

Clinical vignette

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Coronary bioabsorbable magnesium stent: 15-month intravascular ultrasound and optical coherence tomography findings

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A 65-year-old man underwent elective percutaneous coronary intervention for a stenosis in the proximal left anterior descending artery (LAD). As part of the PROGRESS study (designed as a first-in-man coronary study in 65 patients in seven European centres), a 3.5 × 15 mm magnesium-based bioabsorbable stent (Lekton Magic Stent, Biotronik, Bulach, Switzerland) was implanted achieving an excellent angiographic result. Fifteen months following the initial intervention, an exercise treadmill test to evaluate exertional dyspnoea was positive. Angiography revealed a new and separate lesion in the mid-LAD/diagonal artery that was treated successfully with two sirolimus-eluting stents (Cypher Select, Cordis, J&J) in a culotte fashion. In the previously treated proximal segment, the vessel lumen was patent with no signs of narrowing or edge effect (Panel A). Imaging using intravascular ultrasound (Panel B) and optical coherence tomography (Panel C) showed the absence of circumferential stent struts with shadowing. Small, scattered, and circumscribed zones of high intensity (arrows) indicated the previous stent strut position (Panels B and C). All struts were covered by a thin neointimal layer with a thickness between 80 and 140 μm (Panel C).

The bioabsorbable stent is constructed from a magnesium alloy containing also zirconium (<5%), yttrium (<5%), and rare earth elements (<5%). The struts disappear over time, but their position can still be identified because of the fact that the strut material is absorbed and the space filled in by calcium apatite complex, accompanied by a phosphorous compound. These stents are compatible with cardiac magnetic resonance imaging and multi-slice computed tomography and can be used as vehicles for possible drug and gene delivery. Such a novel technology may prove useful in negating some of the untoward complications of current permanent metallic stents, namely, stent thrombosis and the need for prolonged dual anti-platelet therapy.

Panel A. Coronary angiography in the right caudal view showing the proximal left anterior descending artery 15 months after implantation of a magnesium bioabsorbable stent. The stented area is indicated by the dashed line. The arrow indicates the region imaged by intravascular ultrasound and optical coherence tomography.

Panels B and C. Intravascular ultrasound and optical coherence tomography imaging of the previously stented segment at 15 months of follow-up. The vessel wall is without stent struts after absorption, but small, well-defined zones of high intensity (arrowheads) are scattered indicating the previous stent strut position. There is a thin, concentric layer of neointima with thickness between 80 and 140 μm (Panel C).

See online supplementary material available at European Heart Journal online for a colour version of this figure.