Case Report

A Rare Case of Acute Stent Recoil in Acute Inferior Wall Myocardial Infarction Patients

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Abstract

Acute stent recoil is a rare phenomenon that can precipitate acute stent thrombosis or in-stent restenosis. Factors associated are reduced strut thickness, a larger stent/vessel ratio, and a larger balloon/stent ratio. We report a case of acute stent recoil of Promus Elite, a platinum chromium everolimus-eluting stent in a 61-year-old male who underwent Rescue PCI to RCA. Acute stent recoil was noted after post dilatation which was tackled by deploying another Resolute Onyx, a platinum-iridium zotarolimus-eluting stent. Acute radial collapse probably occurred due to inadequate lesion preparation, high-pressure post dilatation with a larger balloon, and relatively thin struts of the stent.

Keywords: *Acute stent recoil, rescue PCI, ST-elevation Myocardial infarction, DES.*

Text of manuscript

Case report

History of presentation/ Past Medical History/Investigations

A 61-year-old male with a background history of Diabetes and Hypertension presented to the Emergency room with chest pain of 4 hours duration. He was diagnosed to have Acute coronary syndrome – Inferior wall myocardial infarction. ECG showed ST elevation in lead II III and save. ECHO revealed RWMA and EF 51%. He was hemodynamically stable and was thrombolysis with Tenecteplase. The patient had Ventricular tachycardia post thrombolysis from which he was resuscitated and intubated. Given persistent ST elevation, ventricular arrhythmias, he was taken up for rescue PCI. TPI was done through the Right femoral approach. CAG done through right radial approach revealed Two vessel coronary artery disease and proximally occluded RCA (Fig.1) was the cause of recent Inferior wall Myocardial infarction.

Figure 1: Angiogram shows RCA occluded proximally, lesion crossed with sion blue guiding Wire

Management

RCA was engaged with 6F Judkins Right guiding catheter and wired with 0.014" Sion blue guide wire when the flow was established. Proximal RCA had 75% thrombus containing lesion which was directly stented with 3 X 38 mm Promus Elite platinum chromium everolimus-eluting stent at 10 atm. (Fig 2) . Post dilatation of the stent was done with 3.5 X 15 mm NC Quantum apex noncompliant balloon at 16 atm distally and at 20 atm proximally.

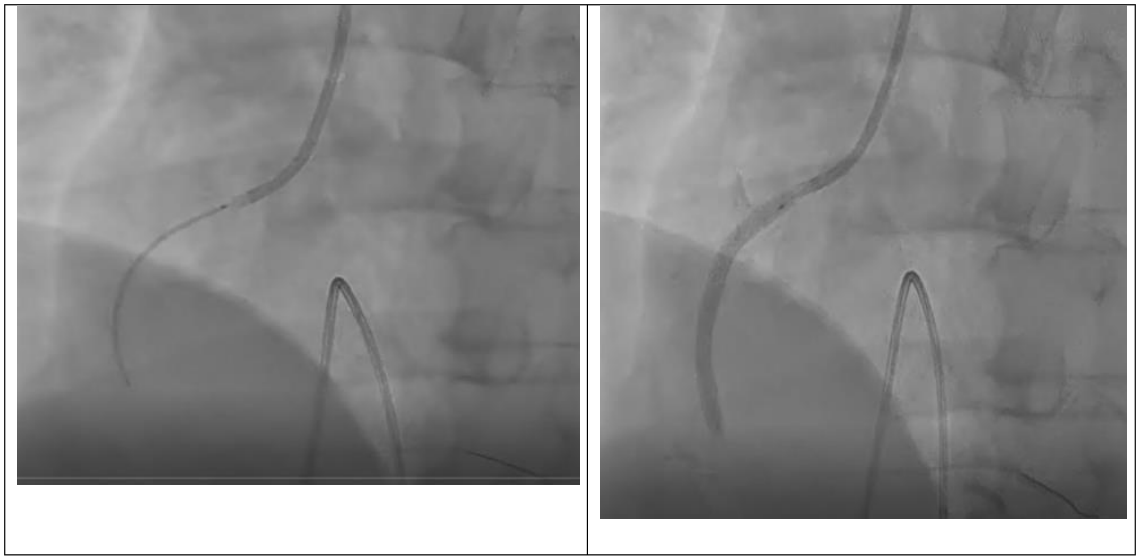

Figure 2: Direct stenting at Proximal RCA

Even though the stent expanded well during deployment and post dilatation, acute stent recoil was noted after few minutes (Fig 3).

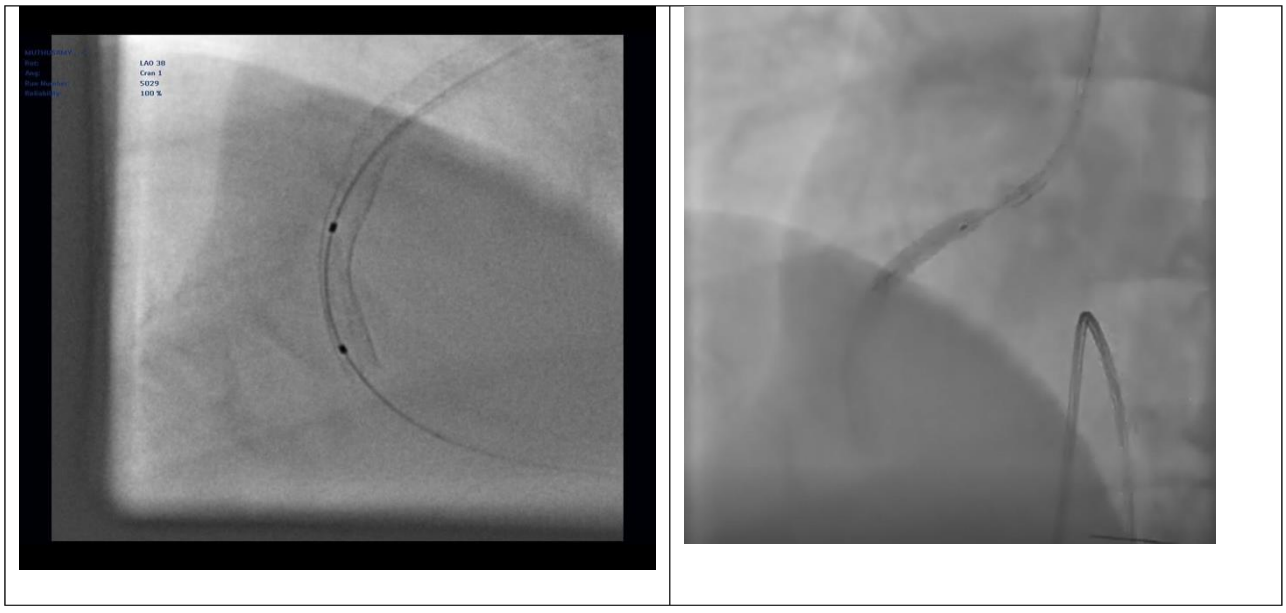

Figure 3: Post dilatation done with 3.5x10 NC Quantum apex balloon

Post dilatation with 3.5 x 15 mm non-compliant balloon was done repeatedly at the recoiled segment upto18 atm. However, the segment repeatedly recoiled even after many dilatations precipitating slow flow and hemodynamic instability (Fig 5, 6 & 7). Another 3.5 x 22 mm Resolute Onyx platinum-iridium zotarolimus-eluting stent was deployed covering the recoiled segment at 12 atm for 10 sec (Fig 7,8 & 9). Post dilatation was done with a shorter 3.5 x 8 mm NC Quantum apex non-compliant balloon at 20 atm.

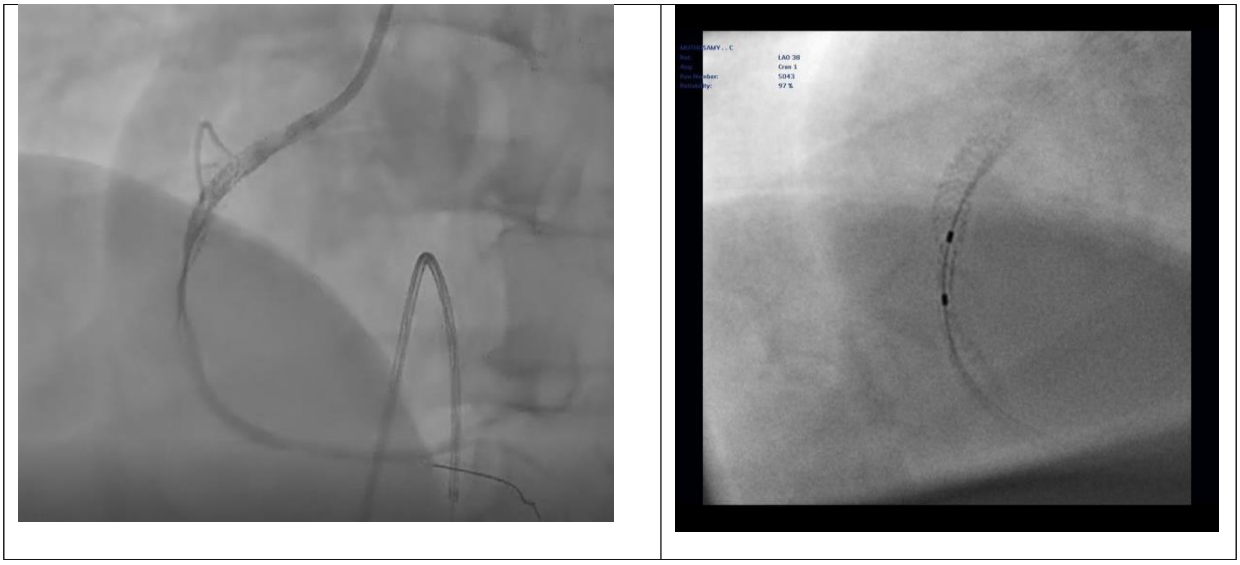

Figure 4: Acute stent recoil is seen at distal segment of stent

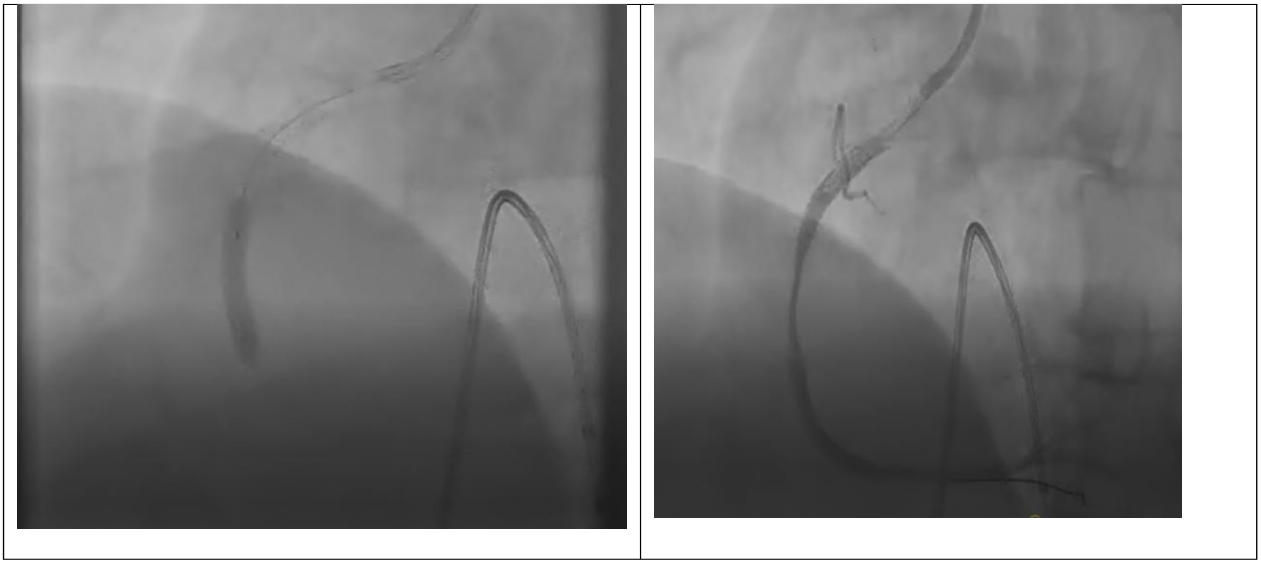

Figure 5A: Recoiled segment of RCA again post dilated with NC balloon, again got recoiled

Figure 5B: After post dilatation, RCA stent again got recoiled

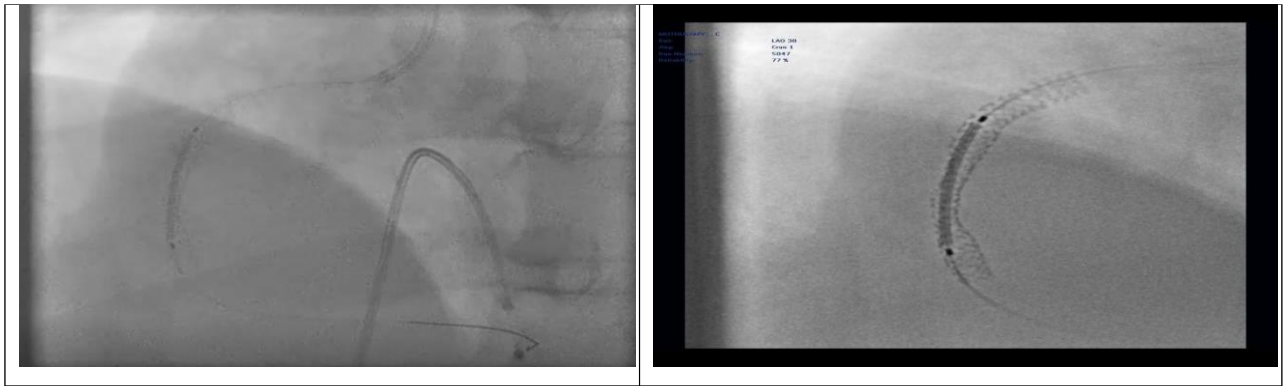

Figure 6: Recoiled segment of RCA stent, stented with one more stent with Resolute Onyx DES stent

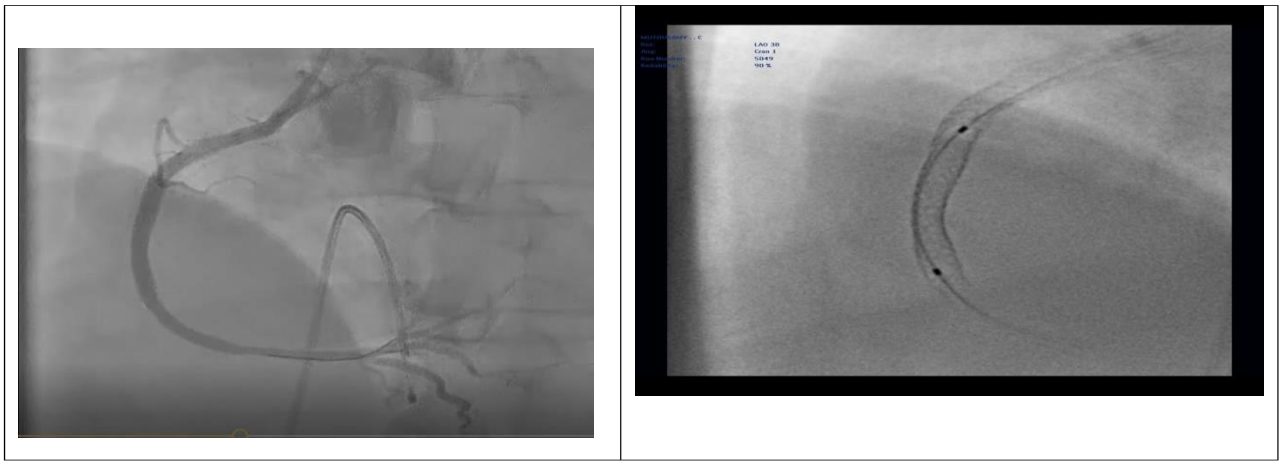

Figure 7: After stenting recoiled segment with another stent, no further recoiling phenomenon,

TIMI III flow in RCA.

The recoiled segment expanded well and no angiographical residual stenosis was observed. IVUS was not done given hemodynamic instability due to recoiling. TIMI III flow was achieved with no procedural complications.

Discussion

Acute stent recoil is a rare phenomenon with an estimated incidence of 1.2% among first or second-generation stents (1) that may lead to acute stent thrombosis or stent restenosis which have serious adverse outcomes. There are multiple factors postulated such as reduced strut thickness, a large stent vessel ratio, a large balloon stent ratio, aggressive high-pressure balloon dilatations. Platinum chromium alloy has been used as a backbone in coronary stents recently for its reduced thickness and better deliverability. Koo et al (2) reported that reduced strut thickness is associated with decreased radial strength and more acute stent recoil. However platinum chromium stents are found to be non-inferior as compared with similar cobalt-chromium alloy stents (3). Stent strut thickness alone may not be the reason for recoil in our patient.

We considered lack of lesion preparation could be a possible reason but the stent expanded well during deployment and initial post dilatation. Recoil was noted after few minutes suggesting that inadequate lesion preparation might not be contributory.

Bommel et al (4) reported large stent vessel ratio and large balloon stent ratio are predictors of acute stent recoil. We used a larger balloon 3.5 mm for a 3 mm stent in our patient resulting in a balloon stent ratio >1. Takagi et al (5) suggested that high-pressure dilatations may lead to acute stent recoil. Even though we inflated up to 16 atm initially at the distal segment, we inflated up to 18 atm after recoil aiming at good expansion.

We ended up deploying another stent in recoiled segment followed by post dilatation thereby having increased strut thickness to achieve good expansion. In our patient, stent strut thickness and inadequate lesion preparation might have not been contributory. We conclude high-pressure dilatation with an oversized balloon as the reason behind acute stent recoil in our patient. However, the sizing was done based on an angiogram which may not be accurate. We did not do IVUS given hemodynamic instability. The ideal would be doing imaging for all possible cases to choose appropriate stent and balloon and using prolonged inflation during deployment, multiple optimal pressure dilatations for good stent expansion rather than using an oversized balloon and high-pressure dilatations.

Follow-up

During subsequent LAD stenting after 72 hours, check CAG revealed RCA stents with no residual stenosis.

Conclusion

Even though thin struts are expected to recoil more, platinum chromium alloy does have good radial strength and stent recoil is multifactorial. Imaging guided appropriate stent and balloon selection, multiple optimal pressure dilatations for adequate stent expansion would help prevent acute stent recoil. High-pressure dilatations of an oversized balloon should be avoided. A double stenting strategycan be considered as a bailout in acute stent recoil.

Learning objectives

1. Multiple optimal pressure dilatations for adequate stent expansion would be helpful in preventing acute stent recoil.

2. High pressure dilations of oversized balloon should be avoided and double stenting strategy can be helpful in acute stent recoil, imaging can be more helpful to assess stent recoil which is limitation of our case report.

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