



Chronic total occlusion special issue

"In this special issue of Interventional Cardiology, an array of high-level review articles on chronic total occlusion written by experts in the field are presented."

Since its pioneering years, interventional cardiology has faced the hurdle of dealing with the special case of chronic total occlusion (CTO). Long considered to be the 'last frontier' of percutaneous coronary interventions, it is only in the last decade that we have finally observed a significant breakthrough in this challenging field, mostly owing to new techniques and materials coming from Japan.

Chronic total occlusion procedures now constitute approximately 10–20% of all angioplasty operations at high-volume hospitals [1]. Advances, mainly in guidewire technology, and the development of new techniques have increased success rates up to an astounding 90% in specialized centers with experienced operators [2]. Concomitantly, a reduction of the CTO restenosis rate has been observed with the advent of drug-eluting stents [3].

New data have also highlighted the clinical benefits of CTO revascularization, which, in addition to angina relief, include improvement of left ventricular function, a reduction of major adverse cardiac events and perhaps increased survival rates [4]. However, an important hurdle on the road to wider utilization of CTO revascularization is that these are long, expensive procedures that expose the operators to high doses of radiation. A particularly steep learning curve also exists. Complexity of procedures and limited familiarity with new techniques may often lead to premature interruption of procedures, causing both physician and patient frustration and representing a common reason for referral to bypass surgery or for choosing medical treatment. Strict adherence to recently developed guidelines [5], especially concerning patient selection, equipment, facilities and proctoring, is thus, in our opinion, essential for an adequate set-up and maintenance of a successful CTO program.

Recent advances in CTO techniques that have broadened percutaneous coronary intervention indications and improved success rates can be categorized into antegrade and retrograde

approaches [6]. In the presence of visible contralateral collaterals, operators now widely use bilateral injections to allow for simultaneous antegrade and retrograde filling of the target vessel. Antegrade, parallel wire, controlled dissection and microchannel penetration techniques have been developed [7]. Techniques for retrograde penetration of the distal CTO cap are various, with the controlled antegrade and retrograde tracking [8], especially in its 'reverse' variety, being particularly popular. However, no consensus exists for selection of the initial approach to a CTO.

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In this special issue of *Interventional Cardiology*, an array of high-level review articles on CTO written by experts in the field are presented. These reviews are the result of a CTO Workshop held at the Catholic University of the Sacred Heart, Italy in June 2009. The topics covered range from the access site for the procedure, with an overview of the emerging radial access [9], to the serious strategic problem of the patient with both a CTO and an acute occlusion of another vessel [10]. Technical tips and tricks are widely explored with two papers from Professor Galassi's group [11,12], as well as the dilemma of which stent to choose in CTO [13]: whether to use additional intravascular imaging [14], or devices such as the CROSSER® [15]. Finally, Bernhard Reimers shares with us his large experience as a leading expert and organizer of CTO meetings covering the particularly thorny issue of how to avoid, and in some cases recognize and treat, the specific complications related to CTO treatment [16].



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Bibliography

- 1 Stone GW, Kandzari DE, Mehran R *et al.*: Percutaneous recanalization of chronically occluded coronary arteries. A consensus document. Part I. *Circulation* 112, 2364–2372 (2005).
- 2 Olivari Z, Rubartelli P, Piscione F *et al.*: Immediate results and one-year clinical outcome after percutaneous coronary interventions in chronic total occlusions: data from a multicenter, prospective, observational study (TOAST-GISE). *JACC* 41, 1672–1678 (2003).
- 3 Hoye A, Tanabe K, Lemos PA *et al.*: Significant reduction in restenosis after the use of sirolimus-eluting stents in the treatment of chronic total occlusions. *JACC* 43, 1954–1958 (2004).
- 4 Godino C, Mehran R, Dangas DG *et al.*: Clinical impact of percutaneous coronary intervention in totally occluded left anterior descending artery. *JACC* 53, A79 (2009).
- 5 Di Mario C, Werner GS, Sianos G *et al.*: European perspective in the recanalisation of chronic total occlusions (CTO): consensus document from the EuroCTO Club. *EuroIntervention* 3(1), 30–43 (2007).
- 6 Weisz G, Moses JW: Contemporary principles of coronary chronic total occlusion recanalization. *Catheter Cardiovasc. Interv.* 75(Suppl. 1), S21–S27 (2010).
- 7 Colombo A, Mikhail GW, Michev I *et al.*: Treating chronic total occlusions using subintimal tracking and reentry: the STAR technique. *Catheter Cardiovasc. Interv.* 64, 407–411 (2005).
- 8 Surmely JF, Tsuchikane E, Katoh O *et al.*: New concept for CTO recanalization using controlled antegrade and retrograde subintimal tracking: the CART technique. *J. Invasive Cardiol.* 18, 334–338 (2006).
- 9 Burzotta F, de Vita M, Trani C: Transradial approach for percutaneous coronary interventions on chronic total occlusions. *Interv. Cardiol.* 2(3), 417–425 (2010).
- 10 Maria Leone A, Giubilato S, de Caterina AR: Recanalization of a chronic total occlusion in ST-segment elevation myocardial infarction patients: why and when? *Interv. Cardiol.* 2(3), 427–433 (2010).
- 11 Galassi AR, Tomasello SD, Costanzo L, Tamburino C: Retrograde approach for chronic total occlusion percutaneous revascularization. *Interv. Cardiol.* 2(3), 391–403 (2010).
- 12 Galassi AR, Tomasello SD, Costanzo L, Tamburino C: Anterograde techniques for percutaneous revascularization of chronic total coronary occlusions. *Interv. Cardiol.* 2(3), 377–390 (2010).
- 13 Leo A, Giubilato S, Bacà M, Montone RA, Niccoli G: Stent for chronic total coronary occlusions: benefits and drawbacks after the introduction of drug-eluting stents. *Interv. Cardiol.* 2(3), 405–416 (2010).
- 14 Dato I, Hamilton-Craig C, Camaioni C, Porto I: Intracoronary imaging in chronic total occlusions. *Interv. Cardiol.* 2(3), 369–376 (2010).
- 15 Cannon L: Novel high-frequency vibration approach for recanalization of difficult coronary and peripheral chronic total occlusions. *Interv. Cardiol.* 2(3), 281–288 (2010).
- 16 Favero L, Penzo C, Nikas D *et al.*: Cardiac and extracardiac complications during CTO interventions: prevention and management. *Interv. Cardiol.* 355–367 (2010).