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Reaching an Unreachable Left Main Coronary Ostium in a Patient with Dilated Aortic Root

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WU AND TSUI: *Reaching an Unreachable Left Main Coronary Ostium in a Patient with Dilated Aortic Root.*

This case report describes the use of an extended guiding system with an anchoring coronary guidewire to facilitate diagnostic coronary angiography and subsequent coronary stent delivery in a patient with severe aortic regurgitation and dilated aortic root. (*J HK Coll Cardiol* 2016;24:14-17)

Aortic, Coronary, Left, Main, Regurgitation

摘要

這個案例闡述使用具有固定冠狀動脈引導線的延伸導向系統幫助診斷冠狀動脈血管造影檢查，其後為嚴重主動脈瓣逆流及主動脈根部擴張病人進行置入冠狀動脈支架。

關鍵詞：主動脈、冠狀動脈、左面、主要、逆流

Introduction

Catheterizations of the coronary ostia in patients with dilated aortic roots are technically demanding which may require special techniques. We describe the use of an extended guiding system with an anchoring coronary guidewire to facilitate diagnostic coronary angiography and subsequent coronary stent delivery.

Case

A 83-year-old male was admitted for non-ST segment elevation myocardial infarction (NSTEMI) in March 2015. He was an ex-smoker and he had past

history of essential hypertension. He presented with angina at rest. 12 lead electrocardiogram was performed after admission which showed ST segment depression over V3-6. Serum troponin I level was elevated to 11 ng/mL (<0.03 ng/mL). Echocardiogram showed dilated aortic root, and the dimensions of aorta at the level of aortic sinus and sinotubular junction measured at the parasternal long axis view were 5.19 cm and 5.14 cm respectively (Figure 1). Severe aortic regurgitation was noted at multiple views (Figure 2). The left ventricular ejection fraction was 53 percent. Medical treatment for NSTEMI was initiated which included aspirin, clopidogrel and low molecular weight heparin, however patient had persistent angina. Therefore the potential need of coronary revascularization was explained to patient, which included the option of coronary artery bypass graft (CABG) for possible obstructive coronary artery disease and concomitant aortic valve replacement for severe aortic regurgitation. However patient refused open heart surgery. He only accepted percutaneous route of coronary revascularization.

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We proceeded to coronary angiogram via the right radial artery using the 6 F sheath. Engagement of the left main coronary artery ostium was difficult with 5 Fr Tiger II Catheter (Terumo) as the aortic root was dilated. Therefore selective angiogram of right coronary artery (RCA) was performed first by the same diagnostic catheter, which showed chronic total occlusion over the middle segment of RCA. Subsequent engagement of the left main coronary artery was failed by 6Fr Judkin's Left 3.5, 4, 5 and 6 diagnostic catheters (Cordis). In this regard, we performed non-selective contrast injection over the coronary sinus which could only vaguely delineate the left main coronary artery ostium and apparently an obstructive lesion was seen over the proximal segment of left anterior descending artery

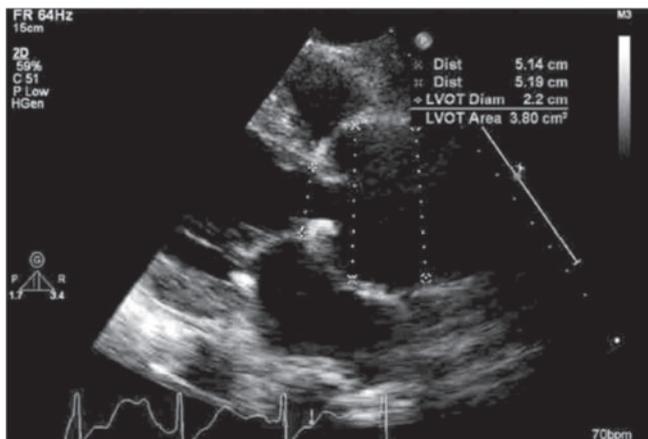


Figure 1. Dilated aortic root from parasternal long axis view.

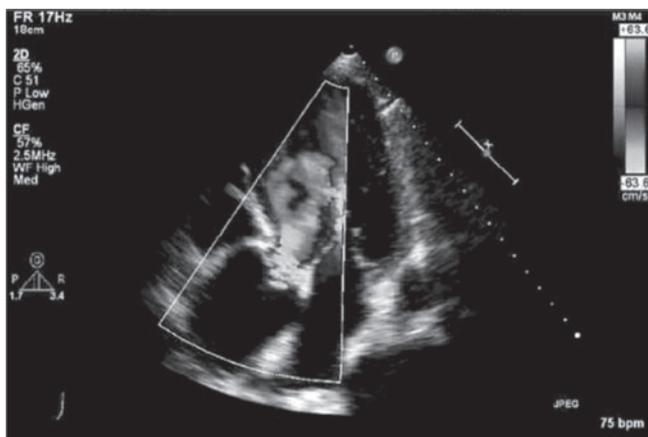


Figure 2. Dilated aortic root with severe aortic regurgitation from apical five chamber view.

(LAD). We then tried cannulation of left main coronary artery by 6Fr Amplatz Left 1, 2, 3, 6F Extra Back Up 4, 4.5, and 6Fr Multipurpose diagnostic catheters (Cordis) but we were still in vain.

As the left main coronary artery ostium was unreachable via the right radial artery, we switched the access site to the right femoral artery. A 7Fr femoral sheath was inserted. Again, engagement by 7Fr Extra Back Up 4 and 4.5 guide catheters and 6Fr Multipurpose guide catheter (Medtronic) were all failed. Wiring of ostium was then attempted by NS Runthrough coronary guidewire (Terumo) through the unengaged guide catheter, but such strategy was unsuccessful even after insertion of J-tipped 0.035 inch wire to change the configuration of the guide catheter (Figure 3).

After that, a 7Fr GuideLiner catheter (Innotronik) was inserted which extended the working length of the 7Fr Extra Back Up 4.5 guide catheter but cannulation of the left main coronary artery ostium was still unsuccessful. This extended guiding system, however, could be manipulated closer to and orientated more towards the left main coronary artery ostium. With this extended guiding system, attempts were made to manipulate the NS Runthrough coronary guidewire (Terumo) into the left coronary artery, but it was still difficult (Figure 4). Yet after repeated manipulation of the guiding system and its orientation, the coronary guidewire subsequently could reach the left main coronary artery ostium and passed downstream into left anterior descending artery (Figure 5).

The extended guiding system was then tracked over the coronary guidewire and engaged into the left main coronary artery ostium. Selective angiogram confirmed a significant stenosis over the proximal segment of LAD, which was pre-dilated by 2.5 mm by 15 mm Sprinter Legend balloon (Medtronic) and stented by 4.0 mm by 18 mm Resolute Integrity drug eluting coronary stent (Medtronic) (Figure 6). The patient was discharged with stable condition on the next day after the procedure. We planned to arrange thallium scan to assess the functional significance of the chronic total occlusion over the right coronary artery in order to decide the need of further intervention.

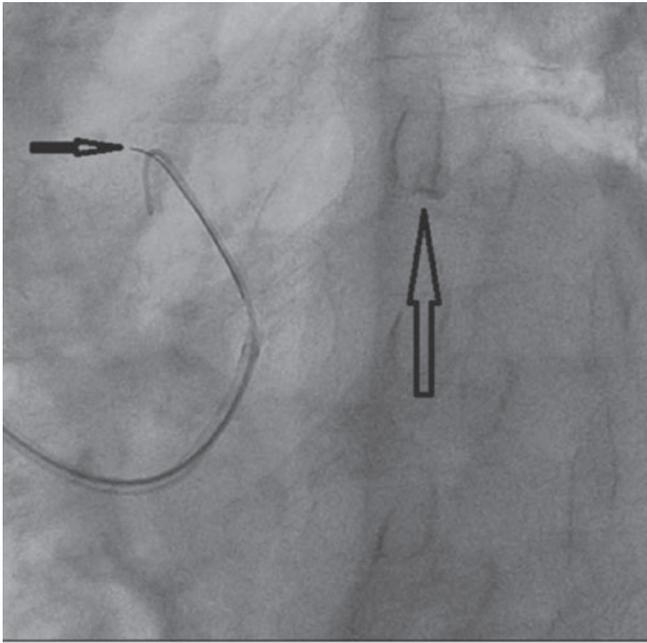


Figure 3. Unsuccessful wiring (small arrow) of the left main coronary artery (big arrow) by 7Fr EBU 4.5 guiding catheter with the J-tipped 0.035 inch wire in-situ which served to change the configuration of guide catheter.

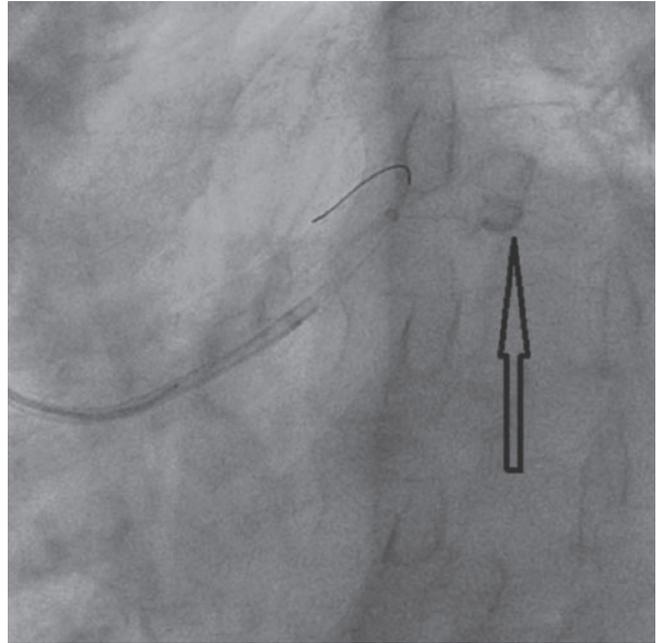


Figure 4. The guiding system was extended by 7 Fr GuideLiner catheter but wiring of the left main coronary artery (straight arrow) was still difficult.

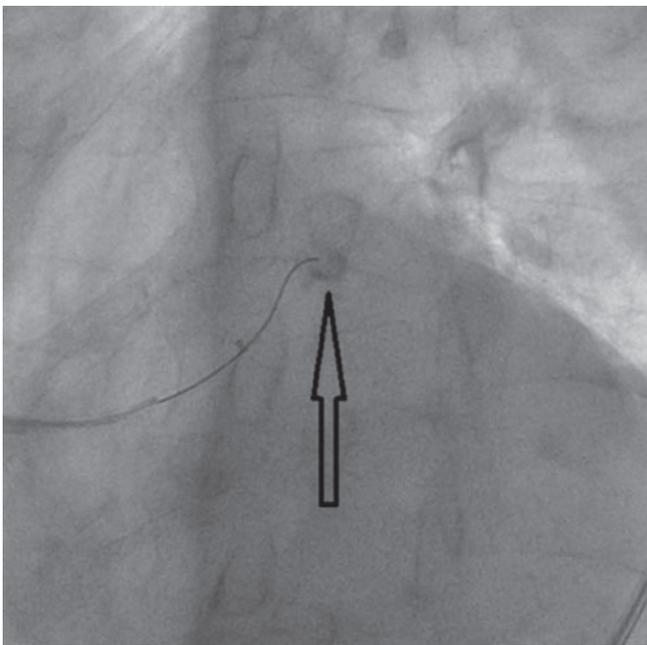


Figure 5. Successful wiring of the left main coronary artery ostium (straight arrow).

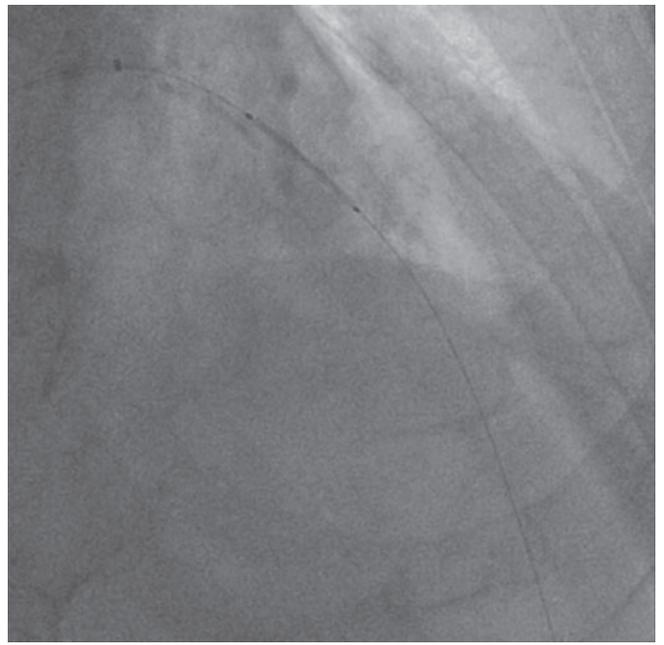


Figure 6. Positioning of stent over the proximal segment of left anterior descending artery.

Discussion

This patient presented with NSTEMI and 12 lead electrocardiogram revealed myocardial ischemia over the territory supplied by left anterior descending artery (ST segment depression over V3-6). Apparently there was an obstructive lesion over the proximal segment of left anterior descending artery during non-selective contrast injection over the coronary sinus. Therefore percutaneous coronary intervention was warranted for this patient who refused open heart surgery.

In dealing with difficult cannulations of coronary ostia, if both diagnostic and guiding catheters were failed, wiring by coronary wire through an unengaged guiding catheter could be first considered. However, such maneuver could be unsuccessful in patients with dilated root because of the long distance between the catheter tip and the coronary ostia. In such case, telescopic technique¹ can be a solution.

Previously described telescopic techniques included both "four-in-six" system and "five-in-six" system. The "four-in-six" approach utilizes a 4Fr, 125 cm Multipurpose diagnostic catheter (Cordis) inside the 6Fr guide catheter. Whereas the "five-in-six" approach utilizes a 5Fr Heartrail catheter (Terumo) inside the 6Fr guide catheter.²

The GuideLiner catheter (Innotronik) is a co-axial guiding catheter extension delivered through a standard guiding catheter on a monorail system. It comprises of a 20 cm polytetrafluoroethylene extension whose inner diameter is 1 Fr size smaller than the guide catheter. The main use of this catheter is to deliver stents in tortuous coronary lesions by deep engagement and providing better support.³

When GuideLiner catheter is used to facilitate engagement of coronary ostium, it has an advantage over the traditional telescoping catheter approach. Stent delivery is possible with a 6Fr Guideliner catheter left in-situ within a 6Fr guide catheter, but such strategy is not possible with a 4 or 5Fr diagnostic catheter which is inserted in a 6Fr guide catheter.

Roth et al. had described a case of successful left main coronary artery ostium after guide system extension by GuideLiner catheter in a patient with dilated aortic root.⁴ However, in our case we still failed

with this approach alone. Anchoring of the left main coronary artery was only successful when this approach was combined with manipulation of a coronary guidewire into the left coronary artery through the unengaged guiding system. Furuichi et al. has reported a case using coronary guidewire with the aid of telescopic catheter to achieve successful cannulation and intervention of a right coronary artery with anterior take-off.⁵ However, to our understanding the present case is the first report employing Guideliner catheter and coronary guidewire to accomplish cannulation of left main coronary artery in a patient with dilated aortic root. This technique has the advantage of allowing successful intervention without the need of removing a telescopic catheter.

Conclusion

Engagement of left main coronary artery ostium could be difficult in patients with dilated aortic root. In cases of failed cannulation by conventional methods, use of extended guiding system with GuideLiner catheter together with anchoring of a coronary guidewire into the coronary ostium can bring success to reach this unreachable coronary artery.

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