VIA MEDICA

IMAGE IN CARDIOVASCULAR MEDICINE

Cardiology Journal
2019, Vol. 26, No. 3, 294–295
DOI: 10.5603/CJ.2019.0058

ISSN 1897–5593

# A case of a de-novo lesion in the left circumflex artery treated with excimer laser and drug-coated balloon under the guidance of optical frequency domain imaging

Shinichiro Masuda[1], Takashi Shibui[1], Takaaki Tsuchiyama[1], Takashi Ashikaga[2]

[1]Department of Cardiology, Tokyo Metropolitan Hiroo Hospital, Tokyo, Japan
[2]Department of Cardiology, Japanese Red Cross Musashino Hospital, Tokyo, Japan

A 72-year-old man who previously underwent percutaneous coronary intervention with a drug-eluting stent implantation from the left main trunk and extending to proximal left anterior descending artery was admitted to the documented hospital for angina pectoris. Coronary angiography (CAG) revealed 90% stenosis at the ostium of the left circumflex artery (LCX) (Fig. 1A). Excimer laser coronary angioplasty (ELCA) was performed using a 0.9 mm concentric laser catheter at a pulse rate of 25 Hz and energy output of 45 mJ/mm$^2$, 35 Hz and 55 mJ/mm$^2$, and 45 Hz and 60 mJ/mm$^2$ for a total of 5200 pulses and balloon angioplasty using a drug-coated balloon (DCB) under the guidance of optical frequency domain imaging (OFDI), which revealed fibrous plaque and eccentric severe calcification (Fig. 1B). After ELCA, minimum lumen area (MLA) increased from 1.4 mm$^2$ to 2.6 mm$^2$ (Fig. 1C) and on final OFDI to 3.9 mm$^2$ along with minor plaque dissection (Fig. 1D). Final CAG demonstrated optimal result without flow limitation (Fig 1E). After discharge, no significant clinical events were reported. Eight months later, follow-up CAG and OFDI were performed. Follow-up CAG demonstrated no restenosis at the ostium of the LCX (Fig. 1F). OFDI showed that the MLA slightly decreased from 3.9 mm$^2$ to 3.5 mm$^2$ and that the minor dissection had clearly improved (Fig. 1G). The DCB is efficacious in de-novo coronary artery lesions [1], which mainly contributed to suppress the restenosis in this case; however, although OFDI after ELCA demonstrated a slight increase in MLA, ELCA might be attributed to the lesion debulking and modification leading to optimal balloon expansion. A similar mechanism was previously reported in the case of in-stent restenosis [2]. For acute myocardial infarction, the combined use of ELCA and DCB for de-novo coronary artery disease works synergistically to reduce restenosis [3]. Stent-less strategy employing ELCA and DCB may be an effective revascularization of large vessel de-novo lesions, when traditional stent deployment is not a viable option.

Informed consent was obtained from the patient in accordance with the Helsinki Declaration.

## Acknowledgements

The authors wish to thank Dr. Richard H. Kaszynski for reviewing and revising this manuscript.

**Conflict of interest:** None declared

## References

1. Uskela S, Kärkkäinen JM, Eränen J, et al. Percutaneous coronary intervention with drug-coated balloon-only strategy in stable coronary artery disease and in acute coronary syndromes: An all-comers registry study. Catheter Cardiovasc Interv. 2019; 93(5): 893–900, doi: 10.1002/ccd.27950, indexed in Pubmed: 30380186.
2. Yin Da, Maehara A, Mezzafonte S, et al. Excimer laser angioplasty-facilitated fracturing of napkin-ring peri-stent calcium in a chronically underexpanded stent: documentation by optical coherence tomography. JACC Cardiovasc Interv. 2015; 8(8): e137–e139, doi: 10.1016/j.jcin.2015.02.018, indexed in Pubmed: 26205458.
3. Harima A, Sairaku A, Inoue I, et al. Real-life experience of a stent-less revascularization strategy using a combination of excimer laser and drug-coated balloon for patients with acute coronary syndrome. J Interv Cardiol. 2018; 31(3): 284–292, doi: 10.1111/joic.12495, indexed in Pubmed: 29464846.

Address for correspondence: Shinichiro Masuda, MD, Department of Cardiology, Tokyo Metropolitan Hiroo Hospital, 2-34-10, Ebisu, Shibuya-ku, Tokyo, 150-0013, Japan, tel: +08-3-3444-1181, fax: +08-3-3444-3196, e-mail: giga627@yahoo.co.jp

Received: 24.07.2018 Accepted: 28.01.2019

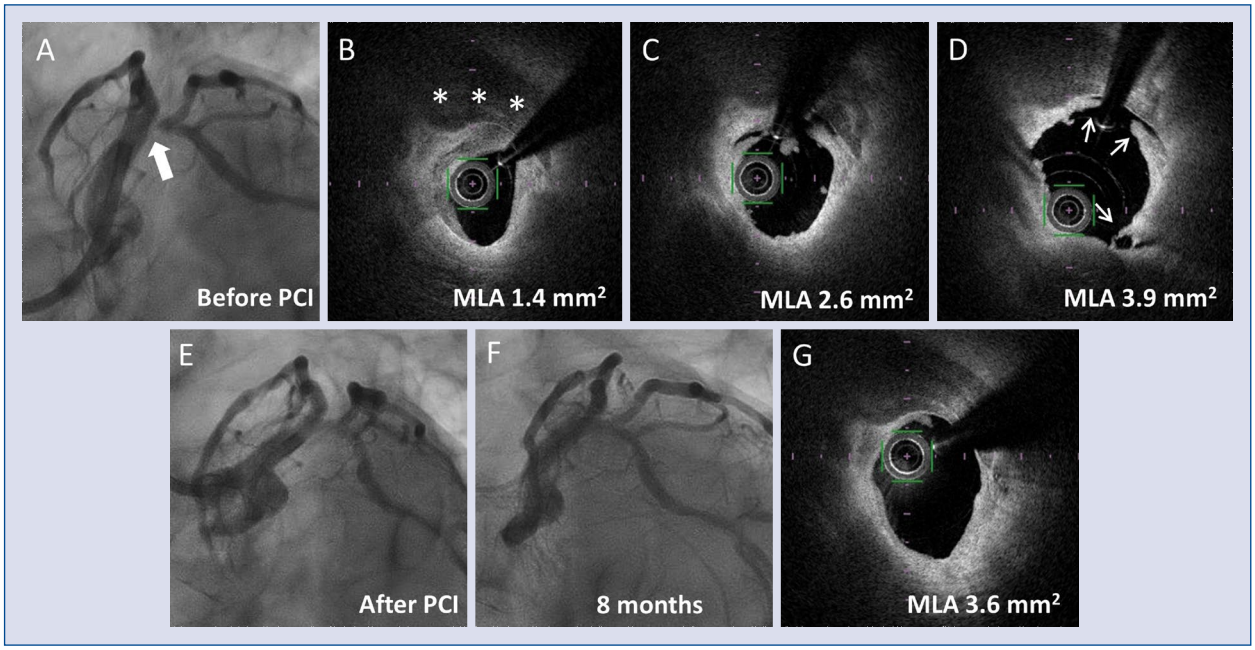


**Figure 1.** Coronary angiography (CAG) and optical frequency domain imaging (OFDI) findings of the culprit lesion at the time of percutaneous coronary intervention (PCI) and subsequent follow-up CAG. **A.** CAG before PCI showing severe stenosis at the ostium of the left circumflex artery (white arrow); **B.** OFDI image before PCI showing eccentric severe calcification (asterisks), and a minimum lumen area (MLA) of 1.4 $mm^2$; **C.** OFDI image after excimer laser coronary angioplasty with MLA of 2.6 $mm^2$; **D.** Final OFDI image at the PCI demonstrates a small plaque dissection (white arrows) and MLA of 3.9 $mm^2$; **E.** CAG after PCI showing optimal results; **F.** CAG at follow-up shows no restenosis; **G.** OFDI at follow-up CAG showing improvements in plaque dissection and a slight reduction in the MLA from 3.9 $mm^2$ to 3.6 $mm^2$.