Journal of Clinical & Experimental Cardiology
ISSN: 2155-9880

Mozid et al., J Clin Exp Cardiolog 2014, 5:9
DOI: 10.4172/2155-9880.1000338

Case Report Open Access

Bilateral Trans-radial/ulnar Access for Percutaneous Recanalization of a Chronic Total Coronary Artery Occlusion using Antegrade Dissection and Re-entry

Abdul M Mozid*, Kare H Tang and John R Davies

The Essex Cardiothoracic Centre, Basildon, Essex SS16 5NL, UK

Abstract

Percutaneous Coronary Intervention (PCI) for Chronic Total Occlusions (CTOs) necessitates dual arterial access to allow visualisation of the vessel both proximal and distal to the occlusion as well as the course of interventional collaterals. Potential access sites include bilateral femoral, combination of femoral and radial and bilateral radial arteries. Trans-ulnar access has been shown to be safe and feasible in patients with weak radial pulses and this is a further option. The advantages of radial/ulnar access relate to reduction in access site bleeding complications, which is particularly pertinent in CTO PCI where 7-8Fr guiding catheters are usually required. We describe a case of a patient undergoing repeat attempt at PCI of a Right Coronary Artery (RCA) CTO, the first attempt having been complicated by a life threatening retroperitoneal haemorrhage secondary to 8Fr femoral arterial access. Access was gained via the right ulnar artery and the left radial artery, a 7Fr JR4 guide catheter was used to intubate the RCA with a 5Fr EBU3.5 catheter in the left coronary artery providing contrast visualisation of the distal RCA. The CTO was successfully recanalized using antegrade dissection and re-entry technique with the Stingray™ catheter system without any access site complications. This case highlights the safety and feasibility of CTO PCI via bilateral trans-radial/ulnar access and this maybe the combination of choice in patients at high risk of access site bleeding.

Keywords: Chronic total occlusion; Antegrade dissection re-entry; Trans-radial intervention

Introduction

There is renewed enthusiasm for Percutaneous Coronary Intervention (PCI) for Chronic Total Occlusion (CTO) of coronary arteries. This is in part due to improved equipment and techniques, which have significantly improved the success rates of these complex procedures [1,2]. There is also strong data to suggest improved clinical outcomes in terms of morbidity and mortality in patients undergoing successful PCI of a CTO [3,4]. Furthermore, the incidence of major procedural complications has been shown to be relatively low and in particular the rate of vascular complications appears to be similar to non-CTO PCI despite the need for dual arterial access [5]. Traditionally, bilateral femoral arterial site has been utilised due to the need for 7-8Fr guiding catheters for back-up support and equipment delivery. Radial access for PCI has gained popularity in recent years due to lower rates of access site bleeding with similar procedural success rates in high volume centres [6]. Hence, there is increasing use of radial access for CTO procedures, usually in combination with femoral access or occasionally bilateral radial access [7]. In this case report we describe a case of bilateral trans-ulnar and trans-radial access to successfully perform PCI of a right coronary artery CTO using the Stingray™ (Boston Scientific) re-entry system.

Case Report

A 62 year old female was admitted to our tertiary centre for repeat attempt at PCI of a chronically occluded RCA. She had undergone failed attempt 4 months previously and this was complicated by a life threatening retroperitoneal haemorrhage secondary to 8Fr femoral arterial access. The patient remained significantly symptomatic with angina and was very keen on a repeat attempt.

Arterial access

Due to previous history of major femoral access site complication we planned to perform this procedure via bilateral trans-radial access. The right radial artery was weak in calibre so a 7Fr sheath was successfully inserted into the right ulnar artery and a 7Fr JR4 guide catheter was used to intubate the RCA (Figure 1a). A 7Fr sheath was inserted into the left radial artery however radial angiography showed severe spasm and dissection (Figure 1b). This was successfully negotiated with a 0.014" Whisper MS guide wire (Abbott Vascular) and a 5Fr EBU3.5 catheter was used to intubate the LCA.

Relevant catheterization findings: Diagnostic angiography revealed an ostial CTO of the previously proximally stented RCA with retrograde visualization of the distal RCA from the Left Coronary Artery (LCA) showing a long-segment of occlusion but good distal target for re-entry technique (Figures 1c and 1d).

Interventional management: The proximal cap of the ostial RCA occlusion was punctured with a Confienza Pro12 wire (Asahi Intecc.), which, backed up by a 135 cm Corsair microcatheter (Asahi Intecc.), was then successfully negotiated to the distal RCA and confirmed to be within stent in orthogonal views. However, the tip of the wire was clearly identified to be in the sub-intimal space adjacent to the distal vessel on retrograde contrast injection (Figure 2a). With no retrograde option available due to the limitations of a 5F guide catheter in the donor vessel, the only option was to try and re-enter the true lumen of the distal vessel. To maximise the chance of success, a Stingray™ balloon

***Corresponding author:** Abdul M Mozid, The Essex Cardiothoracic Centre, Basildon, Essex SS16 5NL, UK, Tel: +4484515531; E-mail: ammozid@hotmail.com

Received July 14, 2014; **Accepted** September 26, 2014; **Published** September 30, 2014

Citation: Mozid AM, Tang KH, Davies JR (2014) Bilateral Trans-radial/ulnar Access for Percutaneous Recanalization of a Chronic Total Coronary Artery Occlusion using Antegrade Dissection and Re-entry. J Clin Exp Cardiolog 5: 338. doi:10.4172/2155-9880.1000338

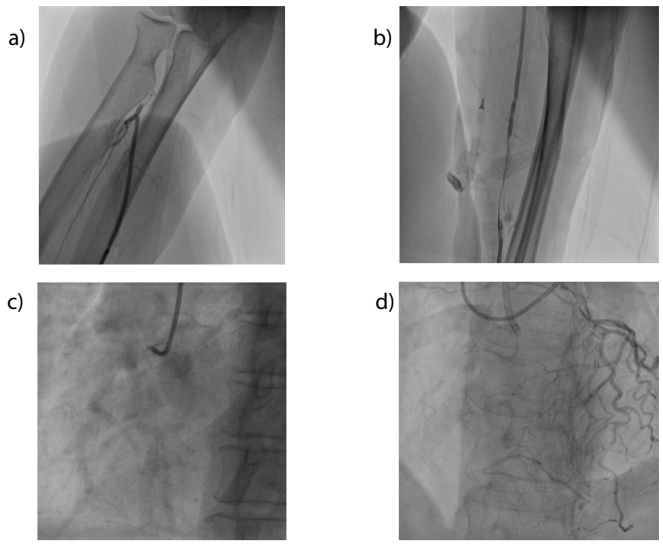

Figure 1: Baseline peripheral and coronary angiography. a) right ulnar angiogram showing good quality vessel and patent radial; b) left radial angiogram showing spasm and dissection which was successfully negotiated with a Whisper MS wire; c) right coronary artery angiogram showing ostial occlusion in-stent; d) distal right coronary artery visualisation via left coronary angiogram.

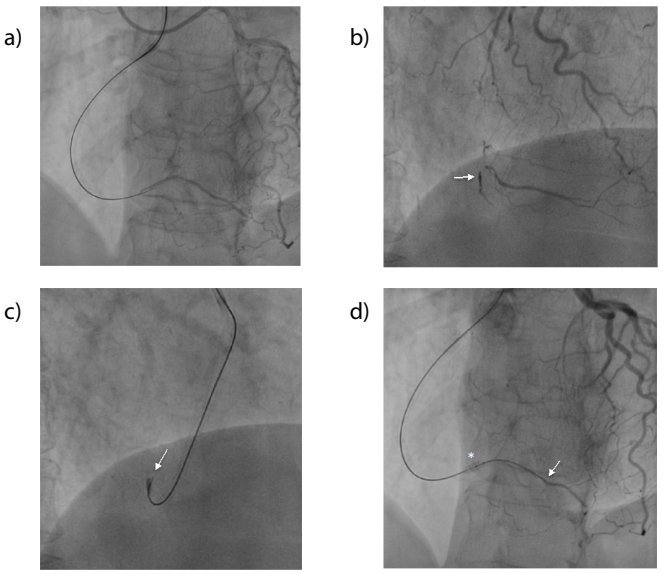

Figure 2: Antegrade dissection re-entry. a) Retrograde injection showed sub-intimal position of Confienza Pro12 wire,adjacent to good distal target for re-entry; b) Stingray™ catheter deployed In sub-intimal space (arrowed) RAO cranial view was best to align balloon with true lumen to the right of the catheter; c) Confienza wire used to re-enter true lumen (arrowed); d) Confienza wire passed easily to distal vessel (arrowed), Note: Stingray™ catheter now seen en face*.

catheter (Boston Scientific) re-entry technique was employed (Figures 2b-2d). A Confienza Pro12 wire was passed out of the proximal port of the Stingray™ balloon catheter entering the distal vessel at the first attempt. The Confienza wire was then exchanged for a Sion Blue wire (Asahi Intecc.) using the trapping technique. The ostial and proximal RCA stented segment was dilated with a compliant balloon ensuring adequate stent expansion using intravascular ultrasound guidance. The distal to mid RCA was pre-dilated and treated with two overlapping everolimus eluting stents with an excellent final angiographic result (Figure 3). The patient was discharged the following day without any complications. At 4 months follow-up, the patient remains free of angina with unlimited exercise tolerance.

Discussion

In this case report we have demonstrated successful recanalization of a RCA CTO using antegrade dissection entry technique via bilateral trans-radial/ulnar access. Femoral access was avoided given the patient's previous history of major retroperitoneal haemorrhage and considering that female sex and excessive anticoagulation (such as required during CTO procedures) are known risk factors for retroperitoneal haemorrhage [8].

Trans-radial PCI has gained popularity due to high profile studies demonstrating lower access site complications, reduced need for blood transfusion and reduced overall mortality [9-11]. Trans-ulnar access has also been demonstrated to be a safe and feasible access site in several published series even in patients with poor/absent ipsilateral radial pulse [12,13]. However, routine ulnar access is not recommended, as this is associated with a higher failure rate than radial access [14]. In our case, right ulnar artery access with a 7Fr sheath was safe and feasible in the presence of a weak ipsilateral radial pulse with no ischaemic complications.

Recanalization of CTOs via radial access has been shown to be feasible with comparable success rates to femoral access [7,15]. The incidence of vascular access complications has been shown to lower in patients undergoing radial access compared to femoral for CTO procedures [15]. The perceived advantages of femoral access mainly relate to the ability to deliver 8Fr guide catheters, which provide extra backup support as well as providing adequate lumen size for multiple device delivery. However, standard 7Fr, 7.5 sheath-less and even 8Fr guide catheters have been utilised for trans-radial intervention [16,17]. At our institution, our usual practice for CTO procedures is dual access via 8Fr right femoral and 7Fr right radial arterial access. In our experience it is usually possible to deliver a standard 7Fr guide catheter via the radial artery in most male patients and a significant proportion of female patients.

Antegrade dissection and re-entry using the Stingray™ catheter has recently improved success rate for CTO recanalization and this technique is now an established part of the hybrid algorithm [2,18]. Dual access is usually required to facilitate contralateral coronary artery contrast injection to visualise the re-entry zone distal to the CTO. Although the Stingray™ catheter is 6Fr compatible, at least 7Fr guide

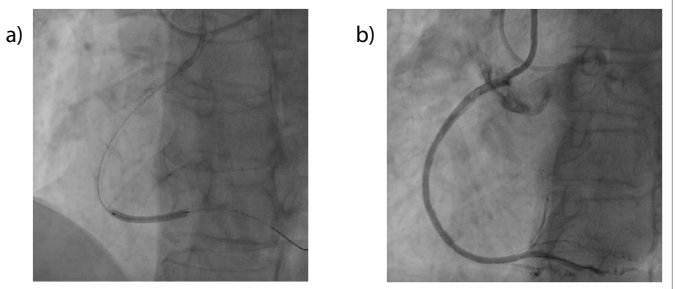

Figure 3: Stenting and final angiographic result. a) Confienza wire exchanged to a SionBlue using trapping technique and occlusion predilated and treated with two everolimus eluting stents; b) Final angiographic result (LAO view).

catheters are recommended to reliably perform catheter exchanges using the trapping balloon technique [19]. In our case, the limitations on donor vessel catheter size due to radial artery spasm mandated the case be successfully completed by an anterograde approach and the use of the Stingray™ catheter to maximise the chances of successful anterograde dissection re-entry.

Conclusions

Complex coronary intervention for CTO recanalization using antegrade dissection re-entry technique can be successfully performed via bilateral radial and ulnar access in patients at risk of access site bleeding complications.

References

1. Thompson CA, Jayne JE, Robb JF, Friedman BJ, Kaplan AV, et al. (2009) Retrograde techniques and the impact of operator volume on percutaneous intervention for coronary chronic total occlusions an early U.S. experience. JACC Cardiovasc Interv 2: 834-842.
2. Brilakis ES, Grantham JA, Rinfret S, Wyman RM, Burke MN, et al. (2012) Percutaneous treatment algorithm for crossing coronary chronic total occlusions. JACC Cardiovasc Interv 5: 367-379.
3. Jones DA, Weerackody R, Rathod K, Behar J, Gallagher S, et al. (2012) Successful recanalization of chronic total occlusions is associated with improved long-term survival. JACC Cardiovasc Interv 5: 380-388.
4. Joyal D, Afilalo J, Rinfret S (2010) Effectiveness of recanalization of chronic total occlusions: a systematic review and meta-analysis. Am Heart J 160: 179-187.
5. Patel VG, Brayton KM, Tamayo A, Mogabgab O, Michael TT, et al. (2013) Angiographic success and procedural complications in patients undergoing percutaneous coronary chronic total occlusion interventions: a weighted meta-analysis of 18,061 patients from 65 studies. JACC Cardiovasc Interv. 6: 128-136.
6. Jolly SS, Cairns J, Yusuf S, Niemela K, Steg PG, et al. (2013) Procedural Volume and Outcomes with Radial or Femoral access for coronary angiography and intervention. J Am Coll Cardiol 63: 954-963.
7. Burzotta F, De Vita M, Lefevre T, Tommasino A, Louvard Y, et al. (2014) Radial approach for percutaneous coronary interventions on chronic total occlusions: technical issues and data review. Catheter Cardiovasc Interv 83: 47-57.
8. Kent KC, Moscucci M, Mansour KA, DiMattia S, Gallagher S, et al. (1994) Retroperitoneal hematoma after cardiac catheterization: prevalence, risk factors, and optimal management. J Vasc Surg 20: 905-910.
9. Chase AJ, Fretz EB, Warburton WP, Klinke WP, Carere RG, et al. (2008) Association of the arterial access site at angioplasty with transfusion and mortality: the M.O.R.T.A.L study (Mortality benefit Of Reduced Transfusion after percutaneous coronary intervention via the Arm or Leg). Heart 94: 1019-1025.
10. Romagnoli E, Biondi-Zoccai G, Sciahbasi A, Politi L, Rigattieri S, et al. (2012) Radial versus femoral randomized investigation in ST-segment elevation acute coronary syndrome: the RIFLE-STEACS (Radial Versus Femoral Randomized Investigation in ST-Elevation Acute Coronary Syndrome) study. J Am Coll Cardiol 60: 2481-2489.
11. Jolly SS, Yusuf S, Cairns J, Niemela K, Xavier D, et al. (2011) Radial versus femoral access for coronary angiography and intervention in patients with acute coronary syndromes (RIVAL): a randomised, parallel group, multicentre trial. Lancet 377: 1409-1420.
12. Kedev S, Zafirovska B, Dharma S, Petkoska D (2014) Safety and feasibility of transulnar catheterization when ipsilateral radial access is not available. Catheter Cardiovasc Interv 83: E51-60.
13. Kwan TW, Ratcliffe JA, Chaudhry M, Huang Y, Wong S, et al. (2013) Transulnar catheterization in patients with ipsilateral radial artery occlusion. Catheter Cardiovasc Interv 82: E849-855.
14. Hahalis G, Tsigkas G, Xanthopoulou I, Deftereos S, Ziakas A, et al. (2013) Transulnar compared with transradial artery approach as a default strategy for coronary procedures: a randomized trial. The Transulnar or Transradial Instead of Coronary Transfemoral Angiographies Study (the AURA of ARTEMIS Study). Circ Cardiovasc Interv 6: 252-261.
15. Rathore S, Hakeem A, Pauriah M, Roberts E, Beaumont A, et al. (2009) A comparison of the transradial and the transfemoral approach in chronic total occlusion percutaneous coronary intervention. Catheter Cardiovasc Interv 73: 883-887.
16. Mamas MA, Fath-Ordoubadi F, Fraser DG (2008) Atraumatic complex transradial intervention using large bore sheathless guide catheter. Catheter Cardiovasc Interv 72: 357-364.
17. Wu SS, Galani RJ, Bahro A, Moore JA, Burket MW, et al. (2000) 8 french transradial coronary interventions: clinical outcome and late effects on the radial artery and hand function. J Invasive Cardiol 12: 605-609.
18. Whitlow PL, Burke MN, Lombardi WL, Wyman RM, Moses JW, et al. (2012) Use of a novel crossing and re-entry system in coronary chronic total occlusions that have failed standard crossing techniques: results of the FAST-CTOs (Facilitated Antegrade Steering Technique in Chronic Total Occlusions) trial. JACC Cardiovasc Interv. 5: 393-401.
19. Briliakis E (2014) Manual of Coronary Chronic Total Occlusion Interventions: A Step-by-Step Approach. Academic Press: 59-60.