**[INTERVENTIONAL MANAGEMENT]**

**Procedural step.** Bi-radial approach

The RCA was engaged with 6Fr AL3 guiding catheter. An antegrade approach was initially attempted with Fielder XTA wire, supported by finecross microcatheter A Guideliner was advanced in the RCA to enhance the support because of the slightly anterior take off of the RCA ostium and the dilated aortic root. The left main was then engaged with a 6Fr CLS 4.5 guiding catheter for retrograde injection.

The strategy was then changed from the antegrade wire escalation to the retrograde approach after further attempting with the antegrade wiring technique. Retrograde collateral tracking was succeeded with Sion and Fielder XTR wires with the support of Cosair microcatheter. The reverse CART technique was decided. The pilot 200 wire and Gaia Second wire were advanced into the subintimal spaces from retrograde and antegrade direction respectively (Fig3). A semi-compliant 2.5x10 mm balloon was advanced in the occluded segment to dilate the sub-intimal space (Fig 4). The wires meet in the sub-intimal space and the retrograde wire was then advanced into the antegrade guiding catheter, followed by the Corsair which was then looped from the retrograde guiding catheter in the left coronary artery to the antegrade guiding catheter in the RCA. A RG3 330 mm long wire was inserted.

The procedure was finished with further balloon pre-dilatation and two long overlapping drug-eluting stents deployment (Promus element 3.0x38 and 3.5 x 28). The final angiographic result was satisfactory (Fig 5-6).

**Case Summary.** A 7Fr guiding catheter through the femoral approach is usually suggested for treating a CTO lesion in retrograde manner. Although the support would be enhanced, the patient also faces a higher chance of vascular complication. In this patient, with the use of Guideliner, we can greatly improve the support for this complex trans-radial PCI procedure for the CTO.

This case is a good example to illustrate the importance of guiding support. The mother-child technique with Guideliner makes the advancement of wires, balloon dilatation and long stent advancement in treating a complex CTO procedure by radial approach possible.

The patient remained symptom free at subsequent follow-up.

**TCTAP C-074**
Crusade Catheter Assistance for Antegrade Puncture by Retrograde Wire Guidance in Chronic Total Occlusion

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**[CLINICAL INFORMATION]**

Patient initials or identifier number. HZZ

Relevant clinical history and physical exam. A 50 y/o man, smoker, with history of old CVA and HTN was admitted via ER because of dyspnea for one day with chest tightness and orthopnea. In ER, desaturation with consciousness loss was noted.

Intubation was done with ventilator support. PE showed diffuse rales over bilateral lungs, otherwise was unremarkable. Echo cardiology revealed hypokinesis over anteroseptal wall to apex. For CHFN YHA FcIII related to ischemic heart disease, he was admitted.
Relevant test results prior to catheterization. For CHF NYHA FcIII and the patient’s EKG showed myocardial ischemia, ischemic heart disease was suspected. Echocardiography was done and revealed LVEF of 56% with hypokinesis over anteroseptal wall to apex. LAD disease was favored.

Relevant catheterization findings. CAG was done via right radial artery and showed as below,

LM: normal
LAD: proximal total occlusion with calcification
LCX: atherosclerosis, proximal 20-30% stenosis
RCA: atherosclerotic change, distal 20-30% stenosis
Ramus: Nil
Collaterals: from RCA to LAD, LCX to LAD

[Interventional Management]
Procedural step. LCA was engaged with a 6Fr EBU4 guiding catheter and RCA was engaged with a 7Fr SAL1 guiding catheter via right radial and right femoral artery, the lesion of LAD cannot be crossed by 0.014" Fielder Fc, Fielder XT and Miracle 3 wires with Corsair catheter assistance, despite of parallel wire technique. For saving side branches and minimized false lumen, retrograde approach was done with a 0.014" Sion wire via septal channel to LAD distal CTO cap (several septal channels were tried), however, Corsair and Fine cross catheters cannot advance to septal collateral channels with several attempts. Antegrade approach was tried again with a Crusade catheter assistance, the lesion was then finally crossed by a Progress 200T wire with direct puncture to proximal and distal CTO caps under retrograde wire guidance. The CTO lesion was then dilated with an Apex push 1.5/12mm balloon at 10-16 bars and further dilated with a Sprinter 2.5/20 mm balloon at 8-14 bars, the residual stenosis was >40% and a Resolute 2.5/30mm stent was deployed at 8-14 bars, post dilatation was done with a NCS printer 3.0/15mm balloon at 18-24 bars. Before ending the procedure, IVUS study was done and the stent was well expanded and apposite. TIMI-3 flow was noted with minimal residual stenosis after PCI.
Case Summary. In most cases, antegrade approach for CTO would be the first choice. During antegrade approach, false lumen with dissection is usually made, but when side branches are important, we should avoid making long false lumens. So, before making a long dissection, it is the time for retrograde approach.

However, devices for retrograde approach are not always advanced from collateral channels to target vessel, this is one of the reasons for PCI failure. Crusade catheter can help in conditions not only for parallel wire technique but also in side branches just near the CTO or CTO with a blunt end to increase successful rate of CTO re-canalization. Of course, wires and delicate skills are crucial.