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Case report

Distal ulnar palmar approach to treat bifurcation stenosis of the left main (Medina 1.1.0) with Culotte technique

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Abstract

Background: Female patients possess a higher risk for poorer outcome in ST segment elevation myocardial infarction (STEMI). There is possibility that transradial access (TRA) for primary percutaneous coronary intervention (PPCI) could provide better outcome than transfemoral access (TFA) in female patients with STEMI.

Methods: During access transition period from 2008 to 2010, 418 female patients (out of 1808 patients) underwent PPCI for acute STEMI. The registry recruited all-comers patients with acute STEMI. Major bleeding and vascular access site complications, death rates, and overall MACE rates (composite of death, stroke, re MI and TVR) after 2 years follow-up were compared between TRA and TFA.

Results: TRA for PPCI was performed in 261 patients and 157 underwent TFA PPCI. The 30-days and 1 year mortality rates were lower in TRA compared to TFA (6.9 vs. 14.6%, p = 0.009, and 8.8 vs. 15.3%, p.0.032, respectively). After 2 years follow-up, the overall MACE rates were similar (26.4% vs. 31.2%, p.0.17). The major bleeding and particularly major vascular access site complications were more favorable for TRA than TFA (4.4 vs. 14%, p< 0.001, and 2.7 vs. 10.8 %, p.0.001, respectively).

Conclusion: Transradial access for primary PCI in female patients provides less bleeding and lower incidence of vascular access site complications, and better early clinical outcome in acute STEMI.

Key words transradial approach; female gender; STEMI

Introduction

Angiography and percutaneous coronary intervention (PCI) through arteries of the upper extremities is superior to femoral approach, and is on a rise due to less bleeding, easier practice of hemostasis, more patient convenience, shorter procedure time, lower cost imposed to patients and health system, and shorter period of hospitalization.[1-4] In addition, patients will sooner restore their routine physical activity in case of an upper extremity approach. Artery size, anatomical variations, arterial loop, hypoplasia, radial artery occlusion (RAO), previous RA harvesting for coronary artery bypass graft (CABG), and so like are the most troublesome issues with trans-radial approach.[2,5,6] In other words, this approach is not always successful with obligatory shift to other routes.[7] Although many investigators have shown that complications of trans-ulnar approach are rather equal to trans-radial approach, and the latter is suggested as an alternative to trans-radial approach,[5,8-10] but trans-ulnar approach has also its own difficulties and limitations; so, more innovative routes with lower complications and higher patient and operator convenience are strongly warranted. In this our clinical case, we presented new access in the upper limb at more distal points in contrast to conventional approaches, i.e.trans-palmar approach. Clinical case from our daily practice of haevily obese patient with unstabile angina. Angyography shown multivessel disease with distal LM disease involving the ostium of LAD and significant in-stent restenosis in prox LCx (Medina 1,1,0). Heart team's conclusion was CABG. Patient refused cardiosurgery and accepted angioplasty. The size of LAD and LCx were approximarely the same with no acute side branch angle, so we decided to do a Cullotte IVUS guided LM stenting by right distal ulnar palmar approach.

Case presentation

A 77 years/old female patient , heavily obese (BMI 44.4 kg/m^2) had following risk factors: diabetes mellitus insulin dependent, hypertension, metabolic syndrome, and positive family history of CAD. She had following coronary procedures: November 2018 - 2 DES implanted in proximal and mid circumflex artery (LCx) due to STEMI, and in December 2018 long tapered DES was implanted in mid left anterior descending artery (LAD). She was symptomatic for a few days prior to hospitalization. ECG showed sinus rhythm, heart rate of 72/min, negative T wave in leads I, aVL, and V5-V6 (Figure 1). Laboratory results were normal. Echocardiography showed large hypokinesia and dilatation of left ventricle with EF 38% (Figure 2). Angiography (Figure 3) was performed through 6F right ulnar approach, due to radial artery occlusion from previous angioplasty. The conclusion was

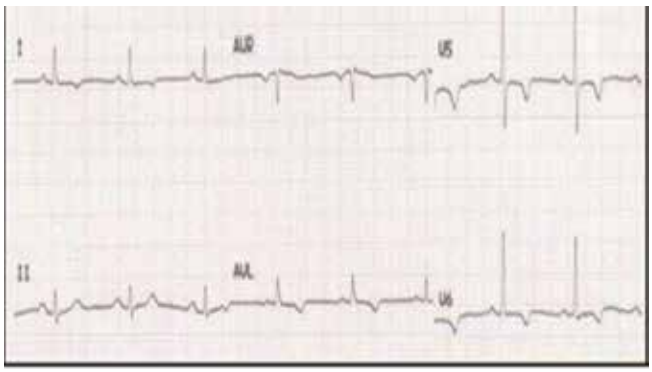
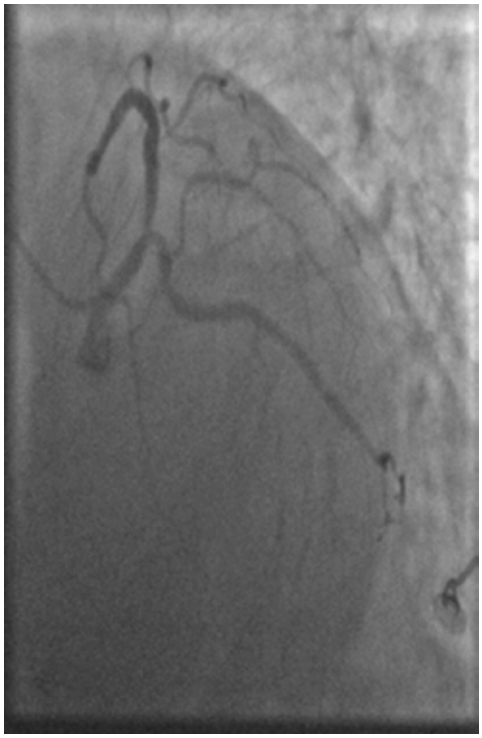


Figure 1. ECG

Figure 2. Echocardiography



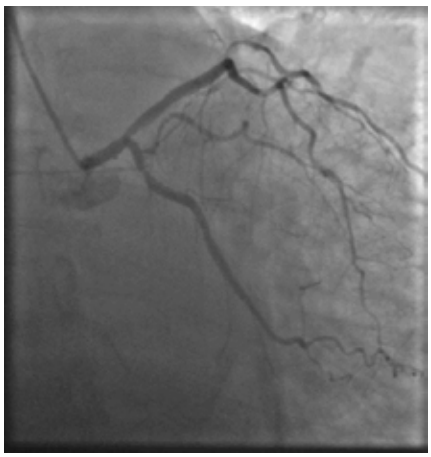


Figure 3-5. LM - distal 60% stenosis involving ostium of LAD (Medina 1,1,0)
LAD - significant ostioproximal stenosis with patent stents in mid LAD, LCx - 80% in-stent restenosis in proximal LCx

multivessel disease with distal LM disease involving the ostium of LAD, and significant in-stent restenosis of proximal LCx (Medina 1,1,0).

Due to radial occlusion and morbid obesity, the procedure was performed by distal ulnar palmar approach with sheathless GC PB 3.5/7.5Fr (Figure 6). The size of LAD and LCx were approximarely the same with no acute side branch angle, so we decided to proceed with a Cullotte technique with IVUS guided left main (LM) stenting. Two "workhorse" wires BMW were placed in LAD and LCx. IVUS in the LM showed significant 60% stenosis in distal segment with minimal luminal area (MLA) of 5.1mm^2, considered to be also functionally significant (Figure 7).

We did pre-dilatations with two semicompliant balloons (3.0x20mm) towards LAD and LCx and kissing balloon inflation with the same ballons (Figure 8). Then, we deployed DES 3.5/24 mm from LM towards LCx (Figure 9). After rewiring LAD and dilatation of the struts toward LAD with non-compliant balloon 2.5/15mm (Figure 10), we implanted DES 3.5/32mm from LM towards LAD, with proximal overlap (Figure 11). We performed proximal optimization with non-compliant balloon (4.0/12 mm, Figure 12), and recrossed the stent to LCX and perform final kissing balloon with 2 non-compliant balloons (3.75/18mm, Figure 13) with final proximal optimization with the same balloon use for the first optimization. The final results showing optimal angiographic result (Figure 14), and nicely opened stents with stent boost technique (Figure 15).

Final IVUS (Figure 16a-c) was done and showed following dimensions: LM (minimal diameter 3.8mm; maximal diameter 4,2mm2, luminal area 12.2 mm^2), LAD (minimal diameter 3.7mm; maximal diameter 4.1 mm2, luminal area 11.4 mm^2), and Cx (minimal diameter 3.7mm; maximal diamater 3.7mm, luminal area 9.3mm^2). The final appearance after PCI of the palmar region is presented in Figures 17a and b.

One, 3 and 6 months after revascularization the patient was completely symptom free. Control echocardiogra-

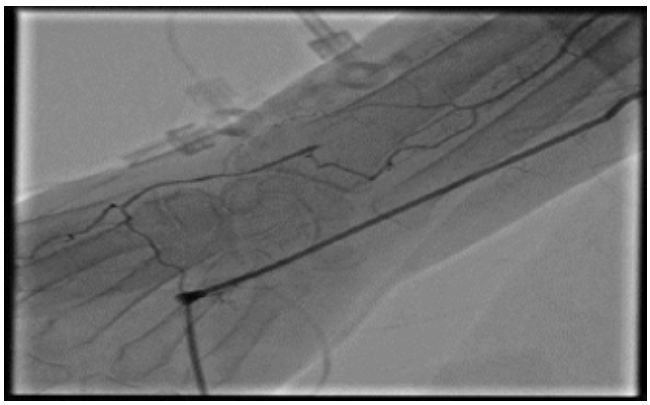


Figure 6.

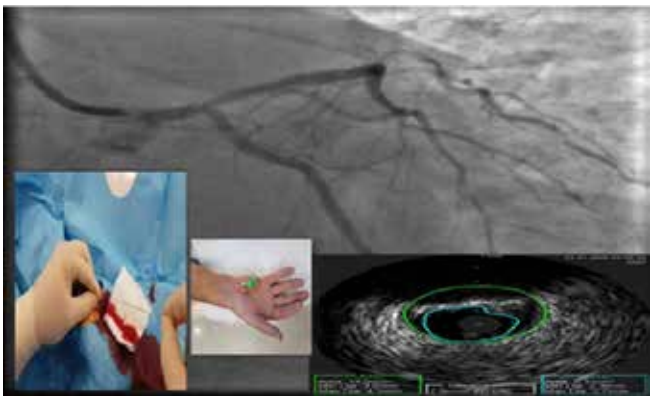


Figure 7.

Figure 8.

Figure 9.

Figure 10.

Figure 11.

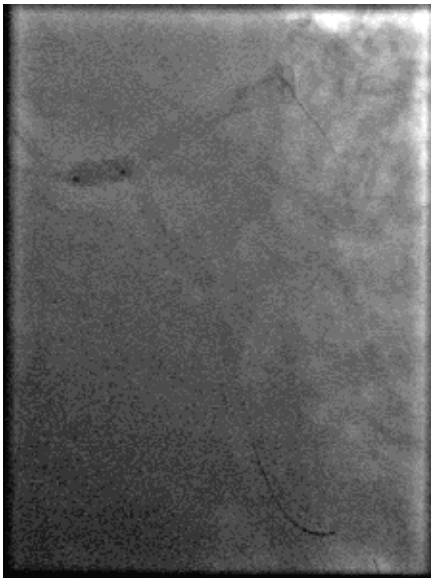


Figure 12.

Figure 13.

Figure 14.

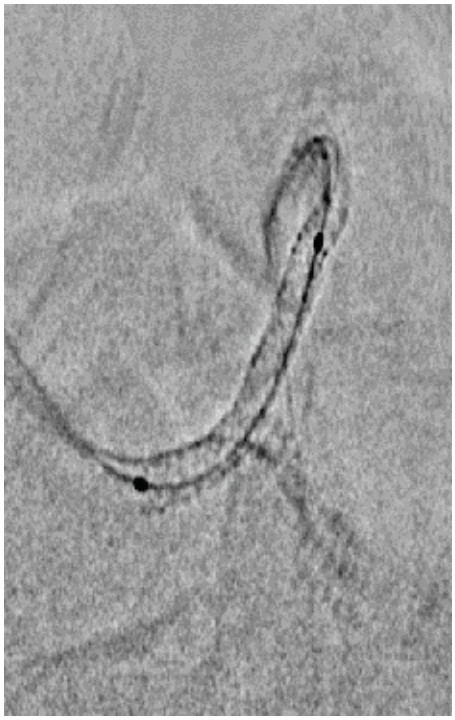


Figure 15.

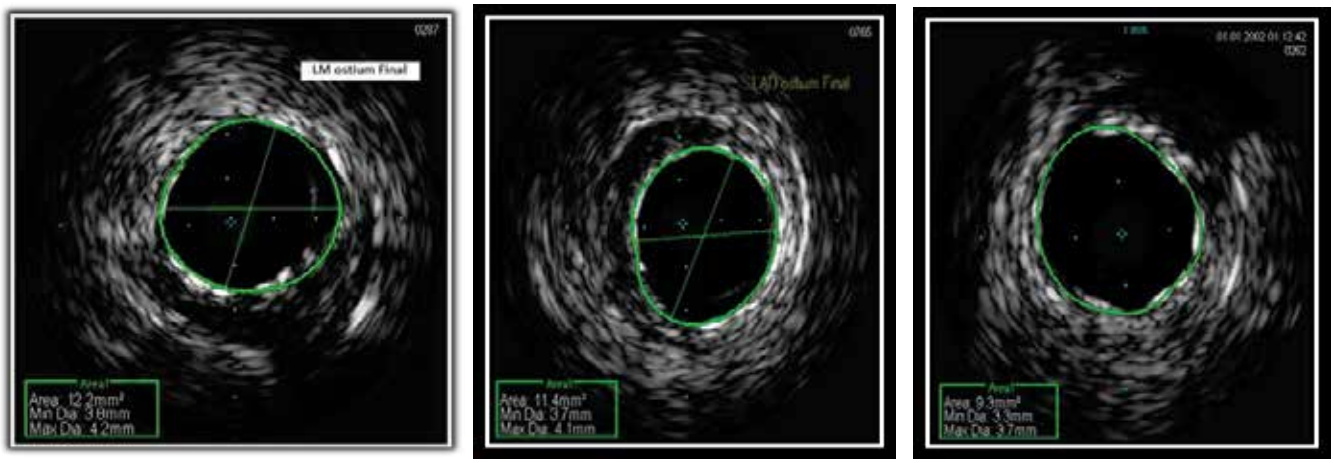


Figure 16. a-c

Figure 17. a, b

phy showed improvement of ejection fraction to 48%. One year follow-up is in progress.

Discussion

As a conclusion, although this new innovative approach could be suggested safe, feasible, and reliable to be used for coronary angiography and/or angioplasty with low complications, but they are at their early stages with about a follow-up period of 1-6 months; so more researches based on large clinical trials are recommended to be conducted in forthcoming months and years. Distal ulnar palmar approach is adequate suitable as the classic approaches/femoral, radial, ulnar, brachial/ for all kind of complex percutaneous interventions.
At the price of a more difficult puncture and risk of access failure, there are possible ergonomic advantages, with lower risk of upstream artery occlusion and shorter hemostasis
In case of complex coronary anatomy indicated for cardiosurgery, and patient refuses operation, PCI/LM/if possible/ is apsolutely indication and adequate solution . Complex Bifurcations remain a challenge for PCI. In such situations, IVUS guidance is preferred. Technique of LM stenting is preferable choise of the operator depending on the anatomy of the vessels and also from the experience of the team, especially experience of the leader of the team, the interventional cardiologyst is crucial for the success of the procedure.

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