

Re-stenting technique with a second drug-eluting stent and re-narrowing recurrence as assessed in intravascular ultrasound. Mechanism of a late pre-dilatation effect

Technika ponownego stentowania z użyciem drugiego stentu uwalniającego lek a nawrót zwężenia w ocenie za pomocą ultrasonografii wewnątrznaczyniowej. Mechanizm odległego efektu pre-dylatacji

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Intravascular ultrasound (IVUS) scans frequently identify the presence of a stent under-expansion among late drug-eluting stent (DES) failures. We present two patients referred for a control angiography due to relapse of symptoms, both with a history of proximal left anterior descending (LAD) artery stenting with a DES. The first patient, 64-year-old female, six-months earlier had a second DES implanted on top of the initial one that had a focal restenosis located on both edges (re-stenting with DES of 2.75 × 32 mm). The procedure was done using a direct stenting technique (without pre-dilatation). Figure — Panel 1 and 2 — present the angiographic appearance of a focal model of in-DES re-narrowing, recognised at the proximal edge of the overlapping stents (Panel 1–1a and 2–2a, white arrows). Relevant vessel cross-sections recorded with IVUS are displayed on Panel a–b. Inner DES under-expansion, with its minimal cross-sectional area (CSA) of < 3.0 mm² (black arrows indicate single stent's struts), is seen. Remarkably, also the originally implanted DES (white arrows) appeared to be inadequately expanded (minimal CSA < 5.0 mm²). The second patient, a 67-year-old man, was diagnosed for the first time with in-DES (3.5 × 18 mm) restenosis, presenting a typical focal model (Panel 3, white arrows). Re-stenting with a second DES was performed, with a high-pressure pre-dilatation (2 × 20 atm.) with a non-compliant balloon (ø = 3.5 mm; being ≥ ø of the original DES, Panel 3a). IVUS revealed that the pre-dilatation re-expanded the original DES, thus creating enough space for a second DES (Panel 3c). Note that the relative expansion of the originally implanted DES (stent CSA/lumen CSA in distal reference × 100%; white arrows) was < 80%. The upper row of Panel c displays the stent's struts recorded prior to, and the middle row after, pre-dilatation (distal and proximal references are located far right and left, respectively). Finally, re-stenting using a second DES (3.5 × 22 mm/18 atm.) was performed successfully with IVUS documenting adequate DES expansion with its minimal CSA > 5.0 mm² (black arrows). Even a small amount of intimal hyperplasia located at the under-expanded stent's regions leads to significant lumen compromise. Proper re-stenting technique aimed at an adequate expansion of stents could lower the 30% rate of a recurrent re-narrowing after DES restenosis treatment with a second DES. Aggressive balloon pre-dilatation using an appropriately sized NC balloon could be a valid option applied prior to a re-stenting treatment.

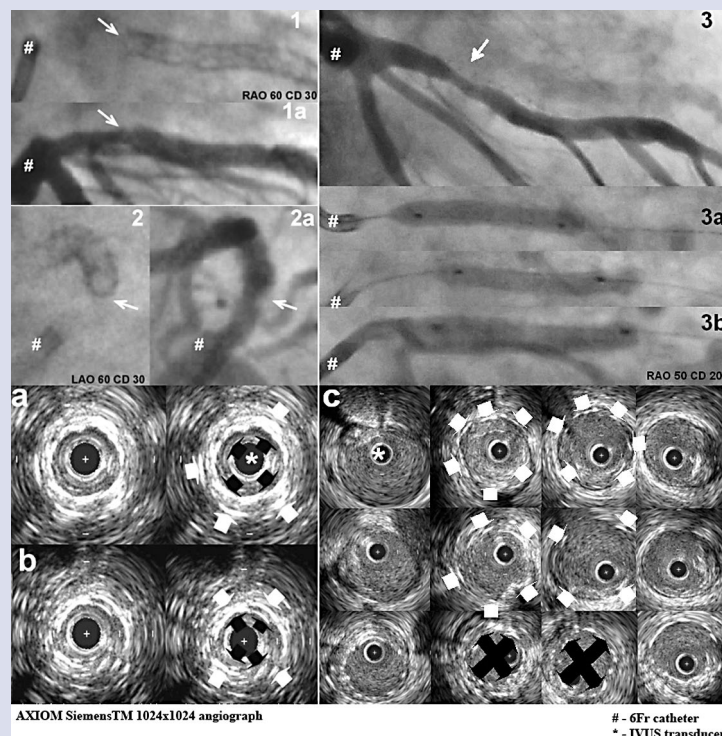


Figure. Panel 1 and 2 present angiographic appearance of a focal re-narrowing after re-stenting done with a drug-eluting stent (DES) for a treatment of restenosis in a DES implanted in proximal left anterior descending (LAD) artery. Panel a and b display relevant vessel cross-sections recorded with intravascular ultrasound (IVUS; OptiCross™, 40 MHz), documenting under-expansion of both stents. Panel 3–3a and 3b display angiographic view of a high-pressure balloon pre-dilatation prior to a re-stenting of restenosis in the DES implanted in proximal LAD. IVUS images, presented in Panel c, document the mechanism of pre-dilatation, performed to achieve an adequate expansion of stents'

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