

## CTO TEAM



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Our physicians have PowerPoint presentations that can be presented to health care providers. For further information, please call.

## How to Refer Patients/CTO PCI procedure

We request your consideration of referral of CTO patients and look forward to sharing with you in their clinical improvement. To arrange an appointment for a patient, please call Gwen Herndon at 404.605.5049 (office); 404.550.1538 (mobile); or email at [gwendolyn.herndon@piedmont.org](mailto:gwendolyn.herndon@piedmont.org). Or, please contact one of the CTO Team physicians listed on this brochure by cell phone or email.

Every patient will be evaluated by a member of our CTO team, and the team member reviews the clinical scenario, angiograms and any other pertinent information (eg, results of the stress test, echocardiograms and electrocardiograms). We also invite the referring physician or patient to send the relevant data before making the appointment for timely review of the case. Following a review of the case by the CTO team, a decision is made regarding the appropriateness of proceeding with PCI, and the risks and benefits of the procedure are discussed in detail. In most cases, the patient is admitted for overnight hospitalization and is discharged home the next morning after being examined by a member of the CTO team and with scheduled follow-up with the referring physician.

### References:

1. Percutaneous transluminal coronary angioplasty of chronic total occlusions. Primary success, restenosis and long-term clinical follow-up. RJ Ivanhoe, WJ Weintraub, JS Douglas Jr, NJ Lembo, et al. *Circulation*, Vol 85, 106-115, 1992
2. Percutaneous recanalization of Chronically Occluded Coronary Arteries. Stone GW, Kandzari DE, Mehran R, Colombo A, et al. *Circulation* 2005;112:2364-2372
3. Retrograde techniques and the impact of operator volume on percutaneous intervention for coronary chronic total occlusions an early U.S. experience. Thompson CA, Jayne JE, Robb JF, Friedman BJ, et al *JACC Cardiovasc Interv.* 2009 Sep;2(9):834-42
4. Effects of stenting of recent or chronic coronary occlusions on late vessel patency and left ventricular function. Van Belle E, Blouard P, McFadden EP, Lablanche JM, et al. *Am J Cardiol.* 1997 Nov 1;80(9):1150-4.
5. Effectiveness of recanalization of chronic total occlusions: a systematic review and meta-analysis. Joyal D, Afilalo J, Rinfret S. *Am Heart J.* 2010 Jul;160(1):179-87.
6. In-hospital outcomes of contemporary percutaneous coronary intervention in patients with chronic total occlusion insights from the J-CTO Registry (Multicenter CTO Registry in Japan). Morino Y, Kimura T, Hayashi Y, Muramatsu T, et al. *JACC Cardiovasc Interv.* 2010 Feb;3(2):143-51.



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## Coronary Chronic Total Occlusion (CTO) Program

*Piedmont Heart Institute's commitment to progress and innovation*



[piedmontheart.org](http://piedmontheart.org)

*Dear Colleague,*

Chronic total coronary occlusions (CTO) remain a clinical dilemma and formidable challenge for clinicians caring for patients with cardiovascular disease. Because of technical challenges to treat these difficult lesions and uncertainties regarding patient selection, CTOs have been described as the 'last great barrier to percutaneous coronary intervention (PCI) success.' For these reasons alone, despite their presence in up to 1/3 of patients with advanced coronary disease, a CTO remains the most common reason for referral to bypass surgery or deferral to medication therapy alone.

Increasing evidence supports the clinical benefit of percutaneous revascularization of CTOs to improve left ventricular function, reduce angina severity and perhaps improve long-term survival. In addition to advances in technique and technology, recent study has further refined the patient selection and appropriateness to identify those who most benefit from CTO revascularization.

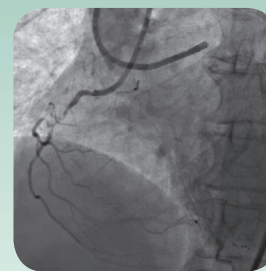
At the Piedmont Heart Institute, we have developed a nationally recognized CTO program involving physicians who have been long dedicated to the evaluation and treatment of CTO patients in every perspective, including:

- Completion of approximately 300 cases since program initiation.
- Demonstrated success rate that exceeds 90%—well above the national average of 65%— with a safety record on par with routine non-CTO coronary PCI.
- Advanced training both nationally and internationally among all operators with 2 dedicated CTO days in the catheterization laboratory every week.
- Expertise in all advanced CTO PCI techniques, including retrograde and antegrade coronary angioplasty, including CART (Controlled Antegrade and Retrograde tracking), reverse CART, IVUS- and Stingray Catheter-directed re-entry, STAR (Subintimal Tracking And Re-Entry) and LAST (Limited Antegrade Subintimal tracking).
- Team approach to CTO cases with case review and performance of all CTO procedures with 2 operators.
- Leadership in CTO revascularization among PHI clinicians including:
  - Leadership, design and conduct of clinical trials specific to CTO patients.
  - Development and evaluation of novel CTO technologies and techniques.
  - Authorship of leading articles on CTO revascularization and outcomes.
  - Performance of advanced noninvasive imaging with CT angiography and/or cardiac MRI to predict procedural success and identify patients who may best derive long-term clinical benefit.
  - Host center of training and education for international thought leaders and practitioners of CTO revascularization.

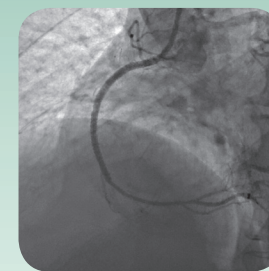
## Six pre- and post-cases with a brief history and wires/techniques used:

### Case 1

Chronically occluded right coronary artery (RCA) shown before (A) and after (B) revascularization. The vessel was recanalized via the retrograde approach from the left anterior descending (LAD) septal collaterals using the reverse CART and IVUS directed re-entry techniques.



Insert A



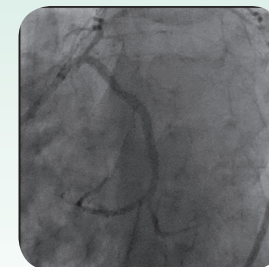
Insert B

### Case 2

Insert C represents two sequential CTOs in the mid and distal segments of the left circumflex artery in a patient with refractory angina. The vessel was recanalized via a retrograde approach via epicardial collaterals from the LAD using a direct re-entry technique in the left main artery. Following successful stent revascularization (insert D), the patient experienced complete resolution of angina symptoms.



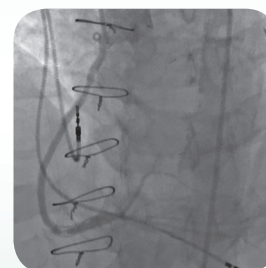
Insert C



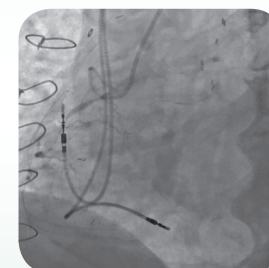
Insert D

### Case 3

This case represents a patient 15 years after bypass surgery who underwent multiple percutaneous interventions to the vein graft to the RCA for recurrent in-stent restenosis (E; native chronically occluded RCA, insert F). Figure G shows the final angiographic result after PCI of the native RCA CTO, accomplished via a retrograde approach from the SVG and reverse CART for re-entry into the native proximal RCA.



Insert E



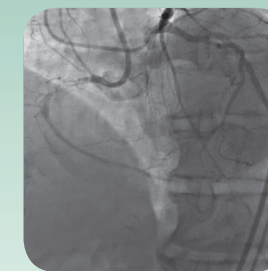
Insert F



Insert G

### Case 4

An RCA CTO with challenging proximal anatomy (H) was recanalized via the an antegrade approach (I) using distal true lumen re-entry using the Stingray balloon and wire.



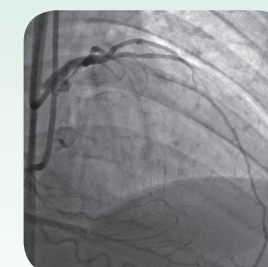
Insert H



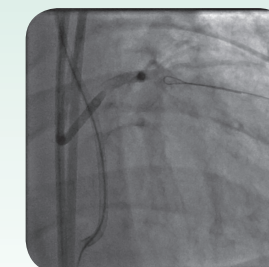
Insert I

### Case 5

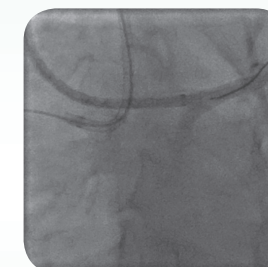
In a patient with chest pain despite medical therapy and a large reversible anterior wall defect by nuclear stress test, an LAD CTO (J) was attempted twice unsuccessfully via the antegrade approach in two referring hospitals. The CTO was approached via the retrograde approach from the RCA septal collateral vessels (K). Complex re-entry was performed in the left main artery (L) after guidewire replacement in all the major epicardial vessels to secure their patency. Symptoms resolved after successful PCI (M).



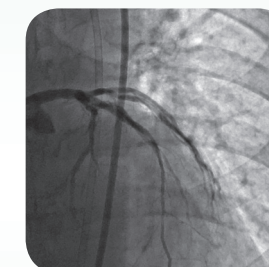
Insert J



Insert K



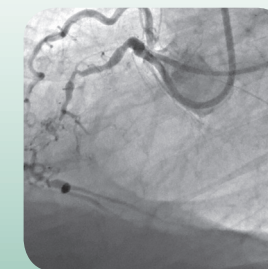
Insert L



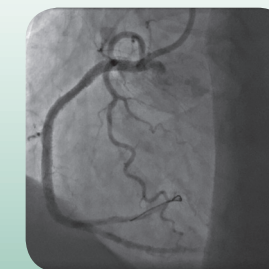
Insert M

### Case 6

A very long complex RCA CTO (N) was recanalized via the antegrade approach using the STAR technique, and distal intraluminal wire position was confirmed by IVUS. The final angiographic result after stenting is shown (O).



Insert N



Insert O