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Editorial Comment

Thrombo-Atherectomy: Hope for Pesky Thrombus-Containing Lesions?

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Angiographic lesion morphology remains an important predictor of acute and long-term clinical outcomes after percutaneous coronary interventional (PCI) procedures even in the current era of the stent. Chronic total occlusions and thrombus-containing lesions present perhaps the greatest risk for failed PCI due to technical issues or procedural-related clinical events such as no-flow or distal embolization [1]. These lesion subsets may indeed benefit form a novel mechanical solution to address the technical limitations of existing devices applied to the treatment of these pesky lesion subsets.

Thrombus-containing lesions represent a subset of lesions with a high risk for procedural-related thrombotic or flow-mediated complications. Thrombolytic and anticoagulant therapies have generally proven unreliable in preventing procedural-related thrombotic events and improving clinical outcomes. Antiplatelet therapies with GP IIb/IIIa inhibitors (abciximab, eptifibatide, tirofiban) have been shown to improve clinical outcome with PCI in patients with acute coronary syndromes by reducing procedural-related myocardial infarctions. Only anecdotal evidence supports the use of GP IIb/IIIa inhibitors for PCI of thrombus-containing lesions [1].

Several mechanical solutions have been proposed for intracoronary thrombectomy. The transluminal extraction catheter (TEC) was the first device developed for the purpose of cutting and aspirating thrombus [2]. The physical properties (profile and flexibility) of the TEC catheter, however, substantially limited clinical adoption of the device and caused a high frequency of dissections as well as distal embolic events. The incompatibility of the TEC catheter with contemporary-sized (6–8 Fr) guide catheters and guidewires also impacted negatively on the clinical integration of this device. The POSSIS Angiojet rheolytic thrombectomy system has been developed for peripheral vascular and selected coronary arterial lesion subsets [3]. The POSSIS catheter utilizes a unique high-pressure fluid jet and aspiration system to remove thrombus. The device is well proven for the treatment of thrombotic occlusion of peripheral vascular grafts and native vessels. The device, however, has limited application for intracoronary thrombus due to profile and a high probability for bradyarrhythmias as well as adverse hemodynamic consequences.

The X-Sizer (EndiCor Medical, San Clemente, CA), as described by Kwok et al. [4], is an 8 Fr–compatible excisional thrombo-atherectomy catheter with 2.0 and 2.3 mm tip sizes. The X-Sizer removes thrombo-embolic debris by cutting with a rotating helical cutter (2,100 rpm) while aspirating the material away from the lesion through the central catheter lumen into a vacuum bottle. This excisional atherectomy device, unlike the TEC, is compatible with off-the-shelf 0.014″ guidewires.

Kwok et al. [4] report a retrospective angiographic analysis of the initial clinical application of the X-Sizer for the treatment of 14 complex noncalcified and thrombus-containing lesions as part of an 85-patient international multicenter phase I clinical trial [5]. Patients treated with GP IIb/IIIa inhibitors were excluded from this retrospective study. The report of Kwok et al. [4], unfortunately, reminds one of past experiences with similarly designed thrombo-atherectomy devices. The acute gain after thrombo-atherectomy with the X-Sizer was approximately 1 mm, which equates to 50% or less of the cutter dimensions (2.0 or 2.3 mm). The cut-and-suck approach effectively removed the entire thrombus in four of nine patients (40%), while three patients (33%) had persistent thrombus after the X-Sizer and adjunctive therapy with PTCA or stenting. Distal embolization occurred in only one of 14 patients; unfortunately, periprocedural CPK data and the incidence of myocardial infarction were not reported in this angiographic study.

Kwok et al. [4] identify yet another potential mechanical approach for dealing with complex or thrombus-containing lesions. These feasibility data must be supported by clinical efficacy documented in the randomized multicenter trial comparing the X-Sizer with PTCA while employing contemporary mechanical (stents, embolic protection) and pharmacological therapies (GP IIb/IIIa inhibitors). An approach harmonizing mechanical and pharmacological therapies will likely prove more efficacious than simply aspirating thrombus.

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