


CARDIOVASCULAR FLASHLIGHT

Optical coherence tomography-guided percutaneous coronary intervention in pre-terminal chronic kidney disease with no radio-contrast administration

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A 67-year-old man with advanced chronic kidney disease (CKD) (creatinine = 4.5 mg/dL, eGFR = 13 mL/min/1.73 m²) not requiring haemodialysis presented with progressive angina. Diagnostic angiography with ultra-low radio-contrast volume (12 mL, contrast volume/eGFR ratio <1) revealed significant stenosis in the left anterior descending (LAD) artery (Panel A). The lesion was haemodynamically significant (fractional flow reserve: 0.77). Post-angiography, the renal function remained stable. A staged percutaneous coronary intervention (PCI) was performed without utilizing radio-contrast medium. Previous angiographic images were used to guide catheter engagement and guidewire placement in the LAD and diagonal arteries, thus creating a metallic silhouette of the artery (Panel B). Repeat physiological assessment confirmed haemodynamic significance [FFR: 0.78, coronary flow reserve (CFR): 1.4]. Optical coherence tomography (OCT) with angiographic co-registration (OptisI, St Jude Medical, MA) was performed using a mixture of saline and colloid infusate to displace blood (Panels C and D). Proximal (Panel E) and distal (Panel G) reference diameters determined by measuring the distance between respective external elastic laminae and minimal luminal area (Panel F) were used for selection of the pre-dilation balloon and stent sizes. An automated angiographic co-registered OCT pullback was used to guide the PCI (Panels H and I, G: distal reference = white bar). Co-registered OCT was repeated to determine minimal stent area (Panels J and K) and to guide post-dilation. Post-procedure FFR improved to 0.93 and CFR to 3.0. Post-PCI renal function remained stable. This case highlights the feasibility of radio-contrast free OCT-angiographic co-registration guided PCI to prevent contrast-induced nephropathy and requirement for renal replacement therapy in selected extremely high-risk patients with near end-stage CKD.

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