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## INTRODUCTION

Lesion preparation is considered an extremely important step in the PCI procedure to maximize Minimal Lumen Diameter (MLD) which in turn improves long-term outcomes. In the case where stenting is the final strategy, use of scoring devices not only maximizes minimal stented diameter (MSD) but also reduces stent thrombosis and restenosis.

Dissections are typically common, as expansion planes are created during plaque modification to maximize MLD, resulting in less vascular injuries and better long-term outcomes. Therefore, compared with conventional balloons, scoring devices are safer, more efficient, and are often selected for predilatation practically all our cases.

Among the currently available scoring devices, Scoreflex NC has the smallest crossing profile. When compared with the smaller configurations of the previous semi-compliant Scoreflex, the NC version has a lower profile as well as enhanced pushability and a better hydrophilic coating. More importantly, Scoreflex NC exerts greater scoring power for more effective plaque modification under more calcific environment. Scoreflex NC being non-compliant now comes in additional quarter sizes for greater balloon-to-vessel sizing accuracy.

## CASE STUDY 1

### Assessment of Ablation (Rotablator) and Scoring Effects (Scoreflex NC) in calcified lesion by IVUS/OFDI Imaging prior to Stenting

#### Case Details

- 72-year-old male patient with chronic kidney disease (stage 5, maintenance dialysis)
- Left ventricular systolic dysfunction detected under echocardiography vs. previous test. Upon coronary angiography, two-vessel disease in the RCA and LAD was detected and the RCA was treated with aid of IVUS/OFDI imaging

#### Procedure

Stenoses in the RCA was identified by angiography [Fig. 1] with need for coronary PCI. Upon successful positioning of a PTCA guidewire, the IVUS/OFDI catheter could not be advanced due to severe calcification at the lesion. The regular guidewire was exchanged with a RotaWire Floppy for rotational atherectomy using a 1.5 mm burr. Post imaging revealed circumferential calcification within the lesion with the thickness of the residual calcification being less than 500µm [Fig.2]. The lesion was then further dilated with a 2.5 x 15 mm Scoreflex NC at 20 atm [Fig.3]. Post-ballooning IVUS identified the location of the ablation marks by debulking at 6 o'clock and the scoring marks by Scoreflex NC at 3 o'clock and 8 o'clock [Fig.4] with similar findings of the scoring marks under OFDI [Fig.5]. Based on the imaging results, it was decided that there was sufficient lesion preparation for stenting and 2 DES (3.0 x 38 mm and 3.5 x 28 mm) were deployed with excellent stent apposition expansion confirmed by final angiogram [Fig.6].

Fig. 1 CAG

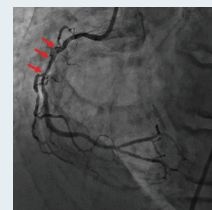


Fig. 2

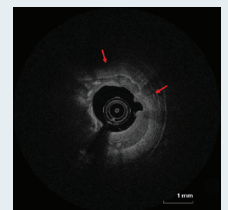


Fig. 3

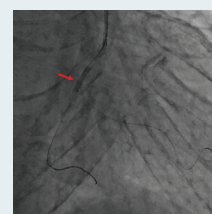


Fig. 4

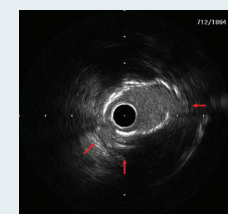


Fig. 5

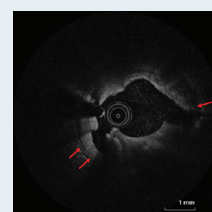
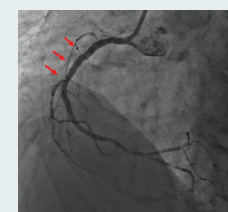


Fig. 6



## CASE STUDY 2

### Assessment of Scoreflex NC's Scoring Efficiency in Small Calcific Vessels

#### Case Details

- 81-year-old female patient
- Patient was first admitted for urgent PCI due to acute myocardial infarction in the RCA.
- Staged PCI was subsequently performed via radial approach on the residual stenotic lesions in the sequence of the LCX and OM [Fig. 7 and 8]

#### Procedure

The procedure began with the engagement of a 6F Q-curve 3.5 guiding catheter and subsequent IVUS imaging revealed eccentric and severely calcified plaque in the small and tortuous LCX. Standard cathlab protocol for lesion treatment under such conditions was to select ballooning over debulking. Predilatation was performed using a 1.75 x 15 mm Scoreflex NC, followed by stenting of a 2.25 x 16 mm DES to achieve maximum lumen channel.

The next lesion treated was the small OM which was also presented with calcium and tortuosity at the proximal segment. The IVUS catheter could not pass the lesion site [Fig.9] so predilatation was needed. Again, scoring was the protocol treatment method and this time with a smaller 1.75 x 15 mm Scoreflex NC (inflated to 20 atm) which crossed the lesion with relative ease without the need for balloon anchoring nor mother-and-child strategy [Fig.10]. IVUS catheter could now pass and showed plaque with a mixture of calcification and fibrous tissue. IVUS image also showed that expansion planes have been created at 6 o'clock and 12 o'clock [Fig.11] by the scoring device with sufficient space behind the calcification for stenting. A 2.25 x 16 mm DES was deployed with excellent results [Fig.12 and 13].

Fig. 7

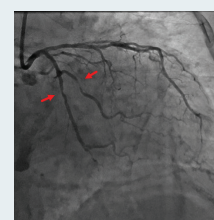


Fig. 8



Fig. 9

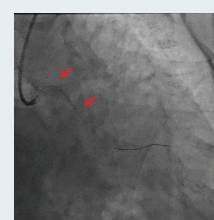


Fig. 10



Fig. 11

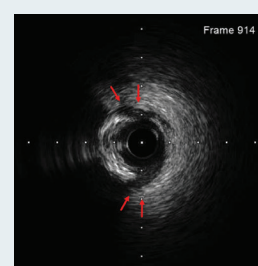


Fig. 12

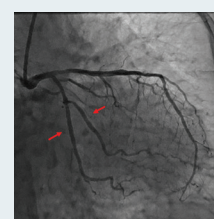
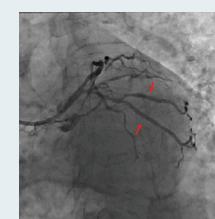


Fig. 13



## Discussion

**For Case 1**, the severity of the calcification which prevented the IVUS/OFDI catheter from crossing required debulking as the best treatment choice. However, between upsizing to a larger burr for further debulking vs. further lesion expansion by ballooning, the latter was deemed sufficient in effectively crushing the residual calcium and creating cracks in the calcification shoulder site and a safer approach prior to stenting. It is acknowledged that the non-compliant nature of Scoreflex NC facilitates dissections which are controlled, hence, safer. Coupled with efficiency in modifying calcified plaque, Scoreflex NC demonstrated its effectiveness in this case. The non-compliance of the balloon also makes Scoreflex NC a considerable choice for non-calcified lesions.

**For Case 2**, the lesion was severely calcified to the extent that the IVUS catheter could not pass, therefore, debulking was deemed inappropriate due to lesion morphology. When ballooning becomes the preferred lesion preparation of choice, a device with higher pressure tolerance coupled with good deliverability (crossability and trackability) would be the desired elements. Moreover, likelihood of perforation and damage are high during dilatation with conventional balloons in eccentric calcified lesions. Therefore, a scoring device which is non-compliant with even pressure distribution within the balloon should be safer whilst the high-pressure tolerance should also facilitate more effective plaque modification.

Based on the mechanism of the device and our practical experience with Scoreflex NC, the device is extremely effective in treating severely calcified lesions versus other scoring devices of its class and especially when debulking is not considered. Compared with the previous Scoreflex, the non-compliant Scoreflex NC has broader size offerings, superior handling, higher pressure tolerance and lower compliance, making it an safe and effective device.