

Percutaneous Coronary Intervention of an Occluded Left Anterior Descending Coronary Artery: Benefits of Contralateral Coronary Angiogram

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Chronic total occlusions (CTO) represent approximately a third of patients with significant coronary stenosis who have undergone angiography. Percutaneous intervention (PCI) for CTO accounts for about 10%15% of all PCI procedures [1]. PCI of the CTO lesion present great challenges including low success rate, prolonged procedure time, large amount of contrast use and high re-occlusion rate [1,2]. One of the major problems during procedure is poor visualization of distal vessel. Visualization of the distal vessel beyond the total occlusion lesion is essential for enviable procedure. If there is no visible distal flow from bridging collaterals or ipsilateral collaterals, a contralateral coronary angiogram may help to opacify the distal lumen through retrograde collaterals. This case illustrates the utility of contralateral coronary angiography to improve visualization of distal vessel beyond the total occlusion lesion in patients who have inadequate antegrade filling of occluded artery.

Case Report

A 62 year old man was admitted with typical chest pain. His medical history was unremarkable and physical examination was normal. His ECG showed Q wave in leads V2-V5. Myocardial Perfusion Scan (Thalium Scan) showed inducible ischemia in basal anterior wall of the left ventricle (LV). Left coronary angiography revealed occlusion in mid segment of the left anterior descending artery (LAD) and no antegrade filling (Figure 1). Right coronary angiography showed insignificant luminal stenosis (<50%) in the right coronary artery (RCA) and marked retrograde filling of LAD (Figure 2). Because of ischemic findings, angioplasty of the occluded LAD lesion was scheduled. Right femoral access with a 7 French (Fr) sheath was used for the interventional procedure. The LMC was engaged selectively through the right femoral approach using a 7 Fr left guiding catheter. 5000 units of heparin were administered intravenously for anticoagulation. PCI was planned to performe under the reference of retrograd filling because of the long occlusion of LAD and absence of antegrad flow. Therefore, right coronary angiography was planned to visualize the distal segment of LAD. Left femoral access with a 7 Fr sheath was used for the right coronary angiography. The right coronary



Figure 1:

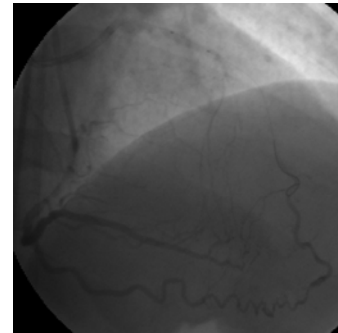


Figure 2:



Figure 3:

artery was engaged selectively using a 7 Fr JR guiding catheter. The total occlusion in the mid-LAD was crossed successfully with Asahi NEO'S 0.014" intermediate guidewire (Asahi Intecc co, Aichi) guided with retrograde filling via right coronary angiography. PTCA was performed with a 3.5x20 mm Checker balloon (Blue medical devices, Helmond). After suboptimal dilatation, a 3.0x10 mm Gendyl easyway stent (Blue medical devices, Helmond) was passed over the occluded LAD region. Flourosopic visualization for verification of appropriate stent position was done through the right coronary angiography

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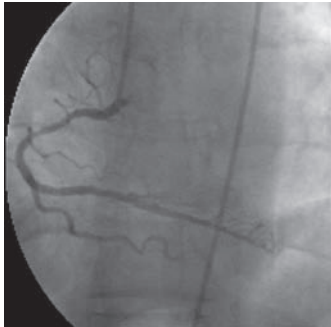


Figure 4:

during the procedure. The stent was deployed at 14 atm in the occluded LAD lesion. The final angiographic picture with the wire and balloon showed an excellent result with a widely patent distal LAD (Figure 3). Final right coronary angiography showed disappearing of retrograde filling to LAD (Figure 4). The patient had an uneventful course and was discharged on the second post-procedure day.

Discussion

CTO remains one of the most challenging lesion subsets in interventional cardiology. Clinical data suggest that revascularization of chronic total occlusions is beneficial, but the success rate for conventional PCI attempts remains only 60 to 70%. [1,3] During the last 10 years, advances in medical devices and technical skill have made great impact on PCI for CTO, with procedural success rate reaching 70% or greater [1,2]. The primary success of PCI of totally occluded segments depends largely on the duration, the length of the occluded segment, and good angiographic visualization of the coronary artery distal to the occlusion by collaterals. The most common cause of procedural failure in CTO is the impossibilities of guide-wire or balloon catheter crossing the totally occluded segments. New catheter-based developments in CTO procedures have the potential to increase the initial success rate of PCI. Newer approaches to crossing total occlusions include blunt microdissection, [4] or the combination of optical coherence reflectometry with pulses of radiofrequency energy. [5] These devices can cross roughly 70% of chronic total occlusions where attempts with conventional guidewires have been unsuccessful.

However, success rate is still far less compared with the treatment outcome of non-occlusive lesions.

The main challenge in angioplasty of a total occlusion is the need to pass a guidewire through the area of occlusion and into the vessel lumen beyond. Adequate visualization of the distal vessel beyond the total occlusion lesion is indispensable in mapping the direction where the wire should be pointed and also for confirming its position in the distal true lumen. Previous reports involving case series showed that use of contralateral angiography in patients with CTO is a more useful technique for adequate visualisation of occluded segment [6,7]. Contralateral coronary angiogram may provide effective visualization of distal true lumen and safe positioning of guide wire in the presence of a marked retrograde coronary collateral flow in patients with CTO whose antegrade filling is poor or absent. In CTO procedures, contralateral coronary angiogram may also decrease the x-ray exposure time and minimize the amount of contrast media used.

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