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Identification of Vulnerable Patients by Intracoronary Near-infrared Spectroscopy
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Background: Recent intracoronary near-infrared spectroscopy (NIRS) studies have detected lipid-rich plaques (LRP) at most ACS culprit sites. While such cross-sectional data suggest a pathophysiologic role for LRP, prospective data on the risk posed by LRP are limited. This study evaluated the association between large LRP detected by NIRS at non-culprit sites and subsequent major adverse coronary and cerebrovascular events (MACCE).

Methods: NIRS was performed in the culprit artery of 121 consecutive patients at baseline. Segments of the culprit artery that were not stented were evaluated for large LRP, defined as a maximum lipid core burden index in 4-mm (maxLCBI4mm) ≥500. Excluding events related to stented segments, patients with and without a maxLCBI4mm ≥500 at a non-stented site were followed for subsequent de novo MACCE; defined as all-cause mortality, ACS requiring revascularization, stroke or TIA.

Results: LRP with a maxLCBI4mm ≥500 at non-stented sites were detected in 9.9% of patients. Over 603 ± 145 days of follow-up, MACCE occurred in 58.3% of those with a maxLCBI4mm ≥500 compared to only 6.4% of those with a maxLCBI4mm < 500 (p< 0.001; relative risk=9.1). In 1 patient, the de novo culprit occurred in an area imaged with NIRS 7 months earlier at baseline; in that case baseline NIRS showed a maxLCBI4mm of 694, thereby identifying a vulnerable plaque (Figure).

Conclusions: Detection of large LRP by NIRS identifies vulnerable patients at increased risk of future MACCE. These findings support ongoing prospective NIRS studies to quantitate the risk of LRP at both a patient and plaque level.

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The Impact Of STENTYS® (STENTYS SA, Paris, France) Self-Apposing Coronary Artery Stent Placement On The Lipid Core Plaque Burden, As Assessed With Near-Infrared Spectroscopy; How Does The Lipid Rich Plaque Modify After Stent Deployment And After Balloon Post-Dilatation?
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Background: Distal embolization is commonly caused by high-pressure stent deployment using balloon-expandable stents in lesions involving lipid-rich plaques (LRP). LRP are quantified by the lipid core burden index (LCBI) as assessed with near-infrared spectroscopy (NIRS). We evaluated the modification of LRP during non-urgent percutaneous coronary intervention (PCI) using the self-apposing® STENTYS stent (STENTYS SA, Paris, France).

Methods: A total of 8 patients with a LCBI>200 on pre-stenting NIRS and successful PCI with the STENTYS stent were included. Intravascular ultrasound with NIRS was done pre-stenting, post-stenting and after post-dilatation to assess the LCBI and the minimal lumen area (MLA). To assess the minimal luminal diameter (MLD) we used quantitative coronary angiography analyses.

Results: Mean MLD was 0.9±0.4mm pre-PCI, 2.2±0.2mm post-stenting and 3.0±0.4mm after post-dilatation (p for trend: < 0.001). Mean MLA was 3.2±0.9mm² pre-stenting, 4.7±1.0mm² post-stenting and 8.4±2.1mm² after post-dilatation (p for trend: < 0.001). Mean LCBI was 351±106 pre-stenting, 128±149 post-stenting and 65±90 after post-dilatation(p for trend: 0.002). The mean LCBI decreased with 64% from pre- to post-stenting, and with 49% from post-stenting to after post-dilatation.

Conclusions: The significant LCBI decreases after stenting and post-dilatation suggest that the self-apposing stent does not potentially prevent distal embolization. The significant MLD and MLA increase after post-dilatation shows the necessity for balloon post-dilatation when using this device to avoid under-expansion and the consequent risk of stent thrombosis.