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Editorial

CTO-PCI: Finding the Right Patient and using the Right Technique

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Over the last decade, refinements in technology have led to increased options in the treatment of chronic total occlusions (CTO). Dedicated CTO operators have pushed the envelope in improving skill sets and driving manufacturers to produce better coronary wires and microcatheters.

In this issue, Schumacher et al. [1] provide a comprehensive overview and a global perspective of the current state of CTO percutaneous coronary intervention (PCI) and technical approaches.

Successful CTO-PCI can be achieved in 90% of cases with careful angiographic evaluation and application of the Japanese CTO (J-CTO) [2,3] and PROGRESS CTO [4] scores that predict procedural outcomes [5]. Utilization of the HYBRID [6] algorithm enhances options for technical success [7]. The indirect benefit has been the availability of tools and techniques for PCI operators in non-CTO cases.

Clinical trials [8] have not, however, demonstrated the much-anticipated benefits such as relief of angina, improvement in left ventricular ejection fraction, or decrease in mortality [9]. At best, there has been improvement in quality of life and perhaps anginal equivalent symptoms [10]. CTO-PCI is an elective procedure, and the risk-benefit ratio has not materialized with increased procedural complications. Compared to elective non-CTO-PCI in the Cath/PCI registry, (Table 1) rates of myocardial infarction (2.7% vs. 1.7%), perforation (4.8%), tamponade (2.3% vs. 0.7%), and groin hematoma (4.3% vs. 0.68%) were reported in the open CTO registry [11]. Overall complication rates were 4.5% with elective PCI and 14.5% with CTO-PCI (Table 1) [12]. Other risks include radiation excess for both the patient and physician and contrast-induced acute kidney injury.

The risks have yet to justify the benefits, and this is unclear in many patients where intervention is no better than optimal medical therapy. CTO-PCI is probably underutilized, at 5% of all PCI cases, whereas the incidence of CTO-PCI is approximately 20% in diagnostic angiography and 50% in post-coronary artery bypass graft patients [6]. While CTO-PCI has generated a lot of talent, selection of the most appropriate cases remains elusive. CTO-PCI of small vessels is probably not justified, and intervention should probably be offered to those with disabling angina or anginal equivalent symptoms despite optimal medical therapy to medium or large vessels supplying >10 % of the myocardium [13].

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Table 1
Complication rates of percutaneous coronary intervention in chronic total occlusions in the Open CTO registry vs elective PCI in the Cath/PCI Registry

Complications (Values are n (%))		
	Open CTO	Cath/PCI Registry
Any complication	14.5	4.53
Death	0.8	0.65
Stroke	0.0	0.15
Myocardial infarction	2.7	1.7
Clinically significant coronary perforation	4.8	
Vascular complication	0.7	0.28
GI bleeding or other bleeding requiring treatment	0.2	0.19
Contrast nephropathy	0.8	0.19
Access-site hematoma	4.3	0.68
Cardiac surgery	0.5	0.81
Repeat PCI in-hospital	0.1	
Septal hematoma	1.4	
Pericardial effusion	2.3	0.07
Donor-vessel thrombosis or dissection	1.9	
Acute radiation dermatitis	0.1	

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