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Case report

Dual-lumen catheter in coronary chronic occlusions

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ABSTRACT

Coronary chronic total occlusion (CTO) is currently considered the most complex lesion for percutaneous coronary intervention (PCI). Despite several crossing techniques are available, failure to cross a CTO with a guidewire is still the most common cause for failure of CTO PCI. We report three CTO cases successfully treated using a dual-lumen catheter after other crossing strategies failed to cross the occlusion. This tool is easy and reliable to use and could be useful in similar situations in CTO cases.

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Introduction

Chronic total occlusion (CTO) still represents the most technical challenging lesion subset that interventional cardiologists face [1]. In recent years, the technical success of percutaneous coronary intervention (PCI) for CTO lesions has improved because of the development of novel techniques and devices as well as accumulated experience [2,3]. Although several crossing techniques are available, failure to cross a CTO with a guidewire is still the most common cause for failure of CTO PCI [4].

We report three CTO cases successfully treated using a dual-lumen catheter (DLC) after other crossing strategies failed to cross the occlusion.

Case 1

A 73-year-old man with hypertension, hyperlipidemia and a prior history of coronary disease presented severe and longstanding angina in spite of maximal medical therapy. The echocardiogram showed a normal left ventricular ejection fraction with normal regional wall motion. He had a known chronic in-stent occlusion in the circumflex for the last 15 years with a previous failed attempt at recanalization.

Angiography showed a relatively long in-stent CTO in the proximal circumflex (20–25 mm) and a bifurcation at the distal cap of the occlusion (Fig. 1A).

PCI of the CTO was performed. Because there was not heterocoronary filling we performed unilateral femoral

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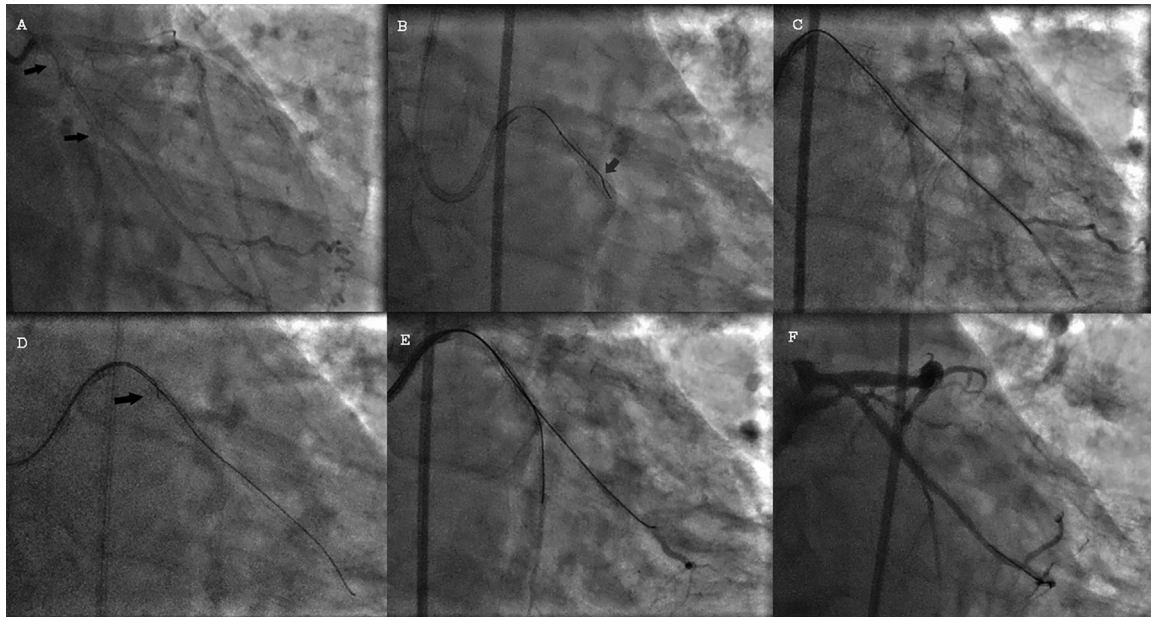


Fig. 1 – (A) Intra-stent chronic total occlusion (CTO) involving a distal bifurcation. (B and C) The wire crossed to the obtuse marginal (OM) but was under struts from the previously placed stents (arrow). (D and E) Crusade dual-lumen catheter allowed the guidewire to penetrate in a different entry point of the proximal cap keeping in the central lumen and reaching the distal circumflex. (F) Final result.

approach with a 7Fr AL2 guiding catheter (Cordis Corp., Miami Lakes, Florida).

A Finecross catheter (Terumo corp. Japan) was used and an Ultimatebros 3 (Asahi Intecc Japan) crossed the occluded segment and reached the distal obtuse marginal (OM), but the finecross could not cross the CTO because the wire was under struts from the previously placed stents (Fig. 1B and C). The wire tip could not be manipulated away from the stent struts. Eventually, the Finecross microcatheter was exchanged for a Crusade DLC (Kaneka Corp., Osaka, Japan) and a second Ultimatebros 3 wire achieved to penetrate in a different entry point of the proximal cap keeping in the central lumen and reaching the distal circumflex (Fig. 1D and E and Video). After predilating the in-stent CTO segment the OM wire was direct to the center lumen and both wires were exchanged by Sion (Asahi Intecc Co., Aichi, Japan) wires, then both branches were predilated and the main vessel stented. Final angiogram showed good result including the bifurcation (Fig. 1F).

Case 2

A 75 year-old male with prior history of diabetes, hypertension and dyslipidemia with longstanding effort angina and a positive exercise treadmill test was referred for coronary angiography in our center.

The coronary angiography revealed a CTO of the mid LAD just distal to the origin of a large diagonal (Fig. 2A). No other coronary lesions were noted. The site of the occlusion was at an acute angle with a very short straight segment proximal to the occlusion but there was no proximal cap ambiguity and the CTO length was about 12 mm, the distal LAD was filled by homocoronary collateral circulation.

Because there was not heterocoronary filling we performed unilateral radial approach. A 7.5 French special curve 3.5 sheathless catheter (Asahi Intecc, Japan) was used to engage the left main coronary artery.

An antegrade wire escalation approach was initially performed but a Finecross catheter with a Sion and a Fielder XT-A (Asahi Intecc, Japan) wires failed to reach the proximal cap prolapsing into the diagonal branch. A Miracle 6 (Asahi Intecc, Japan) was then used to reach the proximal cap and crossed subintimally through the occlusion (Fig. 2B). Then we tried re-entry according to wire-based techniques using a Pilot 200 (Abbott vascular, USA) and a Fielder XT wires. A Pilot 200 guidewire reentered but in a small septal branch (Fig. 2C) and multiple attempts to reentry in the LAD were unsuccessful. A Sion wire was then placed in the septal branch over which a Twin-Pass catheter (Vascular solutions) was introduced which allowed the Pilot 200 to cross the distal LAD (Fig. 2D and E). The lesion was successfully dilated and stented. Final angiogram showed good angiographic result (Fig. 2F).

Case 3

A 76 year-old man ex-smoker with hypertension, hyperlipidemia and atrial fibrillation was admitted to our department because of angina on effort. The echocardiogram showed a normal ejection fraction. He had a known chronic occlusion in the LAD with a previous failed attempt at recanalization.

The coronary angiography revealed a CTO of the mid LAD involving a bifurcation with a diagonal branch within the occluded segment and a blunt proximal cap. The CTO length

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