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Editorial

It is time to have better oversite and accountability in performing too many not indicated percutaneous coronary interventions in patients with chronic total occlusions

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With the introduction of percutaneous coronary intervention (PCI) by Dr. Gruntzig [1], treatment of coronary disease underwent revolution and led to PCI being one of most commonly performed procedures in the world. Since the first PCI, many decades had passed with numerous clinical trials that are available to address various clinical scenarios. It is now clear that real mortality benefit of PCI occurs mostly in the treatment of patients with acute coronary syndrome [2]. PCI performed in the setting of stable coronary artery disease has rarely shown any mortality benefit even in the case of proven ischemia [3,4]. Most revascularization benefit in stable coronary artery disease has been found in patients with significant left main or three vessel coronary disease undergoing coronary bypass surgery. The lack of significant benefit of PCI in the setting of chronic total occlusion (CTO) has been shown in many well-performed clinical trials. This lack of significant benefit in the majority of patients should not be surprising as CTOs are per definition in the categories of stable coronary disease. An occluded coronary vessel per CTO definition should be present over than 3 months in order to be called CTO. Initial enthusiasm looking at the poorly designed published non-randomized studies in CTO patients have been shown to be severely flawed. Comparing successful PCI vs failed PCI for outcome measure is absurd. In this type of comparison, any adverse event that occurred in the failed PCI group including death, perforation, bleeding, contrast induced nephropathy etc. all have been accounted in the group of unsuccessful PCI arm despite the fact that these adverse events would never have occurred if these patients were treated only with optimal medical therapy. Furthermore, patients in the unsuccessful PCI arm had worse baseline characteristic which alone would increase mortality risk [6,7]. In addition, failed PCI group had significantly higher in-hospital mortality (1.44% versus 0.5%), MI (3.17% versus 2.4%), urgent CABG (4.0% versus 0.5%) coronary perforations and tamponade. Despite worse baseline characteristics present in unsuccessful PCI patients, not all observational studies are showing worse outcome in the unsuccessful PCI CTO arm like B-CTO [8]. Some operators believe that CTO intervention may improve left ventricular dysfunction but this presumption has been proven to be false. Explore trial for example has showed no improvement in LV function with higher cardiac death in the PCI CTO arm (6.0% vs 1.0%, $P = 0.02$).

In the DECSION Trial, there was absolutely no benefit in any hard or soft outcomes including any subgroups and patients with low ejection fraction or involving left anterior descending artery [9]. Euro CTO showed no differences in the most important hard points such as quality of life, treatment satisfaction, angina stability, and mortality. A meta-analysis of patients with CTO undergoing PCI vs medical therapy (not unsuccessful vs successful intervention) was presented as an abstract at the ACC 2018 scientific session involving 5518 patients from 6 trials showing no differences in any MACE including cardiac death, myocardial infarction or repeat revascularization between the groups.

In many national and international conferences, we see live cases demonstrating CTO intervention in patients that had no indication to undergo the procedure. Many of them showing small severely and diffusely diseased CTO vessel that would hardly cause any refractory symptoms. We see long cases with a lot of radiation, contrast use and equipment with extremely high cost to the payer and high procedural risk to the patients with hardly any proven benefit.

It is very unfortunate that despite strong evidence of lack of benefit of CTO PCI in the majority of patients, strong industrial push is made to teach and encourage physicians to perform these procedures. I have seen many patients with severe adverse event due to CTO procedure such as death, perforation, bleeding, contrast induced nephropathy and myocardial infarction that could have been avoided if strong push for CTO intervention were not present. Furthermore, offering CTO

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intervention courses indiscrimently to interventionists encourage them to perform this procedure in many non-indicated patients.

I believe CTO PCI could be performed in extremely rare cases of very refactory angina if a vessel supplying large ischemic territory fails to response to maximal medical therapy. However, this type of scenario is extremely rare. I have published many papers about CTO intervention and actually developed with my colleagues a scoring system about anterograde approach to CTO PCI [10]. However, with more evidence being published about lack of CTO PCI benefit, performing CTO intervention should be very rare as optimal medical therapy has been very successful. In my own practice, I have hardly found any patient that has more than class 2 angina on optimal medical therapy and actually the vast majority have no angina at all. I hope that we as interventionist start to accept the fact about lack of CTO PCI benefit in vast majority of patients and accept that because we can, does not mean we should do it. Unfortunately, CTO PCI remains very popular in the interventional conferences due to lucrative financial incentive for operators and strong support from industry. Despite recently published negative trials, CTO advocates have not changed their risky behavior toward our patients.

What is the solution? With raising healthcare cost, we should do our best to prevent unnecessary expensive procedures particularly when it can cause great harm to our patients with hardly any benefit such as CTO intervention. It is time that payers and medical societies start to be active and start having better oversite and accountability for physicians performing CTO interventions. First of all, we have to prevent indicriminate industrial support for offering misleading teaching and courses in regards to CTO interventions. Second of all, every single CTO procedure should be reviewed by two non-interventionists from different institutions before it can be approved or reimbursed. Furthermore, educating patients and changing interventional conferences to a neutral fact presentation by inviting contra opinion in their seminars can reduce bias toward performing CTO interventions and may help to prevent many of unnecessary CTO procedures and prevent many harms.

Conflict of interest

None.

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