Stent Thrombosis Associated with Covid-19 in St-Segment Elevation Myocardial Infarction

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Introduction:

The current pandemic of novel coronavirus disease 2019 (COVID-19) has posed a great threat to people's health worldwide, with specific implications on patients with underlying heart diseases. We report the case of a 64-year-old woman admitted for inferior STEMI and asymptomatic COVID-19. Reperfusion was achieved with coronary angioplasty, but the patient experienced an episode of fatal acute stent thrombosis (ST) at 2 hr following angioplasty and despite optimal medical therapy. The patient underwent repeat angioplasty and thrombosuction for high thrombus load with stent thrombosis, she remained with IABP and ionotropic support for shock but finally stabilized and discharged. This raises concerns about a possible increase in platelet aggregability associated with COVID-19 leading to an increased risk of stent thrombosis, particularly in the context of STEMI. This pleads for the promotion of primary coronary angioplasty as the first-choice revascularization technique in this population and the use of new generation P2Y12 inhibitors. In addition, the use of GPIIb/IIIa inhibitors may be considered in every STEMI patient with COVID-19 to prevent the risk of acute stent thrombosis.

Keywords-STEMI, Stent Thrombosis, COVID-19 infection.

Case Report

A 64-year-old female patient presented to the emergency department with ST-elevation acute coronary syndrome (STEACS) with inferior wall STEMI. Immediately received dual antiplatelet therapy (DAPT) combining ticagrelor 180 mg and aspirin 325 mg linked with a bolus of intravenous unfractionated heparin. She was taken for an urgent coronary angiogram (CAG), which revealed the single-vessel disease. Successful PCI was done for the right coronary artery (RCA) lesion, with implantation of one drug-eluting stent in the coronary artery (***Figure 1,2***).
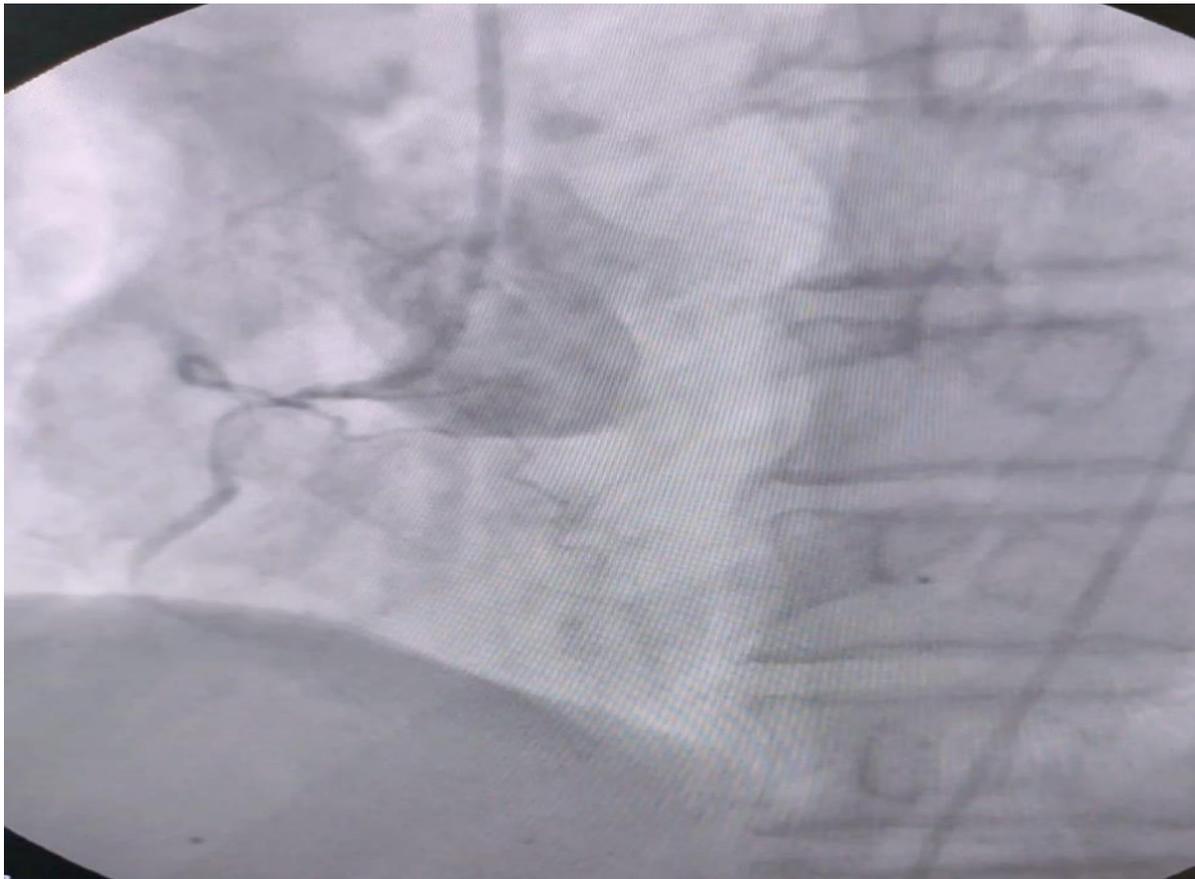

Figure 1: Coronary angiography on LAO cranial view shows significant lesion in paroximal right coronary artery with thrombus containing lesion.
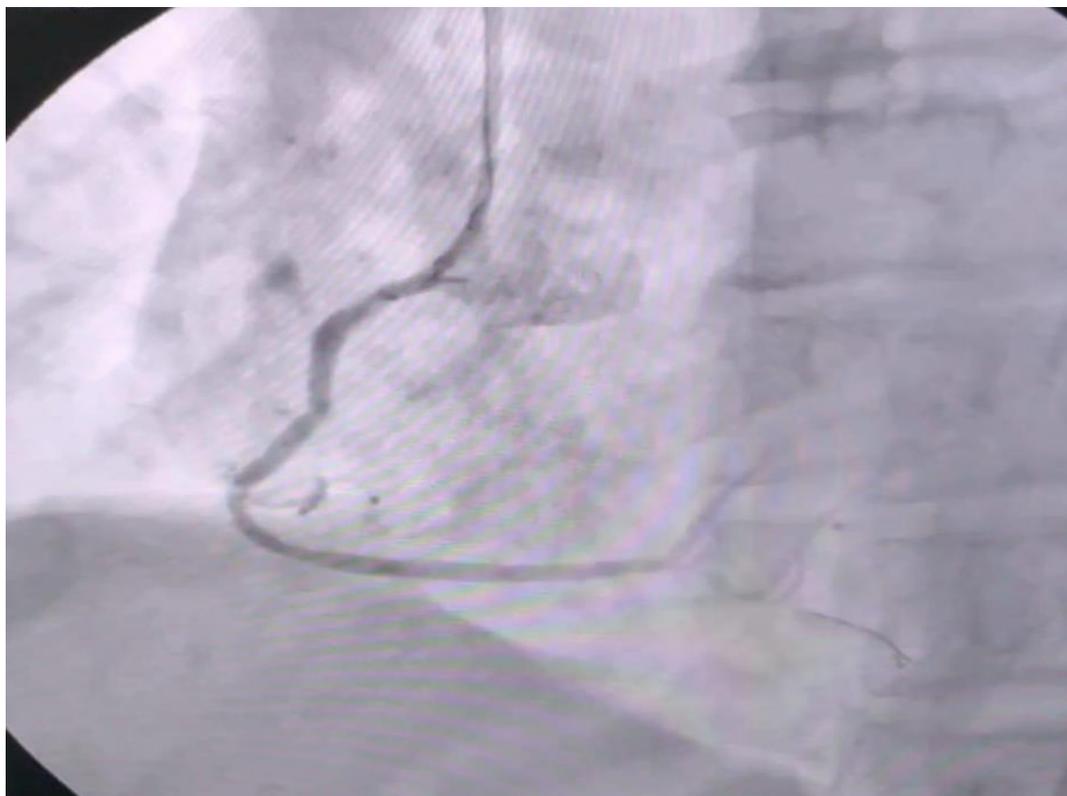
Figure 2: Coronary angiography on LAO cranial view shows right coronary artery after stent implantation.

Two hours later, the patient presented recurrent chest pain, no sustained ventricular tachycardia, and cardiogenic shock. A new emergency coronary angiography revealed acute RCA stent thrombosis that was treated with catheter thrombectomy and balloon angioplasty. DAPT was modified, replacing ticagrelor with prasugrel (with 60 mg loading dose). Left ventricle ejection fraction was estimated at 30%. Inotropic support combining dobutamine infusion and intra-aortic balloon pump (IABP) was started as well as therapeutic anticoagulation with intravenous unfractionated heparin. SARS-CoV-2 PCR from the nose swab was performed and confirmed COVID-19 infection. Of note, at admission, body temperature was normal and no other sign of infection was noted, and blood reports only revealed mild leucocytes elevation (15 G/L, N < 10), mild C-reactive protein elevation (36 mg/L, N < 5), and no changes in a chest x-ray. The patient's condition recovered slowly, Ionotrops and IABP support discontinued and removed after 2 days, echocardiography showed left ventricular function improved to 45% with mild inferior regional wall-motion disturbances. The patient was discharged 6 days after myocardial infarction on a regime of aspirin, prasugrel, metoprolol, ramipril, and rosuvastatin.

Discussion

COVID-19 has significant impacts on patients' coagulation. Severe infection can cause sepsis-associated intravascular disseminated coagulopathy with thrombocytopenia. In this case, combining asymptomatic COVID-19 and STEMI, despite optimal antithrombotic medical therapy, there seems to be an increase in the risk of stent thrombosis due to a possible excessive platelet aggregability [1,2]. As the incidence of COVID-19 is increasing worldwide and the high prevalence of coronary artery disease, we may be exposed to a significant number of cases of patients experiencing STEMI and COVID-19 at the same time. We may even expect an increase in the incidence of STEMI as it is well accepted that acute viral infection increases the risk of acute myocardial infarction, mainly through acute inflammation and endothelial dysfunction. [3,4] Thus, this case and epidemiologic evidence raise concerns about a strategy that would favor intravenous fibrinolytic therapy over timely primary PCI as

(a) COVID-19 may reduce the efficacy of fibrinolytic therapy, (b) COVID-19 which can cause a high thrombus burden may further increase the risk of subsequent stent thrombosis.

Coronary artery stenting which presents as acute STEMI carries a 30-day mortality rate of 20% to 45%. The mechanisms of underlying stent thrombosis are multifactorial; include patient-related factors (diabetes mellitus, renal failure), procedural factors (the complexity of the lesion, bifurcating lesions and poor stent expansion and opposition to vessel wall) and post-procedural factors (type and duration of antiplatelet therapy). [5]

Conclusions

We propose that (a) timely primary PCI remains the first choice over fibrinolytic therapy in STEMI patients, which include the priority of emergency transportation of STEMI patients to cath labs in order to avoid extensive myocardial necrosis, (b) physicians in charge should prefer new generation P2Y12 inhibitors to clopidogrel, according to ACC/AHA and ESC guidelines, and (c) post-primary PCI and stent implantation GPIIb/IIIa inhibitors therapy may be considered in every patient with STEMI and suspected COVID-19 infection, even without high thrombotic burden, to prevent the risk of acute stent thrombosis. Of course, we need data from large registries to confirm this suspected increased risk of stent thrombosis in these patients combining STEMI and COVID-19. Besides the complexity of the procedure, the selection of P2Y12 inhibitor in a post PCI patient is also very important. This report aims mainly to draw attention toward this particular situation that may become more and more frequent in the ongoing pandemic situation.

Conflict Of Interest: The authors declare no conflicts of interest.

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

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