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The novel magnesium Freesolve bioresorbable scaffold, combined with intravascular optical coherence tomography guidance in the management of MINOCA case

Short title: Bioresorbable scaffold in the management of MINOCA case

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A 62-year-old woman with a history of hypertension and hyperlipidemia was referred to our center with suspected non-ST-elevation myocardial infarction (episode of chest pain, no significant ST-T changes on resting electrocardiogram [ECG], mildly elevated cardiac necrotic markers). The initial coronary angiography did not reveal any significant stenosis on the angiographic assessment.

Despite the initial absence of significant lesions in the coronary angiogram, the patient experienced a recurrence of chest pain during the post-procedure period. The echocardiographic examination revealed segmental wall motion abnormalities in the interventricular septum with preserved ejection fraction. Moreover, laboratory analysis demonstrated an elevation in high-sensitivity troponin T level from 140 to 350 pg/ml, however, ECG did not reveal any notable

abnormalities. Given the unclear clinical presentation, the patient underwent a reevaluation with coronary angiography, complemented by optical coherence tomography (OCT) imaging.

The OCT evaluation revealed the presence of a lipid-rich lesion in the mid portion of the left anterior descending artery, accompanied by the presence of a ruptured atherosclerotic plaque (Figure 1A). The area of stenosis was assessed at 60%, with a minimal lumen area of 1.85 mm^2.

In light of the patient's clinical presentation, percutaneous coronary intervention (PCI) was deemed the most appropriate course of treatment. Initial predilation with a non-compliant balloon (NC) 3.0 × 20 mm (16 atm), was followed with novel magnesium bioresorbable scaffold (BRS) Freesolve (Biotronik, Berlin, Germany) 3.0 × 30 mm implantation (12 atm) with additional optimization with an NC 3.25 × 15 mm (17 atm). The OCT assessment revealed a suboptimal proximal landing zone, which was subsequently treated with the implantation of an additional Freesolve BRS (3.0 × 18 mm, 12 atm) implanted in an edge-to-edge manner. In order to achieve adequate stent apposition, an additional dilatation with an NC 3.5 × 12 mm (16 atm) balloon was performed. The final assessment in the OCT demonstrated optimal stent expansion (>90%) with minimal stent area 7.17 mm^2 (Figure 1B). During the rest of hospitalization patient remained asymptomatic and was discharged 3 days after the PCI.

Myocardial infarction with no obstructive coronary artery disease (MINOCA) represents up to 15% of all acute coronary syndromes. MINOCA is a board preliminary diagnosis based on the clinical presentation, supported by laboratory assay abnormalities (troponin T) and potential changes in ECG patterns. Additionally, no significant (>50%) lesion should be present on coronary angiogram [1]. The etiology of this phenomenon is complex and multifaceted [1]. Moreover, intravascular imaging, particularly OCT, remains a crucial element in differential diagnosis, facilitating the identification of the direct mechanism underlying in the etiopathogenesis of this condition [2]. In view of the uncertain outcomes of pharmacological treatment, novel therapeutic approaches are being explored to provide the most convenient clinical outcome [3]. Recently published data suggest favorable outcomes of novel magnesium BRS-Freesolve [4] which combined with fundamental principles of the BRS concept related to providing short-term support of vascular healing during the acute phase after the PCI, and subsequent complete biosorption [5] predisposes this scaffold to meet the unnamed need in field of MINOCA interventions. The presented case suggests that the use of a novel bioresorbable metallic scaffold (Freesolve) in the field of vulnerable plaque interventions might be relatively safe alternative to a conservative approach. However, further high-number studies are necessary to fully evaluate this potential novel therapeutic option.

Article information

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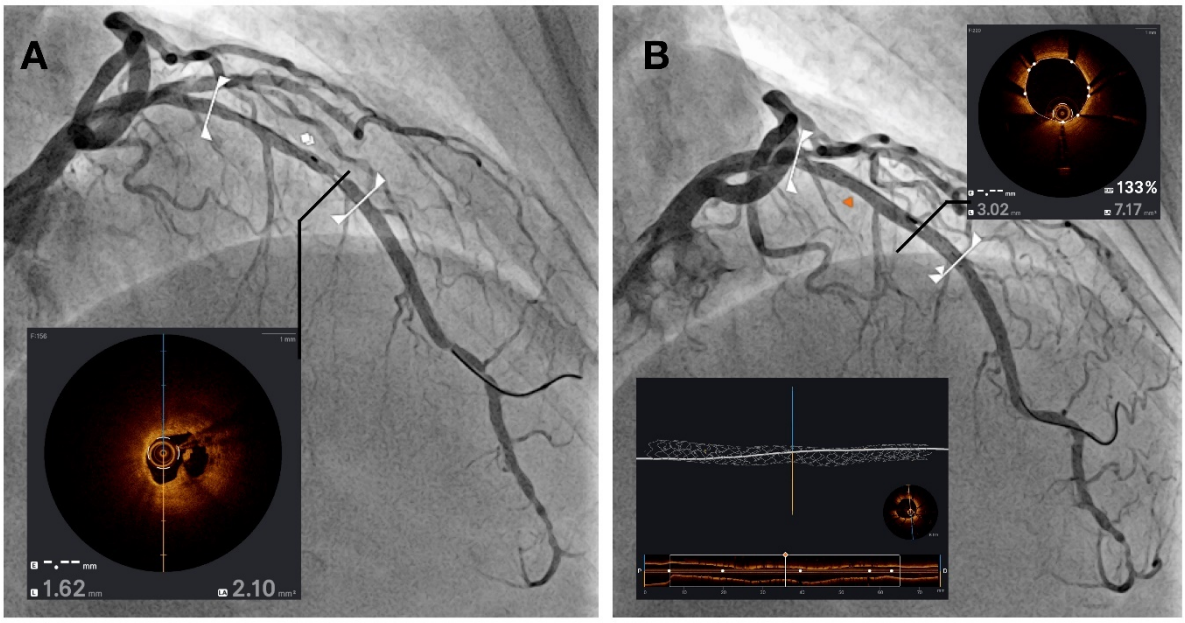

Figure 1. A. Baseline angiography: cross-sectional view of the LAD in OCT with a lipid-rich ruptured atherosclerotic plaque. **B.** Angiographic result after 2 BRS implantation, cross-sectional view of a vessel with optimal BRS apposition, 3D reconstruction of 2 BRS stents

Abbreviations: BRS, bioresorbable scaffold; LAD, left anterior descending; OCT, optical coherence tomography