI secondary to COVID-19 with thrombotic lesions that resolved with anti-thrombotic medical management using "quadruple" therapy consisting of heparin, tirofiban, aspirin, and clopidogrel. This approach differs from alternatives of stenting or fibrinolysis explored in other cases and official practice guidelines. We speculate that as COVID-19 associated STEMI is frequently due to non-atherosclerotic thrombus formation, anti-thrombotic management alone in those situations may be sufficient.