

## Simultaneous Stent Thrombosis In Rca and Lad Treated with Simultaneous Radial and Femoral Approaches

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### INTRODUCTION

Management of ST segment elevation myocardial infarction (STEMI) due to stent thrombosis in multiple vessels can be challenging. Here we present a patient with simultaneous stent thrombosis in the right coronary artery and left anterior descending artery who was treated with simultaneous percutaneous coronary intervention of left anterior descending artery and right coronary artery via the right femoral and right radial approach to minimize the time to restore flow in both the vessels. We also briefly discuss the current practices in staged percutaneous coronary intervention.

### CASE REPORT

A 64-year-old male smoker, with history of coronary artery disease with multiple percutaneous coronary interventions (PCI) to left anterior descending (LAD) and right coronary artery (RCA), presented with inferior STEMI. His other co morbidities include recent diagnosis of stage I non-small cell carcinoma of the lung, status post lobectomy complicated by left pneumothorax, peripheral artery disease, transient ischemic attack, and Guillain-Barré syndrome.

Emergent coronary angiography showed the occlusion of RCA due to stent thrombosis. The LAD had an eccentric 70% stenosis in the mid portion. There were sequential high-grade in-stent restenosis of approximately 90% in the mid and distal portions of the stent in the mid LAD. The left circumflex artery had non-obstructive stenosis. Aspiration thrombectomy was performed and a 2.75×38 mm Xience stent was deployed in the RCA after predilatation with a 2.5×15 mm balloon and post dilated with a 3.0×24 mm non-compliant balloon inflated to 20 atmospheres. The patient had no hemodynamic complications after the procedure. He was transferred to CCU where he was restarted on Prasugrel, which he had stopped a week earlier. Staged intervention of the severe in-stent restenosis of the distal LAD was performed 4 days later with 2.5×15 Xience stent and post dilated

### ABSTRACT

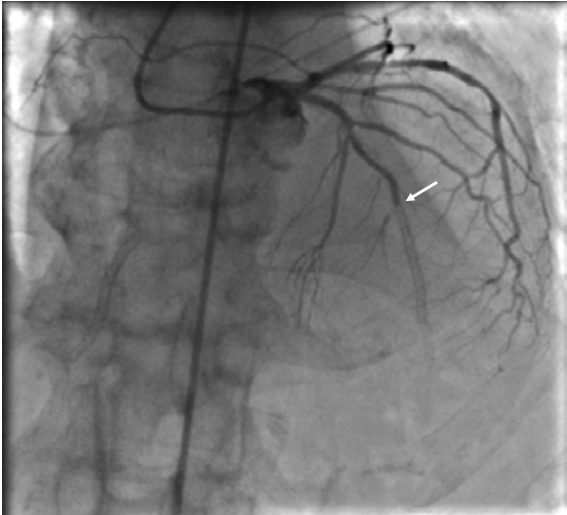
Staged percutaneous coronary intervention of a non-culprit vessel after treatment of the culprit vessel is common practice and has been found to be beneficial in small-randomized controlled trials and observational studies. There is a high risk of stent thrombosis within the first 30 days after stent implantation. Staged percutaneous coronary intervention of a non-culprit vessel is sometimes necessary within the first 30 days of primary percutaneous coronary intervention and is commonly performed but such procedures may be associated with a risk of simultaneous stent thrombosis in the implanted stents. Here we describe a patient who presented with inferior ST elevation myocardial infarction and had percutaneous coronary intervention of the culprit vessel, the right coronary artery, followed by staged percutaneous coronary intervention of left anterior descending artery. One week later the patient presented with simultaneous stent thrombosis in both the right coronary artery and left anterior descending artery. He was then treated with simultaneous percutaneous coronary intervention of left anterior descending and right coronary artery via the right femoral and right radial approach to minimize time to restore flow in both the vessels.

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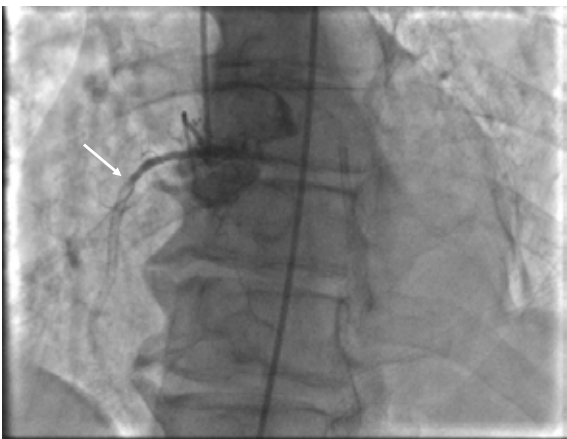
**Key words:** Non culprit lesion PCI; Staged PCI; Rivaioxaban post PC

with a 2.5×25 Trek non-compliant balloon to 18 atmospheres and the patient was discharged.

One week later the patient presented with retrosternal chest pain. He reported being compliant with all his medications including dual antiplatelet therapy. He was found to have ST elevation in the inferior and anterior leads. The patient underwent emergent coronary angiography, which showed 100% occlusion of the mid LAD and RCA due to in-stent thrombosis (Figure 1, 2).



**Figure 1** Mid LAD in-stent thrombosis.



**Figure 2** RCA in-stent thrombosis.

The lesion in mid LAD was crossed with a 0.014" wire with minor difficulty. We were not able to cross the mid LAD 70% stenosis with the aspiration catheter. The LAD was occluded beyond this stenosis. Percutaneous transluminal coronary angioplasty (PTCA) of the 100% occlusion was performed with a 2.5×12 mm balloon along the length of the stent. Following this there was TIMI 1-2 flow in the vessel was established. The door to balloon time for restoration of flow in the LAD was 65 minutes. Multiple doses of nitroprusside and adenosine were given with minimal improvement. Since partial flow was established and there was some difficulty in crossing the lesion, we left the guide wire in place and turned our attention to the RCA. We initiated a right radial access as the left femoral access site had some erythema and tenderness from the procedure performed a week earlier. The RCA was engaged with an R4 guide, the occlusion was crossed with a 0.014" wire and aspiration thrombectomy and PTCA of the RCA was performed with a 2.75×30 mm balloon inflated to 14 atmospheres, bringing its diameter close to 3 mm. At the end of this

procedure there was very good angiographic result (Figure 3). The time to restoration of flow in the RCA was 97 minutes and PCI of RCA completed in 14 minutes. We then returned to the LAD. There was still residual thrombus in the LAD. We used bivalirudin for the procedure with eptifibatide being added due to large thrombus burden in the LAD with slow flow. Activated clotting time was checked prior to adding eptifibatide and was over 300. The aspiration catheter could not be passed to the distal of the mLAD lesions even after predilating the proximal lesion. After multiple balloon inflations, multiple doses of intracoronary nitroprusside, nitroglycerin and adenosine, TIMI 2 flow was restored and maintained and a 2.75×15 mm Xience stent was deployed in the mid LAD at the location of the 70% stenosis. We then deployed a 2.5×12 mm Xience stent in the distal portion of the previously deployed mid LAD stent. Following this, again there was no reflow. After multiple doses of nitroglycerin and adenosine and a few more inflations of the 2.75×30 mm balloon, we were able to establish TIMI 2 flow in the LAD. We re-checked the flow in the RCA, which was very good. At the end of the procedure, there was good angiographic result in the RCA and the LAD (Figure 3 and 4).

Hematology consult was requested to evaluate for any hypercoagulable state in addition to his cancer. The patient was discharged on rivaroxaban, in addition to aspirin and ticagrelor. On follow up visit one month later, the patient was doing well. Later he developed significant epistaxis and rivaroxaban was discontinued.



**Figure 3** Restoration of flow to the RCA.



**Figure 4** Restoration of flow to the LAD.

Due to poor prognosis from his malignancy and other co morbidities palliative care option was provided to the patient.

## DISCUSSION

Our case highlights a few important points. Detection of multivessel disease (MVD) during reperfusion by primary angioplasty for ST-elevation myocardial infarction (STEMI) is common (40-50%)<sup>[1]</sup>. Some observational data and small-randomized trials suggest that complete revascularization with staged PCI to significant non-culprit lesions may help prevent recurrent angina and a better left ventricular ejection fraction compared with medical management alone<sup>[1-3]</sup>. The recently published PRAMI trial, comparing a strategy of immediate preventive PCI in the setting of STEMI (treating all the stenoses including non culprit at the time of STEMI) to a strategy of PCI of the non culprit vessel only in the presence of refractory angina with objective evidence of ischemia, found that preventive PCI resulted in decreased incidence of primary composite endpoint of cardiac death, non-fatal MI and refractory angina<sup>[4]</sup>. A survey done to obtain an insight into current real world practice regarding the staging of PCI procedures suggested that about 75% of cardiologists perform staged intervention to the non culprit vessel less than 30 days after the primary PCI<sup>[5]</sup>. While this is often necessary, the risk of stent thrombosis occurring in more than one vessel simultaneously should be considered. The optimal strategy for PCI of non culprit vessels in STEMI patients including the timing of any staged interventions is also being investigated in the ongoing CVLPRIT study<sup>[6]</sup>.

While simultaneous stent thrombosis in two different arteries has been reported<sup>[7]</sup>, we present a novel approach in a patient with stent thrombosis occurring in the RCA and the LAD simultaneously, that successfully decreased the time to reperfusion in both the vessels. It was especially important in our case since the first vessel we ended up choosing for primary PCI, the LAD, required a significant amount of time to achieve a stable and acceptable result that would allow us to remove the guide wire and proceed to the next vessel. In fact, our initial plan was to complete the PCI to the LAD and then move onto the RCA via the right common femoral approach. Our time to reperfuse the RCA would have been shorter if we had initiated our approach of simultaneous PCI, to restore flow, sooner instead of attempting to get an acceptable result in the LAD prior to going to the RCA. While there is an increased risk of vascular complications with two arterial access sites, consideration has to be given to the increased 1 year mortality with delay to restoration of flow in STEMI patients, even though a recent observational study shows no decrease in 30 day in hospital mortality in STEMI patients nationally in the US despite decreasing door to balloon times from 2005 to 2009<sup>[8,9]</sup>. Our approach enabled us to establish TIMI 3 flow in the RCA and return to the LAD and check the RCA as needed, not only helping the patient but the operator as well since having to deal with slow flow or no reflow in a STEMI patient is stressful even without the added burden of another occluded vessel that is waiting to be opened.

Rivaroxaban has been shown to decrease the incidence of stent thrombosis in patients with acute coronary syndromes at the expense of increased rate of major bleeding<sup>[10]</sup>. This could be considered in high risk patients such as our patient with multiple stents and with a potentially hypercoagulable state related to his lung cancer.

## CONCLUSION

The risk of stent thrombosis occurring in multiple vessels simultaneously should be considered during decision making in multivessel PCI. Our

approach of dual access and simultaneous PCI to minimize time to restoration of flow in both the occluded vessels was successful but the risk of vascular complications associated with multiple access sites has to be weighed carefully on a case-by-case basis.

## CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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