

CASE REPORT

Rotational Atherectomy in Acute STEMI with Heavily Calcified Culprit Lesion is a Rule Breaking Solution

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ARTICLE HISTORY

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Abstract: Background: Calcified coronary lesions represent technical challenges during percutaneous coronary intervention and are associated with a high frequency of restenosis and target lesion revascularization. Rotational atherectomy has been shown to increase procedural success in severely calcified lesions, facilitate stent delivery in undilatable lesions and ensure complete stent expansion. However, rotational atherectomy in ST-elevation Myocardial Infarction (STEMI) is traditionally avoided given the concern for slow or no reflow and considered a contraindication in lesions with a visible thrombus by its manufacturer (Rotablator, Boston Scientific).

Conclusion: This case demonstrates the successful use of rotational atherectomy to facilitate dilation and revascularization of a heavily calcified culprit lesions in a patient with acute anterior STEMI with ongoing chest pain.

Keywords: Rotational atherectomy, STEMI, calcified culprit lesion, thrombus, chest pain, TLR.

1. INTRODUCTION

Calcified coronary lesions represent technical challenges and are associated with a high frequency of restenosis and Target Lesion Revascularization (TLR) [1, 2]. Rotational Atherectomy (RA) has been shown to increase procedural success in severely calcified lesions, to facilitate stent delivery in non-compliant lesions and to ensure complete stent expansion [3, 4]. Once associated with significant angiographic complications (in the early studies, up to 40% of lesions) [5], actual RA-associated adverse events are in part similar to those seen with balloon angioplasty (mortality rates 0-3%, STEMI 0-4.4%, emergent CABG 1-3%, dissection 11-13%, acute occlusion 3-4%, abrupt closure 1% and perforation 0-1%) [6-8].

Despite a well-established use in calcific stable coronary disease [9, 10], its role in thrombo-calcific, acute disease (*i.e.* ACS) remains controversial in the literature. The multicentric ROTational AThErectomy (ROTATE) registry addressed the use of RA in patients with NSTEMI and found similar angiographic and safety outcomes compared to treatment without RA [11].

Very little is known about RA application in STEMI, where RA is traditionally avoided given the concern for 1) Risk of further platelet activation in high thrombotic states and 2) Higher risk of slow or no reflow [8]. Therefore, in a lesion with a visible thrombus, RA is considered as an

absolute contraindication by its manufacturer (Rotablator, lesion with a visible thrombus, RA is considered as an absolute contraindication by its manufacturer (Rotablator, Boston Scientific) and, consequently, STEMI patients are usually not treated with RA and, when treated, excluded in RA registries [11-13]. Nevertheless, a pooled analysis from the HORIZONS-AMI and ACUITY trials demonstrated a high prevalence of moderately and severely calcified target lesions in STEMI (54.6% and 63.7% respectively), being highly predictive for stent thrombosis and ischemic TLR at 1 year. Since RA was only used in 0.7% of these cases the discussion of RA application in STEMI patients with calcified culprit lesions was reinforced [2]. Furthermore, only few reports addressing this topic can be found in the literature [14-17]. We hereby present a case in which an ad hoc, slightly modified RA facilitated dilatation and revascularization of a heavily calcified culprit lesion in a hemodynamically stable patient with acute anterior STEMI in an effective and safe way.

2. CASE REPORT

A 70-year-old gentleman with hyperlipidemia and smoking habit presented at the ER with severe retrosternal chest pain radiating to the jaw and lasting 2 hours since its acute onset. Upon arrival his blood pressure was 130/90 mmHg, pulse 90 bpm, respiratory rate 16/min, and oxygen saturation of 95% on room air. His ECG (Fig. 1) showed significant ST-segment elevation in the antero-apical precordial leads. Initial labs demonstrated an elevated cardiac troponin T of 37 ng/l (ULN < 14 ng/l) and an estimated GFR of 98 ml/min. Acute anterior STEMI was

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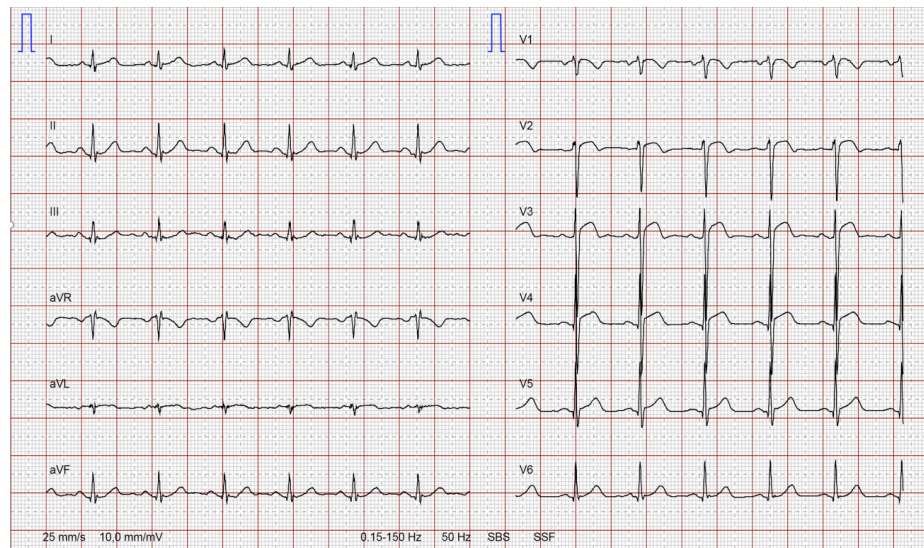


Fig. (1). ECG ad admission showing 1-2 mm STE on leads V1-V5.

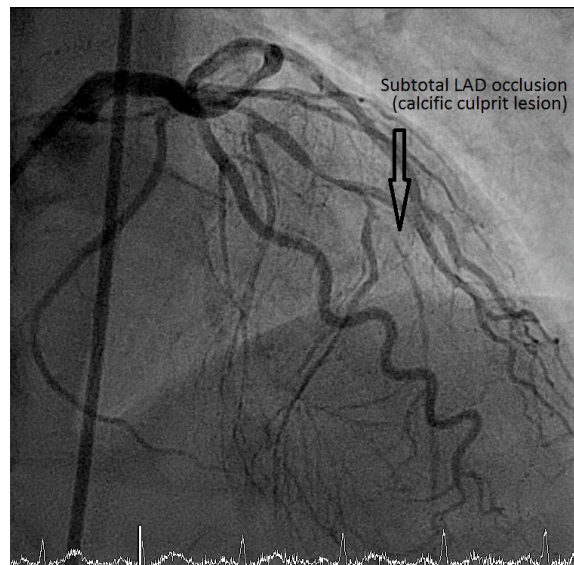


Fig. (2). Coronary angiography RAO 15 CR30 showing calcific subtotal mid LAD occlusion.

diagnosed and emergent cardiac catheterization was performed. A 6 Fr sheath was inserted through the right femoral artery. Diagnostic coronary angiography demonstrated a heavily calcified subtotal occlusion in the mid portion of the left anterior descending coronary artery (LAD) (Fig. 2). The left coronary ostium was engaged with a 6 Fr EBU 3.75 guiding catheter. A Sion blue guidewire (Asahi Intecc Co, Japan) could be advanced through the tight stenosis into the distal LAD. However, several attempts to cross the lesion with small balloons failed (Tazuna 1.5 x 10 mm, Terumo, Japan; Sapphire II PRO 1.25 x 8 mm OrbusNeich, Hong Kong, China). Whilst the patient remained hemodynamically stable but severely symptomatic we decided to perform RA. A Caravel microcatheter (ASAHI Intecc Co., Japan) was used to exchange the guidewire to a RotaWire Floppy (Boston Scientific, USA). For RA runs were performed using a 1.25 burr at 150,000 rpm for 15-20 seconds (Fig. 3). After control angiography demonstrated preserved antegrade TIMI 3 flow in the LAD.

the RotaWire was exchanged with the Sion blue guidewire using the Caravel microcatheter. Lesion preparation was further optimized with several balloon dilations using a 2.5 x 15 mm Maverick balloon catheter (Boston Scientific, USA). Finally consecutive LAD stenting was performed with 2 drug eluting stents (2.75 x 48 mm Xience Xpedition, Abbott Vascular, USA and 3.0 x 36 mm Biomatrix Alpha (Biosensors, Singapore). After several postdilations with a 3.0 x 15 mm non-compliant balloon (Quantum NC, Boston Scientific, USA) final angiography showed an excellent result with TIMI 3 Flow (Fig. 4). Patient is doing well after 1 year follow up.

CONCLUSION

Rotational Atherectomy (RA) is generally avoided in high thrombotic states such as STEMI due to the risk of further platelet activation by the rotator. This case demonstrates the successful use of RA to facilitate dilation and revascu-

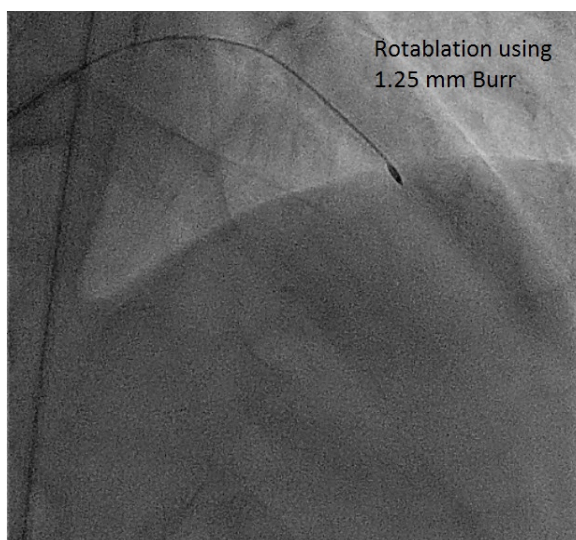


Fig. (3). Coronary angiography RAO 15 CR30 showing Rotablation in mid LAD using 1.25 mm Burr.

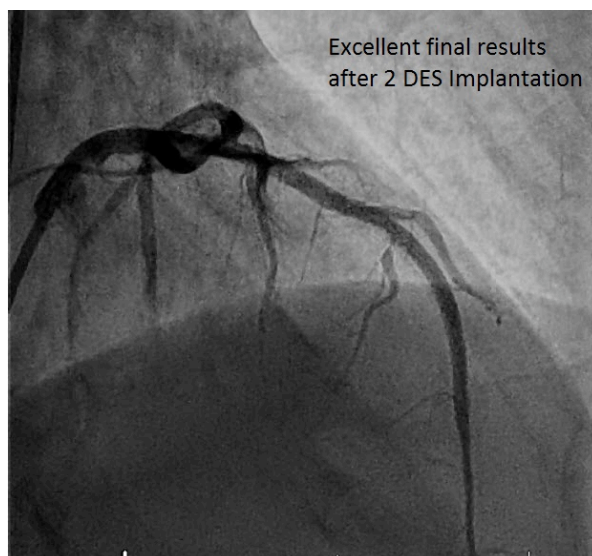


Fig. (4). Coronary angiography RAO 30 CR30 showing excellent angiographic results after stenting with 2 DES and repeated post dilatation with non-compliant balloon.

larization of a heavily calcified culprit lesion in a patient with acute anterior STEMI with ongoing chest pain. The use of RA may be considered in STEMI patients when standard balloon angioplasty is difficult taking onto consideration procedural modifications such as short burr runs and low rotational speed.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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