



Stumpless Chronic Total Occlusions Revascularization Under CT Guidance

Khand A^{1*}, Rao U¹, Yang YH², Nair S³ and Binukrishnan S⁴

¹Department of Cardiology, Liverpool Heart and Chest Hospital, UK

²Department of Cardiology, Aintree University Hospital, UK

³Department of Cardiology, Glan Clwyd Hospital, UK

⁴Department of Radiology, Liverpool Heart and Chest Hospital, UK

Abstract

We present an interesting case of Chronic Total Occlusions (CTO) revascularization with virtually invisible stump, with the use of Computerized Tomography (CT) guided imaging in discerning the course and 3 dimensional reconstruction of coronary vascular anatomy, which ultimate led to a successful outcome.

Introduction

Chronic Total Occlusion (CTO) is defined as a Thrombolysis in Myocardial Infarction (TIMI) grade 0 flow within the occluded segment, with a duration >3 months [1]. Inability to cross a lesion with a guide wire can be a challenge for recanalization. This is also the main reason for procedural failure in CTO recanalization. It is particularly challenging in ostial or stumpless CTOs recanalization due to failure to accurately locate the ostium. Additional detailed anatomical evaluation by imaging technique prior to recanalization can provide advantage to accurately locate the stenosis, assess severity and act as microchannels in the case of stumpless lesions [2]. Several novel techniques including CT angiograms and IVUS guided wiring was used to improve success rate in stumpless CTO recanalization. Here we present a case utilizing Computerized (CT) guided imaging to reconstruct 3D coronary vascular anatomy for stumpless CTO recanalization.

Case Presentation

A 47-year-old male patient was accepted for coronary revascularization in a tertiary cardiac centre on the basis of ongoing angina despite antianginal and a strongly positive exercise test.

He had Chronic Total Occlusions (CTO) of Obtuse Marginal (OM1) branch, Right Coronary Artery (RCA) and diffuses Left Anterior Descending (LAD) artery disease. Physiological assessment of the LAD revealed flow limitation in the first Diagonal branch only (D1) (FFR=0.7). After HEART team discussion and consultation with patient regarding preference, a strategy of Percutaneous Coronary Intervention (PCI) was adopted leading to successful PCI of D1 and recanalization of the OM1 branch.

Recanalization of the RCA CTO was subsequently attempted due to ongoing angina symptoms. This was occluded proximally with no discernible stump, and no feasible retrograde wiring option (Figure 1a, 1b). CTCA with multiplanar reconstruction defined the relationship between the proximal patent artery, the occluded mid-RCA and the high marginal branches (Figure 1c-1f).

Dual arterial puncture was used for antegrade approach and for defining retrograde collaterals. The vessel course was guided by Right Anterior Oblique (RAO) view, lateral CT images and retrograde collaterals. Fielder XT wire (ASAHI, Japan) was able to traverse a microchannel in the CT defined proximal cap and retrograde collaterals confirmed the distal true lumen. The lesion proved uncrossable necessitating the use of excimer laser (0.7 mm catheter). A single drug eluting stent (2.75 mm × 38 mm) following pre-dilation achieved Thrombolysis in Myocardial Infarction (TIMI) 3 flow with no residual stenosis (Figure 1e).

Discussion

In a truly stumpless CTO, coronary anatomy clarification has been described in the literature by intravascular ultrasound, CTCA or retrograde wiring with puncture of the distal cap [3-5]. In our

OPEN ACCESS

*Correspondence:

Khand A, Department of Cardiology, Liverpool Heart and Chest Hospital, UK, E-mail: aleem.khand@lhch.nhs.uk

Received Date: 01 Jan 2020

Accepted Date: 25 Jan 2020

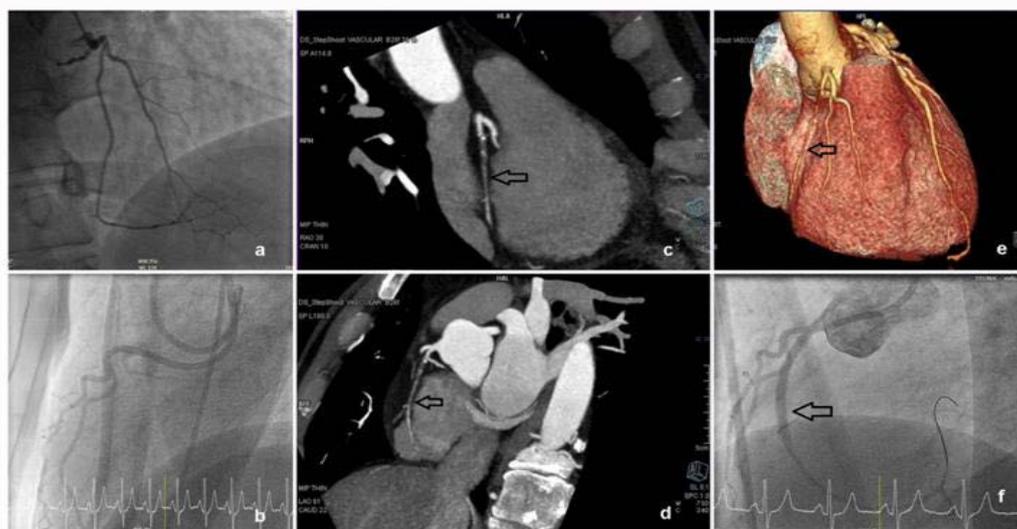
Published Date: 03 Feb 2020

Citation:

Khand A, Rao U, Yang YH, Nair S, Binukrishnan S. Stumpless Chronic Total Occlusions Revascularization Under CT Guidance. *Ann Clin Case Rep.* 2020; 5: 1795.

ISSN: 2474-1655

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Figures 1: a,b): RAO and Lateral Angiographic projections showing high marginal branches but RCA are not visualized. c,d): CT reconstruction images in RAO and lateral projections showing the course of the occluded RCA (black arrow). e): Showing 3-D CT reconstruction images of the course of RCA (black arrow). f): Final angiographic appearance of the recanalized RCA.

case, detailed CTCA reconstructions facilitated antegrade wiring and ultimately a successful procedure.

This case illustrates the pivotal nature of Computerized Tomography Coronary Angiogram (CTCA) in clarifying anatomy and thereby aiding in successful recanalization invisible stump.

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