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CASE REPORT

Challenging Rotablation assisted Percutaneous Coronary Angioplasty to LAD and LCX

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Abstract

Background: Rotational atherectomy (RA) is used for treating severely calcified and complex lesions during percutaneous coronary interventions (PCI).
Case Presentation: A 70 years old male, diabetic and hypertensive, with failed PCI at another facility for calcified dominant left circumflex artery disease (LCX) was scheduled for rotablation assisted PCI.
Management: The angiogram showed a calcified critical lesion in the proximal part of the Left anterior descending artery (LAD). A large dominant LCX with a severely calcified and badly dissected lesion in the mid part. LAD was rotablated with 1.75mm burr followed by a 3.5mm DES. Guidezilla was deep throated in LCX and to support Corsair half way across the mid LCx lesion. Re-Wired from here with Rota floppy. Distal LCX was rotablated with a 1.25mm burr and proximal to the mid part with a 1.75mm burr. The lesion was dilated with noncompliant balloon. Two overlapping DES were deployed via Guidezilla. Both stents were post-dilated with a 3.5mm NC balloon. The patient went home the next day without any complications. At one year follow-up, he was asymptomatic with improved ejection fraction (EF) of 50%.
Conclusion: Patient with reduced EF usually requires LV assist devices such as Impella during such complex interventions, which is considered unaffordable in our setting. Multivessel rotablation is considered high risk in elderly patients with reduced EF, however if planned and performed correctly can help in such cases.

Keywords

Rotablation, Percutaneous Coronary Intervention, Left anterior descending artery, Left circumflex artery, Ejection fraction

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Introduction

Rotational atherectomy (RA) is used for highly calcified coronary artery lesions to facilitate stent deployment and expansion. In the randomized ROTAXUS trial (Rotational Atherectomy Prior to Taxus Stent Treatment for Complex Native Coronary Artery Disease)[1], an approach of calcified lesions preparation with RA prior to first-generation drug-eluting stent (DES) deployment offered a more favorable outcome than standard balloon pre dilatation. Although, in several cases, due to the irregularity of the vessel there is an increased risk of vessel rupture and difficulty in deploying the RA burr to the site of the lesion. High-risk coronary intervention with compromised ejection fraction usually requires a left ventricular assisted device for hemodynamic support but financial constraints are there.

Case presentation

A 70 years old frail male, diabetic and hypertensive, had coronary angiography and failed PCI at another PCI facility for dominant LCX disease three months ago. Interventional Cardiologist was unable to cross the lesion with a 1.0mm balloon. So patient was referred to us for a re-attempt.

Management and Treatment

Angiography and other diagnostic tests

Echocardiography: EF 45%, mid-infero-posterior hypokinesia of left ventricle with preserved thickness.

Angiography: Angiogram showed a calcified critical lesion in the proximal part of LAD. While dominant LCX had proximal luminal irregularity, a long dissected and severely calcified lesion in the mid part and distal two consecutive 70% lesions.

Procedure

On the table, a multidisciplinary team meeting was called but the patient's family refused CABG and were asked to sign a high risk consent. Right femoral access with a 7F femoral sheath was established and a 6Fr temporary pacemaker wire was inserted via 7Fr femoral sheath which was connected to low dose Dobutamine. LCA was engaged with a 7Fr BL3.5 guide catheter. LAD had TIMI 2 flow and a calcified critical lesion in the proximal part (figure 1). LAD was wired with rota floppy wire and rotablated with a 1.75mm burr, followed by a 3.5mm DES distal to ostium, and post dilated with a 3.5mm NC balloon at 24 atms (Figure 2a,2b).

Figure 1: Coronary angiogram showing TIMI 2 flow and a calcified critical lesion in the proximal part of LAD.

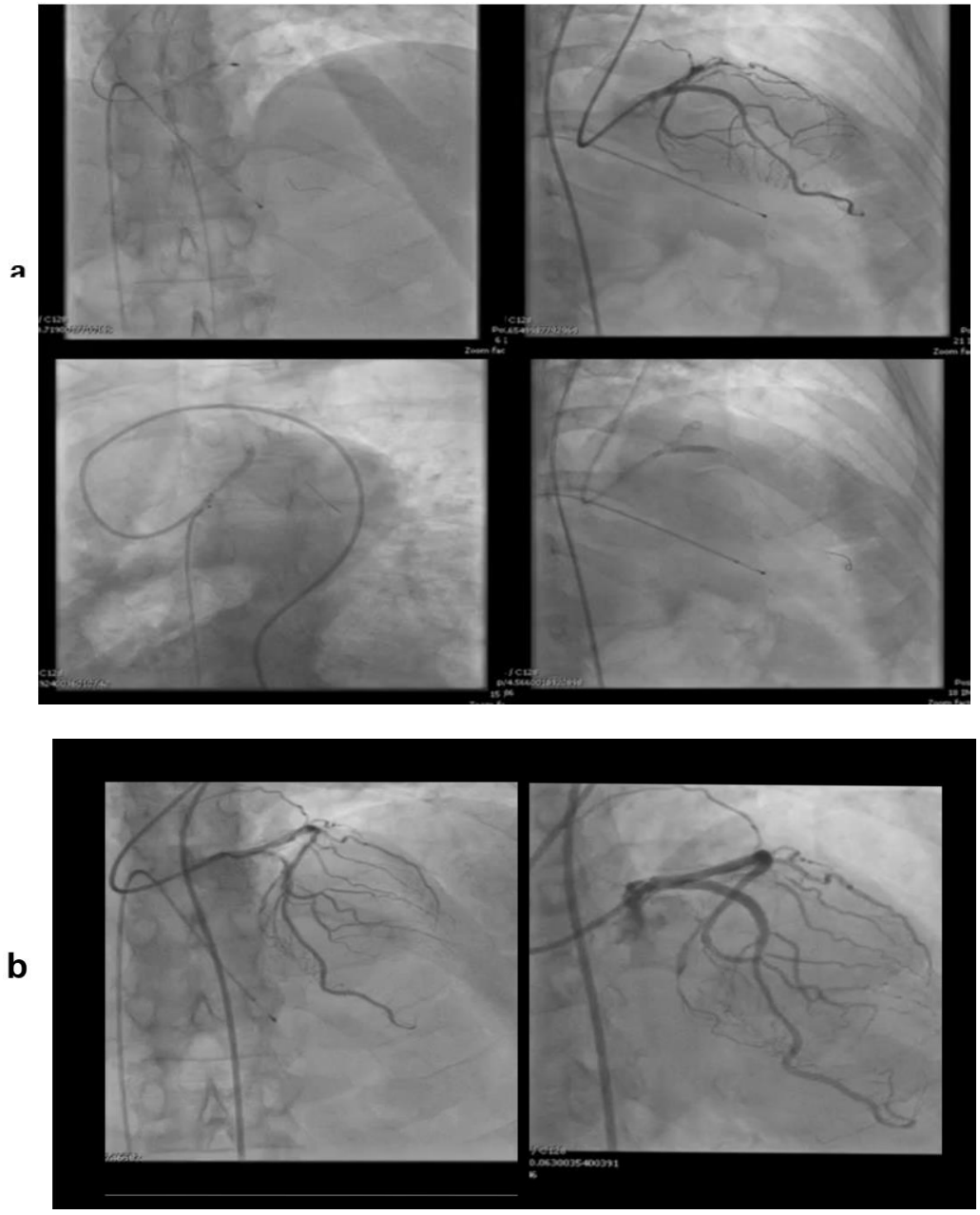

Figure 2a, 2b: Rotablation of LAD followed by a 3.5mm DES distal to ostium, and post dilated with a 3.5mm NC balloon at 24 atms.

LCX wiring was initially attempted with Whisper MS and Pilot 50 but unsuccessful across the dissected part. Run through wire went through via parallel wire technique. Guidezilla was deep throated in LCX and Corsair advanced across the mid lesion. Re-Wired from here with Rota floppy (figure 3). Distal LCX was rotablated with a 1.25mm burr followed by 1.75mm burr in proximal LCX (figure 4).

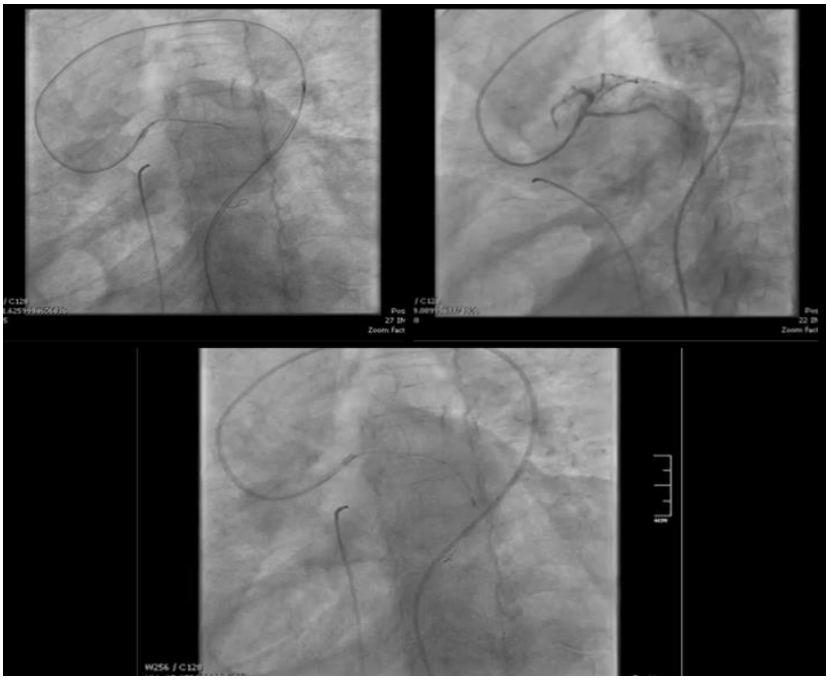

Figure 3: LCX wiring, rotablation with a 1.25mm burr of the dissected segment, followed by 1.75mm burr in proximal LCX.

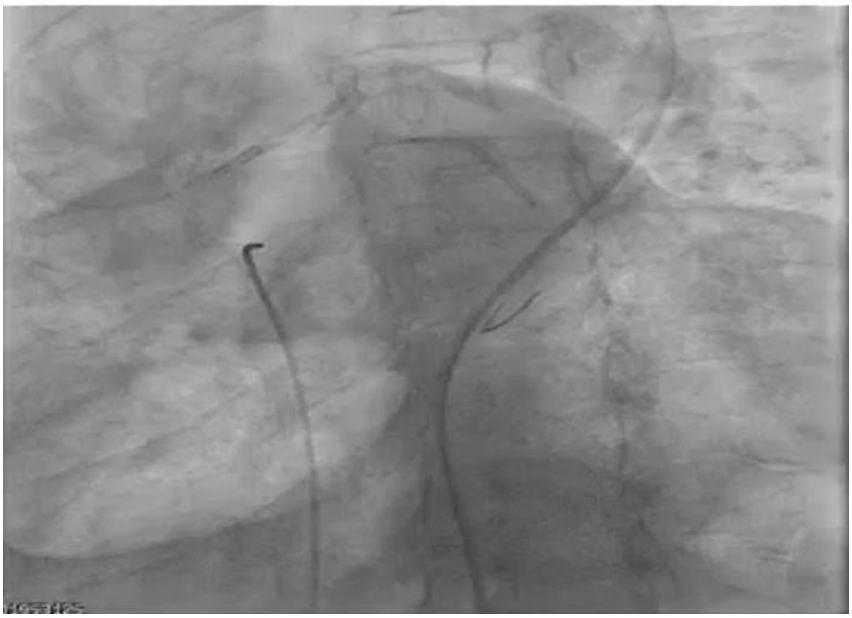

Figure 4: PTCA of mid to distal LCx

Slow flow, ST elevation, and hypotension ensued along with fast AFIB at this point. The plan to wire OM was abandoned. The prox LCx lesion was dilated with a 2.75mm balloon and Guidezilla was advanced to distal LCX, followed by 3.0mm NC balloon dilatation. Two overlapping DES of 2.75×38mm and 30×33mm were deployed via Guidezilla. Both stents were post-dilated with 3.5mm NC balloons at 24 atms (Figure 5a,5b).

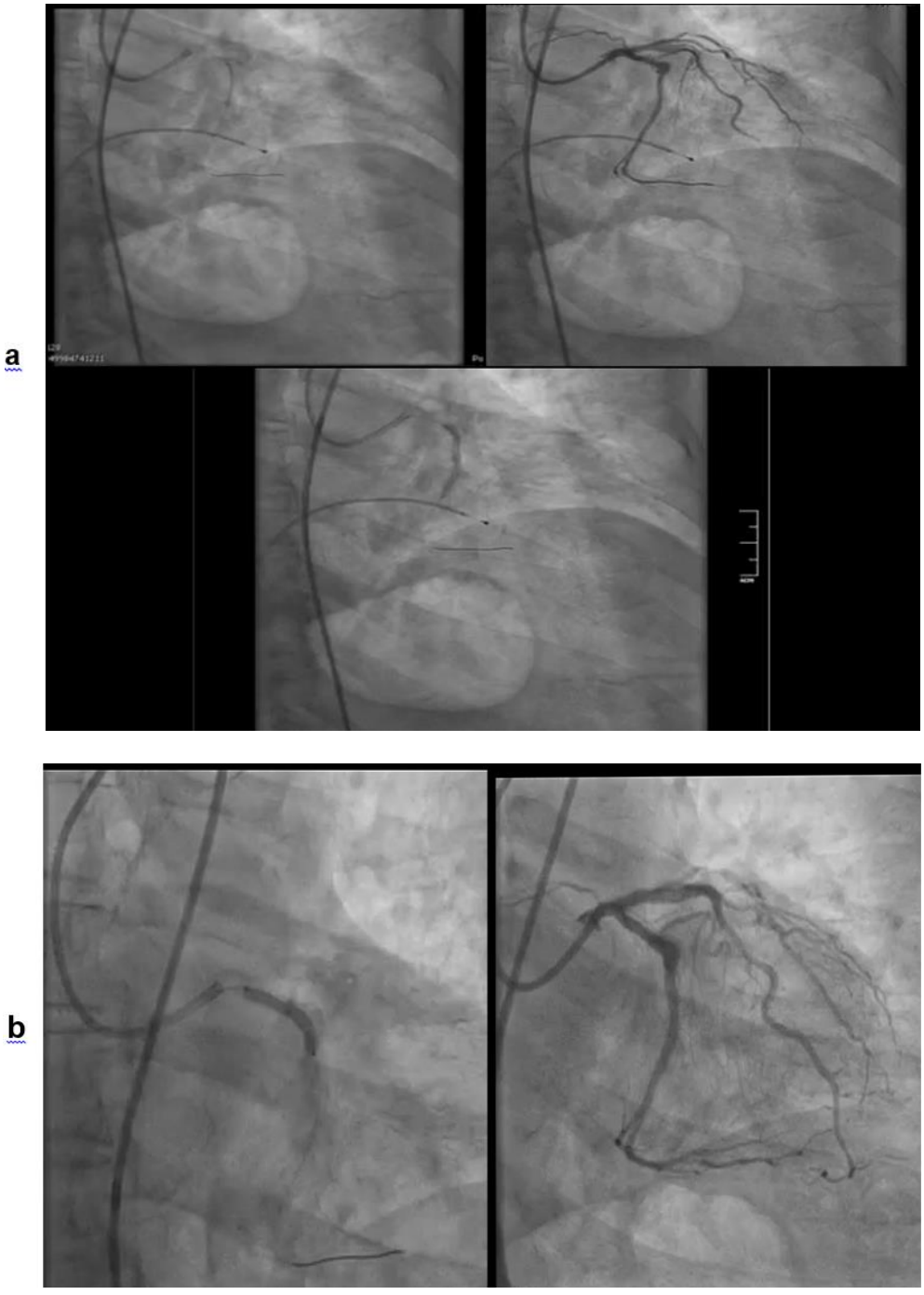

Figure 5a, 5b Guidezilla advancement followed by two overlapping DES placement and post-dilation with 3.5mm NC balloons at 24 atms.

Results

Rotablation assisted PCI resulted in an excellent angiographic outcome. The patient went home the following day without any complications. At one year follow-up, he was asymptomatic with improved LV systolic function of 50%.

Discussion

PCI of heavily calcified coronary lesions is a complex procedure, regardless of remarkable development in the accessible tools and techniques. Calcified coronary lesions are more common in elderly patients with diabetes mellitus and advance renal disease[2]. Resistant plaque, asymmetrical lesion surface, and calcified stenoses are difficult to dilate and may lead to failure of stent deployment or inadequate stent expansion[3]. Rotational atherectomy (RA) can effectively modify calcified lesions and facilitate balloon dilatation, stent deployment, and expansion[4]. In the randomized ROTAXUS trial (Rotational Atherectomy Prior to Taxus Stent Treatment for Complex Native Coronary Artery Disease)[1], an approach of calcified lesions preparation with RA prior to first-generation drug-eluting stent (DES) deployment offered a more favorable outcome than standard balloon pre dilatation. The STRATAS (Study to Determine Rotablator and Transluminal Angioplasty Strategy) compared the clinical success of an aggressive strategy (maximum burr: artery >0.70 alone, or with adjunctive balloon inflation ≤1 atm) and a routine strategy (maximum burr: artery ratio ≤0.70 with routine balloon inflation ≥4 atm)[5].There were no advantages for clinical success, final minimum lumen diameter, or residual lesion offered by aggressive strategy. Also, higher rates of perioperative creatine kinase-myocardial band (CK-MB) release and target lesion revascularization at 6 months was noted with the aggressive strategy. CARAT (Coronary Angioplasty and Rotablator Atherectomy Trial)[6] showed that aggressive strategy offered no advantages for operative success or target vessel revascularization at 6 months, and larger burr/artery ratio had a higher risk of angiographic complications.

The purpose of this case report was to share the procedural planning leading to technical success in a high-risk multivessel Rotablation assisted Percutaneous Coronary Angioplasty case without using an LV assist device. The patient was pre-retreated with IV nitrates and lasix and started on low dose Dobutamine. Cardiothoracic surgery was kept on standby. Intra-aortic balloon pump was kept ready in the lab for insertion. A 7 Fr femoral vein sheath was inserted for a 6 Fr temporary wire and the residual lumen was used as an available central line for immediate resuscitation. We used a 1.75mm burr in proximal LAD and proximal to mid LCx where final post dilatations were performed with 3.75 and 3.5 mm NC balloons respectively (Burr: artery ratio was kept at ≤ 0.5). Patient's systolic BP was kept at >100 mm Hg during rotablation runs. The majority of the runs were less than 10 seconds in duration and the speed of rotablation was kept between 140,000 and 150,000 RPM. Minimum dye usage, short procedure time, and immaculate hemodynamic stabilization during the procedure helped finish the case successfully. We propose to extend the use of challenging Multivessel rotablation for highly calcified lesions, however, if performed correctly can help in such cases[7].

Conclusion

Patient with a reduced left ventricular (LV) ejection fraction (EF) usually requires LV assist devices such as Impella for complex intervention, which is considered unaffordable for patients in our setting. Multivessel rotablation is considered high risk in elderly patients with reduced EF, however, if performed correctly can help in such cases. . In addition to stringent planning, detailed discussion with patient and family, multidisciplinary team approach, readily availability of LV support devices such as impella, intra-aortic balloon pump and adequate experience of the operator, can improve procedural and long term outcomes.

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