patients with CTOs remaining asymptomatic on optimal medical therapy.

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REPLY: Strong Bias Toward Performing Percutaneous Coronary Intervention in Patients With Chronic Total Occlusion Despite Lack of Important Benefit at a Very High Cost and Risk to the Patient

We are grateful to Dr. Mohaved for his insightful comments on our paper (1). A point by point response follows:

1. The EXPLORE (Evaluating Xience and Left Ventricular Function in Percutaneous Coronary Intervention on Occlusions After ST-Elevation Myocardial Infarction) trial. We agree that chronic total occlusion (CTO) percutaneous coronary intervention (PCI) should not be performed in most patients presenting with ST-segment elevation myocardial infarction during the index hospitalization, even though the CTO PCI success rates in the study (73%) were significantly lower than those currently achieved at experienced centers.
2. The DECISION-CTO (Drug-Eluting Stent Implantation Versus Optimal Medical Treatment in Patients With Chronic Total Occlusion) trial was not a trial of CTO PCI versus medical therapy, but a trial in which most patients had multivessel disease and a CTO. It is unclear whether patients had ischemia or symptoms after non-CTO lesions were treated and why the crossover from medical therapy to CTO PCI (in 18% of patients) was not counted as part of the primary endpoint (death, myocardial infarction, or revascularization).
3. In the EuroCTO trial (A Randomized Multicentre Trial to Evaluate the Utilization of Revascularization or Optimal Medical Therapy for the Treatment of Chronic Total Coronary Occlusions), CTO PCI was associated with better quality of life at 12 months compared with medical therapy, as assessed by the Seattle Angina Questionnaire angina frequency ($p = 0.003$) and quality of life ($p = 0.007$).
4. Reference 5 was an abstract, not a publication. We agree that there are limited data that CTO PCI can reduce subsequent death or myocardial infarction, and suggest that "the primary indication for offering and performing CTO PCI should be the alleviation of symptoms."
5. "Validity of comparison between successful and failed CTO PCI": As mentioned in our review, "such analyses have multiple inherent limitations"; that is why we did not discuss these studies.
6. "Failed to mention many negative large observational studies": Reference 8 is a single-center observational study; we only included multicenter studies in our review. Reference 9 compares successful versus failed CTO PCI, which as discussed in the preceding text is an invalid comparison.
7. "CTO PCI is a very costly and risky procedure with no clear benefit, it should only be performed in very selected rare cases of severe refractory angina. However, this type of scenario is extremely rare." We respectfully disagree with several

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aspects of this statement. The average risk of CTO PCI is approximately 3%, which for many patients is perfectly acceptable (97% chance to not have a complication). CTO PCI is more costly than non-CTO PCI; however medical therapy can also be costly, as can be subsequent medical care. There is clear symptomatic benefit of CTO PCI, based on the best available data (Euro CTO trial). Many of us see several patients who benefit from CTO PCI in everyday practice.

CTO PCI has substantially evolved in recent years with increasing success and decreasing complication rates. CTO PCI is a tool, as is medical therapy and surgical revascularization, both of which are chosen for several patients with CTOs.

We believe that "CTO PCI should be performed when the anticipated benefits exceed the potential short- and long-term risks," which is true for all medical interventions. We also believe that our mission as physicians is to help each patient make this determination by presenting both sides of the equation in an objective and balanced fashion.

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RESEARCH CORRESPONDENCE

Percutaneous Coronary Intervention Versus Robotic-Assisted Coronary Artery Bypass for Left Anterior Descending Artery Chronic Total Occlusion

Revascularization for left anterior descending artery (LAD) chronic total occlusion (CTO) lesions usually requires coronary artery bypass grafting (CABG) via sternotomy. Recent advances in CTO percutaneous coronary intervention (PCI) techniques, including a rapid escalation of the hybrid algorithm involving antegrade wire escalation, retrograde techniques, and controlled antegrade retrograde subintimal tracking techniques, have resulted in higher procedural success rates (1). Similarly, surgical techniques have evolved to minimally invasive CABG using the left internal mammary artery (LIMA). One such surgical technique is the robotic-assisted minimally invasive coronary artery bypass (RACAB). During RACAB, the robot is used in the LIMA harvest, the pericardiotomy, and for identification of the LAD. The graft anastomosis is performed manually through a 3- to 4-cm thoracotomy without requirement for cardiopulmonary bypass. The RACAB surgery confers faster healing and recovery times, and reduced infection risk, allowing for earlier patient mobilization and discharge. These contemporary revascularization techniques have been shown to be safe and effective, and may both be offered to patients with LAD CTO (2). However, presently, there are no studies comparing outcomes