MEGA JOURNAL OF CASE REPORTS

OPEN ACCESS

Case Report

Compiled Date: April 13, 2024

Reconstruction of a Diffusely Diseased Left Anterior Descending Coronary Artery Using a Combination of Bioresorbable Scaffolds and Metal Stents

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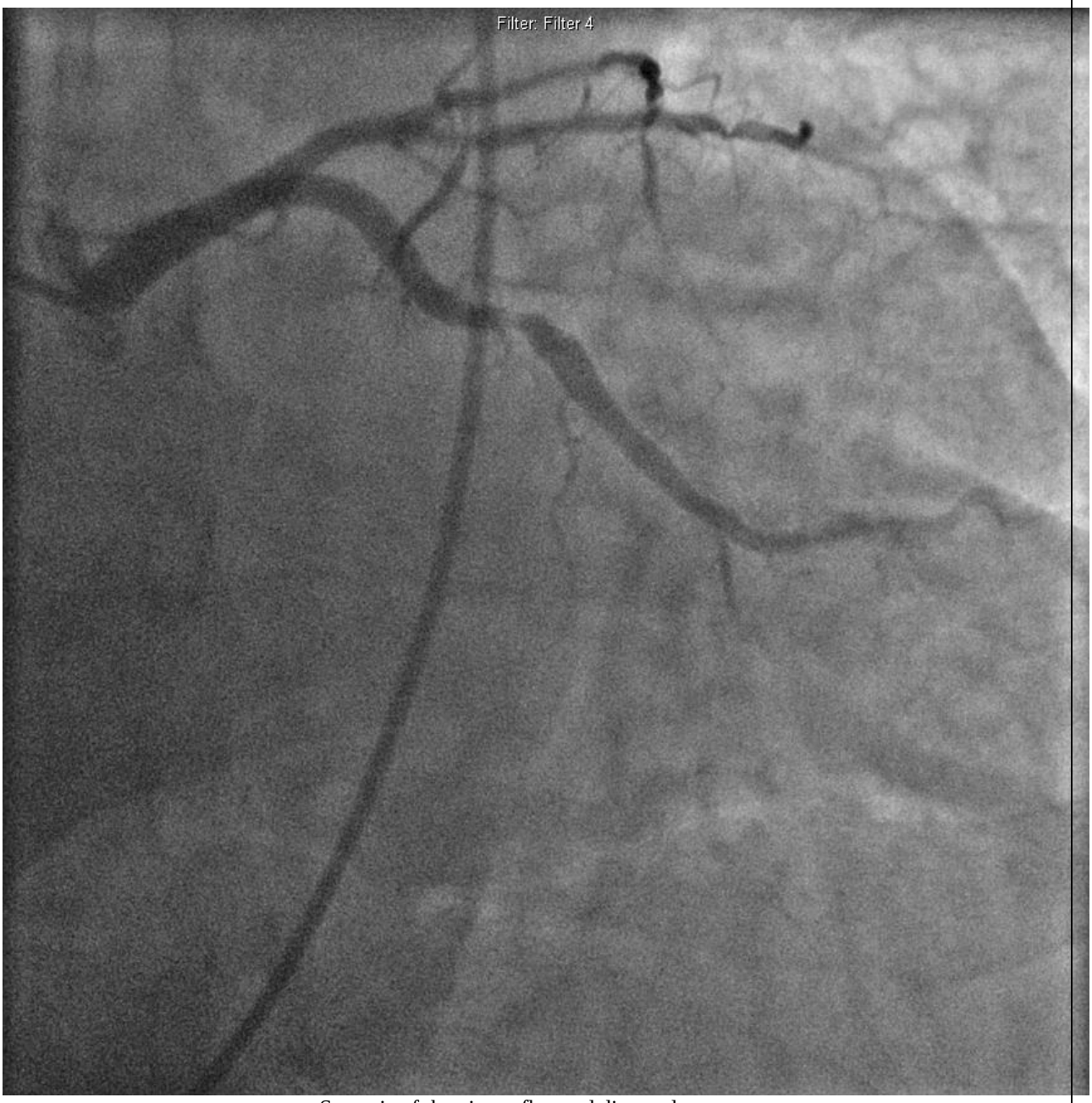
Case Report

74-year-old woman with a history of smoking, hypertension, insulin-treated type 2 diabetes and worsening angina pectoris throughout the recent 6 months was admitted with heavy chest pain, elevated plasma troponin and inverted precordial T-waves suggestive of a non-ST-segment elevation myocardial infarction. Echocardiography showed near normal left ventricular function with a sclerotic non-stenotic tricuspid aortic valve. A subacute coronary angiogram revealed possible culprit lesions in the circumflex artery and a diagonal branch **(Figure 1)**, in addition to a diffusely diseased left anterior descending artery **(Figure 2)**. Immediate percutaneous coronary intervention was performed with implantation of 2 sirolimus-eluting metal stents in the circumflex and the first diagonal **(Figure 3)**. A staged procedure was performed on the second day with the attempt to reconstruct as much as possible of the LAD lesions with bioresorbable scaffolds. Since no scaffolds with a diameter <3.0 mm were available, two sirolimus-eluting metal stents with a diameter of 2.5 mm and a total length of 40 mm were implanted in the peripheral part of the vessel, while two sirolimus-eluting bioresorbable scaffolds based on a Magnesium alloy with a diameter of 3.0 mm and a total length of 50 mm were implanted without overlap in the more proximal section, the whole section being postdilated with a non-compliant 3.0 mm balloon, to cover the remaining part of the lesions **(Figure 4)**. Optical Coherence Tomography (OCT) assured optimal stent and scaffold implantation **(Figure 5)**.

Figure 1: Coronary angiogram preprocedure caudal view.

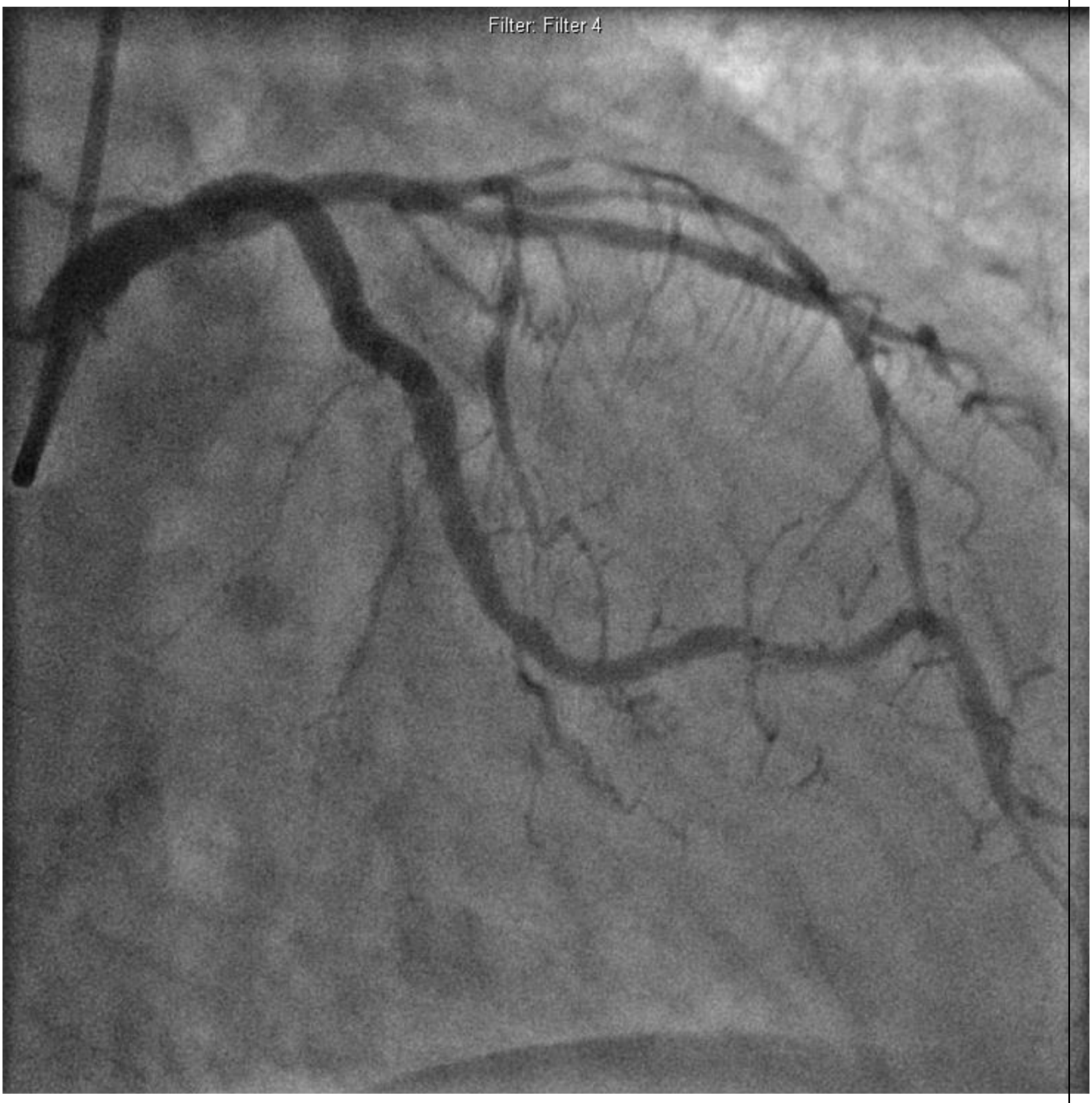


Stenosis of the circumflex and diagonal artery.

Figure 2: Coronary angiogram pretreatment, cranial view.

Long diffuse lesion of the left anterior descending, diagonal and circumflex artery.

Figure 3: Coronary angiogram post treatment, caudal view.

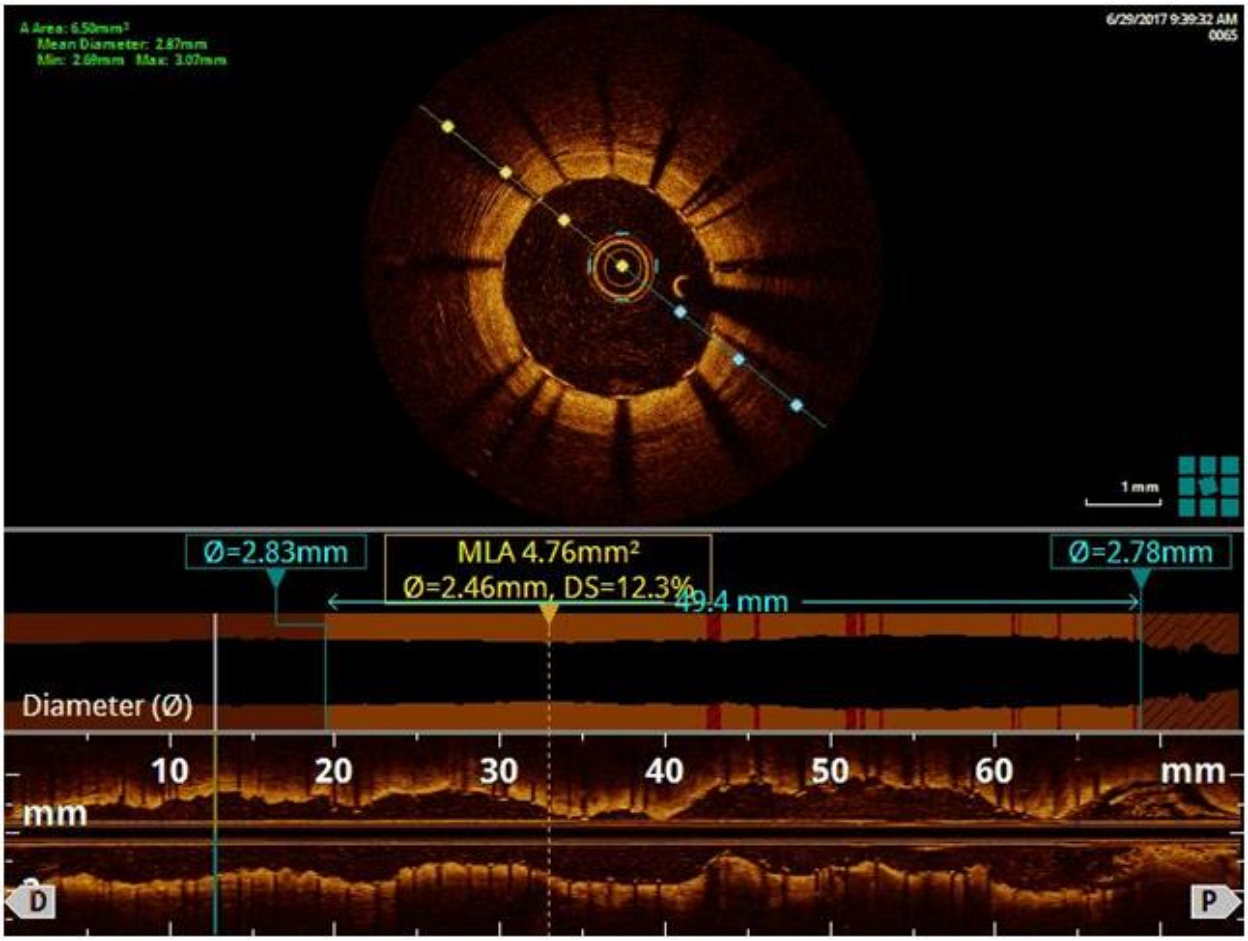


Angiographic result after treatment of the circumflex artery.

Figure 4: Coronary angiogram post treatment.

Angiographic result after treatment of left anterior descending and diagonal arteries.

Figure 5: Postprocedure optical coherence tomography of the left anterior descending artery.

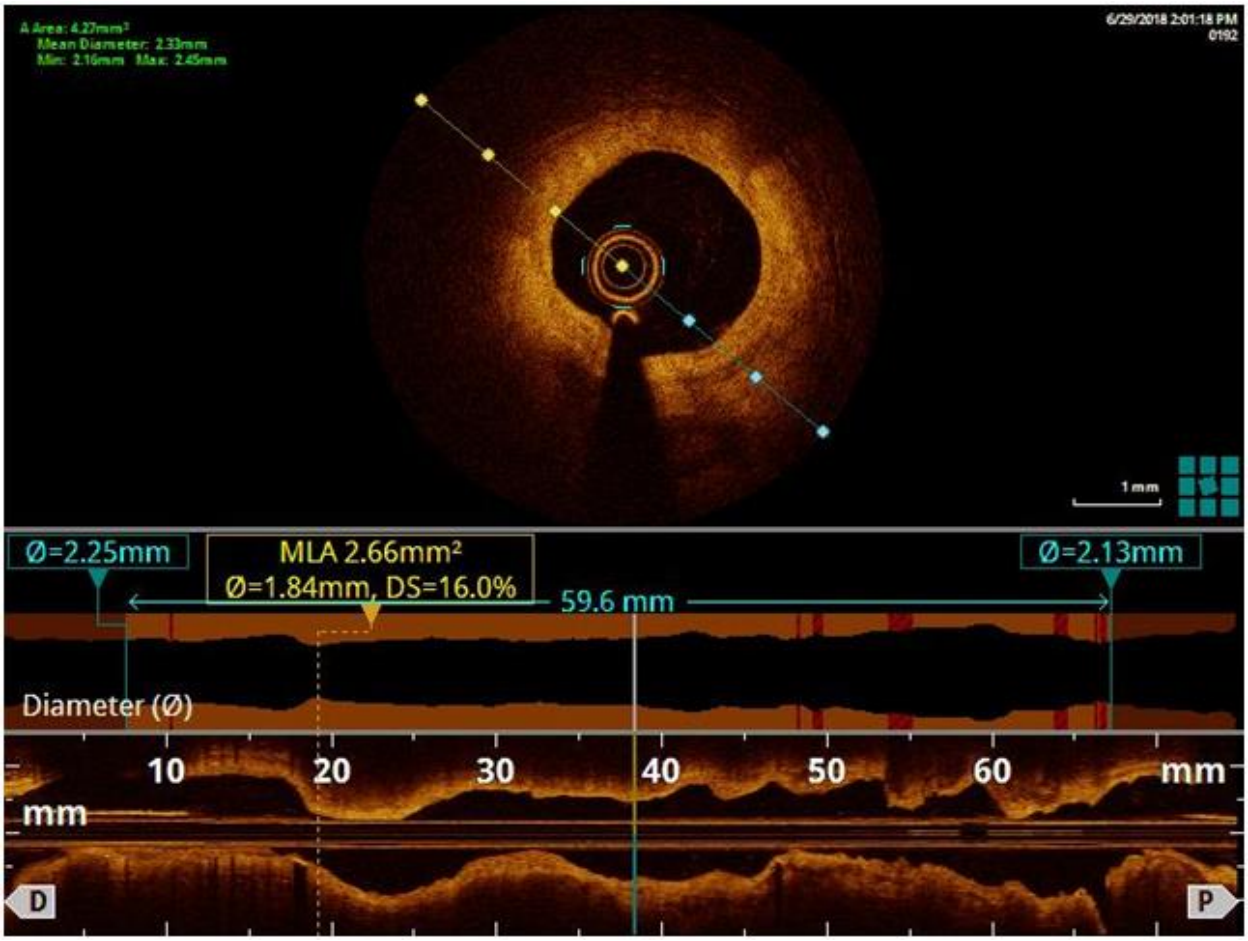


The patient continued dual antiplatelet therapy with aspirin and ticagrelor, and was re-scheduled for clinical and invasive examination one year later due to the extensive stent and scaffold implantation. At that time, she was well-being with a preserved left ventricular function. A repeat angiography showed no signs of restenosis in any of the stented or scaffold-treated coronary segments **(Figure 6)**, with close to complete disappearance of the scaffolds as indicated by OCT **(Figure 7)**.

Figure 6: 12-month coronary angiogram.

Long-term sustained effect of treatment.

Figure 7: 12-month optical coherence tomography of the left anterior descending artery.



The absorbable magnesium scaffold, which is currently the only metal-based resorbable scaffold available for clinical use, demonstrated to be both efficient and safe in our case **[1]**. Despite the risk of unfavorable loss of radial force due to its relatively fast degradation **[2,3]** the absorbable magnesium scaffold may seem an attractive treatment of diffuse disease in coronary vessels with significant side branches, in cases where short-time scaffolding is sufficient for the vessel to re-establish its anatomy including vasomotion without significant recoil or formation of neoatherosclerosis **[4,5]**. A hybrid approach using a combination of bioresorbable and non-resorbable stents for treatment of complex coronary lesions have been described recently **[6-8]**. In our case we document the sustained effect of this combination despite fully resorption of the scaffolds.

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Citation of this Article

Ottesen M, Havndrup O, Kjøller-Hansen L and Kelbæk H. Reconstruction of a Diffusely Diseased Left Anterior Descending Coronary Artery Using a Combination of Bioresorbable Scaffolds and Metal Stents. Mega J Case Rep. 2024;7(4):2001-2009.

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