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Marker Wire Technique for Precise LAD Ostium Stenting

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

The ostial left anterior descending coronary artery (LAD) lesion is an important target for coronary revascularization because its location subtends a large territory of myocardium1. Accurate stent placement is, however, mandatory for optimal results, but this is often difficult to achieve with the guidance of traditional angiography. We present a case of precise LAD ostium stenting with simple innovative marker wire technique. Ostial PCI requires very precise stent positioning to obtain full lesion coverage, yet avoid unnecessary proximal extension which may result in obstruction of major vessels. Excessive stent movement occurs with cardiac contraction. Our case shows that with simple marker wire technique, precise LAD ostium stenting can be done with good results.

Keywords: Marker wire technique; LAD ostial stenting.

1. INTRODUCTION

The ostial left anterior descending coronary artery (LAD) lesion is an important target for coronary revascularization because its location subtends a large territory of myocardium [1]. Accurate stent placement is, however, mandatory for optimal results, but this is often difficult to achieve with the guidance of traditional angiography. Ostial disease is traditionally defined as a lesion arising within 3 mm of the vessel origin. The precise stent placement in

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coronary artery ostium is technically difficult and poses special challenges for interventional cardiologists. “Geographic miss” that is leaving a portion of the lesion uncovered by a stent can result in early restenosis [2]. We present a case of precise LAD ostium stenting with simple innovative marker wire technique.

2. CASE PRESENTATION

2.1 Clinical Background

A 55 year male k/c/o diabetes, hypertension, smoker presented with ongoing chest pain diagnosed as inferior and posterior wall myocardial infarction, with left ventricular ejection fraction 40 to 45 percent. Troponin I was elevated, ecg showed ST segment elevation in inferior leads and V 7,8,9 (posterior leads). Patient was planned for a primary PCI.

2.2 Procedural Description

Procedure was performed from right femoral access with 6F sheath and angiography demonstrated 90 percent stenosis in mid LCX and 90 percent stenosis in ostial LAD, RCA was normal (Fig. 1). Patient was planned for stent to LCX and LAD in single setting. EBU guide catheter was used for the procedure .Since LCX was the culprit artery in this case was treated first. After EBU was engaged to left main ostium, both LAD and LCX were wired with workhorse Runthrough coronary wires. Mid LCX was predilated with a NC ballon 2.75 x 12 mm and stented with DES 2.5 x 24 mm (Fig. 2) .Usually RAO caudal or LAO caudal view is used to examine the lad ostial disease .Then LAD ostium stenting was planned since lesion was classified as Medina (0,1,0). The LAD ostium lesion was predilated with NC ballon 2.75 x 12 mm and a type C dissection (non flow limiting) was noted from ostium to proximal LAD (Fig. 3). Simple innovative marker wire technique was used for precise LAD ostium stenting and also to cover the dissected segment of proximal LAD. The wire kept in the LCX acted as a marker wire at the carina, which helped in precise placement of ostial LAD stent in LAO caudal (Spider view). For precise LAD ostial stenting we made sure that the proximal radio-opaque marker of stent must be positioned just proximal to the ostium of LAD at the level of marker wire of LCX which indicates the carina (Fig. 4). The idea was that with blood flow the portion of wire will stuck with the roof of carina, which acts as marker of ostium. DES 2.75 x 16 mm was placed at LAD ostium in LAO caudal view with LCX wire as the marker for carina and deployed (Fig. 5).Final check shoots were taken showing precise stent placement and complete coverage of dissected segment with good flow in LAD and with no plaque shift or compression of LCX ostium (Fig. 6).

3. DISCUSSION

In this case one of its biggest challenge is the precise positioning of stent in LAD ostium and to cover the dissected proximal LAD.PCI of non-aorto ostial coronary lesions is confronted by unique technical challenges not offered by other lesion subtypes [3,4]. Ostial lesions have a reputation of being fibrotic, calcified, and relatively rigid [5]. Ostial disease is felt to be additionally resistant to dilatation and prone to recoil [6]. Ostial PCI requires very precise stent positioning to obtain full lesion coverage, yet avoid unnecessary proximal extension which may result in obstruction of major vessels. Excessive stent movement occurs with cardiac contraction. Oscillation of the LAD stent increases the risk of inaccurate placement. The more acute the angle is, the greater the risk of suboptimal stent positioning. In addition, vessel foreshortening in two dimensional angiographic images may limit adequate alignment between the ostium and the proximal stent edge [7,8]. Although some operators have suggested placement of stents in both branches to over come these difficulties [9], a single stent strategy remains preferable in view of better long term outcome [10,11]. For precise LAD Ostial PCI, it is necessary to reiterate that the stent is within the radio-opaque markers on the stent balloon and thus the proximal marker must be positioned proximal to the ostial LAD [12]. As LM is free of disease, we prefer here precise placement of stent in LAD ostium to prevent undue jailing of LCX as well as metal in Left Main. Our case shows that with simple marker wire technique precise LAD ostium stenting can be done with good results .The dissected proximal LAD was also covered by the ostial LAD stent. Several other techniques have been suggested to facilitate exact stent placement at non-aorto ostial coronary locations like draw- back technique [13], Szabo technique [14], crossover 1-stent technique [15]. In Szabo technique, the buddy wire passing underneath the last strut of a stent can facilitate precise stent placement by

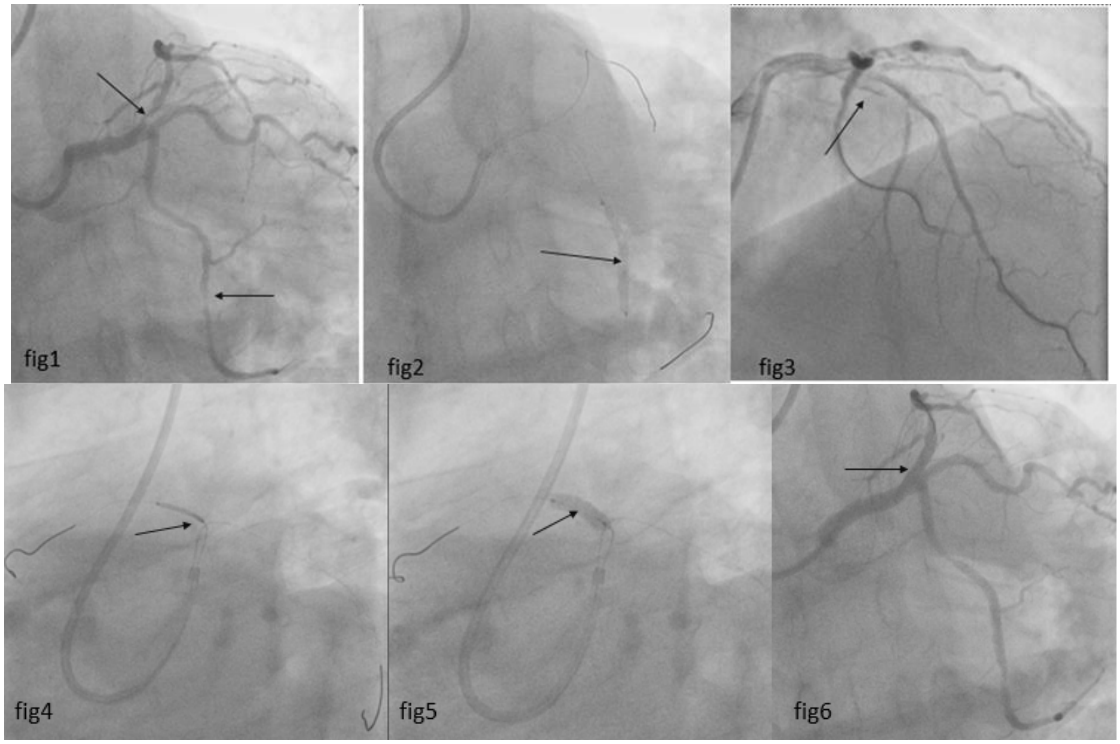

Fig. 1. 90percent stenosis at LAD ostium and mid LCX. Fig. 2. Stent deployed at mid LCX lesion. Fig. 3. Dissection at proximal LAD. Fig. 4. Precise placement of stent at lad ostium using marker wire technique. Fig. 5. Deployment of stent. Fig. 6. Final results

preventing stent motion and allows complete lesion coverage for non-aorto ostial coronary lesions [14]. In draw back technique Schwartz et al. [13] have suggested inflation of a second balloon at low atmospheres in the main branch after placement of the ostial stent, The stent is then gently pulled back before final deployment for complete lesion coverage while the inflated balloon prevents excessive proximal movement of the stent and reduces chance of "stent miss" [16].

4. CONCLUSION

We herein report unique strategy for the management of critical LAD ostial lesion by precise location of stent implantation at ostium by using a wire in LCX which acts as a marker for the carina. Precise LAD ostial stenting can performed with good outcomes with this marker wire technique. So it may be concluded that this technique is quick, effective, and technically simple approach for successful treatment of LAD Ostial lesion.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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