

Modified Technique of Coronary Plaque Deformation Facilitating Side Branch Entrance in Difficult Wiring of Coronary Total Occlusion

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Abstract

The plaque rigidity is an important factor that can complicate proper deployment of coronary stents, consequently increasing the risk of stent thrombosis and Restenosis. While aggressive balloon dilation carries the risk of coronary dissections. Thus, pretreatment of calcific lesions by different modalities of equipments is mandatory to facilitate adequate angioplasty. Here in this case report I utilized the regular balloons with wires to open very tough lesion undilatable with regular PTCA balloons in a step wise technique.

Keywords: Undilatable coronary plaques, PTCA, Side branch ostial occlusion

Introduction

One of the major obstacles to the interventional cardiologist, dense calcifications of coronary atheromatous plaque provide an obstacle to successful revascularization [1]. The intravascular ultrasound (IVUS) can improve detection of calcification compared with fluoroscopy alone [2] the rigid plaque can complicate adequate stent deployment including increased risk of in-stent restenosis or stent thrombosis with asymmetric stent expansion [3-5], while aggressive balloon dilation in noncompliant anatomy can result in coronary dissection [6]. Thus, pretreatment interventions focus on decreasing the degree of calcifications to facilitate adequate angioplasty.

Case Report

Male patient 45 years old, heavy smoker, not hypertensive, not diabetic, dyslipidemic presented with angina pain since 2 months, ECG showed infero-lateral ST segment depression, Echo showed infero-lateral wall hypokinesia, coronary angiography showed total occlusion of mid large dominant left circumflex artery with very late distal filling Figure 1.

Several attempts were done to wire the lesion, but they were very difficult. After that PTCA was done with up-escalated different sizes semi compliant balloons but the lesion failed to be dilated. Several attempts were done to wire the side branch involved inside the lesion with another wire but were very difficult to reach the entry point Figure 2.

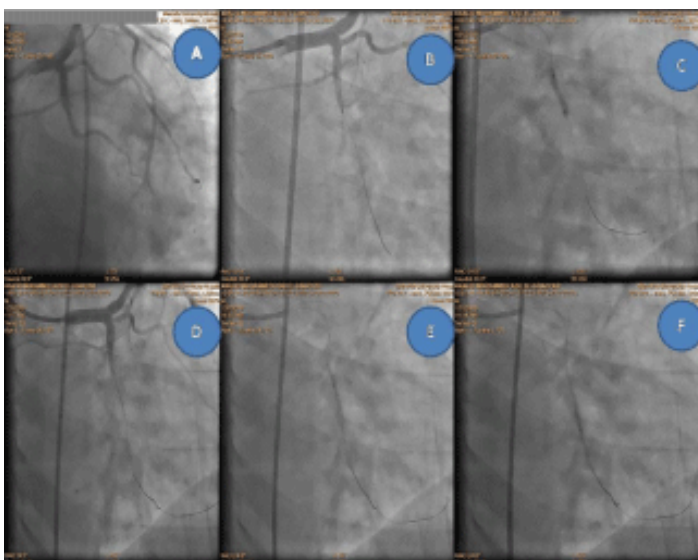


Figure 1. Showed total occlusion of mid part LCX A, then stepped procedure of deforming the plaque B, C, D, E, F by 2 wires with different balloons sizes and POT fashioned technique.

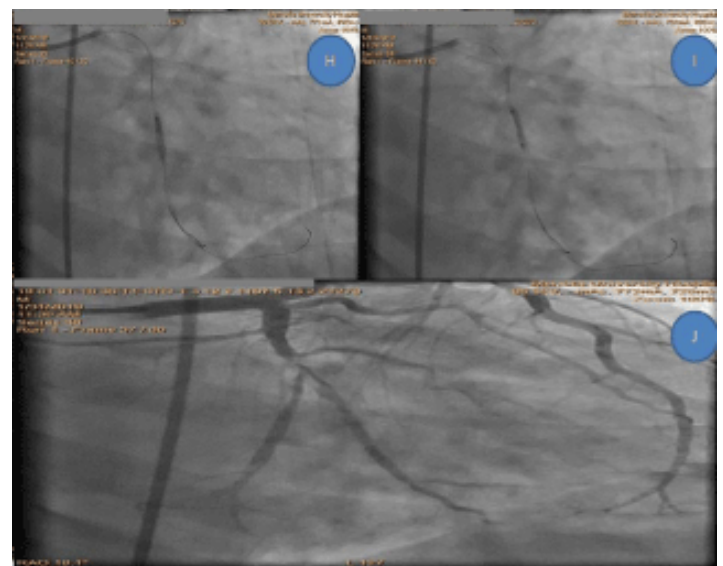


Figure 2. Showed final steps H, I, J of the technique with complete visualization of the vessel. .

Discussion

Many of totally occluded lesions that are undilatable by regular compliant or semi compliant balloons are formed from fibrocalcific plaques; hence they need plaque modification strategies like scoring balloons and rotablaters.

To do plaque modification you need an initial step which is a crossed wire through the lesion. In some totally occluded lesions, they may involve sizable side branches with difficult wiring (bifurcation included) so you need to tackle this problem first as to manage the lesion properly.

Regular pre-stenting balloon dilatation is mandatory in most of tight lesions as to facilitate the crossing of stents. In some situations, the pre-stenting balloons could be utilized in many traditional and untraditional ways as to overcome difficult lesions including fibrocalcific and heavily calcified plaques (regular and scoring balloons) and thrombus containing lesions [7].

Here in current case I utilized regular balloons with different sizes in new way, where I faced a totally occluded bifurcation lesion undilatable with regular PTCA balloons with difficult wiring of the side branch, only the main vessel could be wired. So, I did many tricks as to deform the ostium of the side branch as to be able to wire it.

Technique steps

1. Wiring main branch with proper wire.
2. Balloon dilatation with relatively smaller balloons.
3. Another wire parallel to the first one if failed to enter the side branch.
4. Bigger sized short balloon dilatation in the main segment just before side branch entry point proximal optimization technique (POT) fashioned with dilatation against wire facing the expected side branch ostium, this step could act by deforming the plaque involving plaque angle shifting with cutting property of the placed second wire.
5. After that a sizable inflated balloon on the first wire used to

trap the distal tip of the second wire inside the distal segment of the main branch, then trying to buckle the second wire into the deformed side branch ostium.

6. If succeeded rewire the side branch with the first wire and then pull out the second wire placing it in the distal segment of main branch. (Exchange wires).
7. Balloon dilatations of the side branch then select the proper bifurcation technique you prefer.

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