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Commentary: When the going gets... stuck

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Severe coronary artery calcification affects up to 20% of patients undergoing percutaneous coronary intervention,¹ and a high burden of coronary calcium has been associated with increased risk of both procedural (eg, stent malpositioning,² coronary perforation,³ and dissection⁴) and post-procedural (eg, intrastent thrombosis and restenosis⁵) complications.

In this frame, rotational atherectomy (RA) was introduced in the late 1980s⁶ as an endovascular technique to ablate inelastic, endoluminal calcific debris by forward advancement of a rotating, diamond-tipped, abrasive burr. Although it was originally conceived as a generalized debulking strategy, RA became, over time, an elective preparatory step preceding balloon angioplasty and stenting in severely calcified atherosclerotic lesions.

Waterford and colleagues⁷ report the case of a patient with a history of coronary artery bypass grafting who underwent coronary catheterization 8 years afterward for recurrence of symptoms. The patient was offered RA for treating a calcified lesion in the mid segment of the left anterior descending artery, distal to the anastomotic site of the failed graft. After runs of ablation, the burr could not be pulled back from the coronary artery despite exhaustion of catheter-based removal techniques, and cardiac surgery consultation was required. After redo midline sternotomy, the authors were able to remove the burr through an already existing, guidewire-related perforation site at the distal left anterior descending artery, which was

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CENTRAL MESSAGE

Retained rotational atherectomy device is a challenge surgeons rarely face. Removal requires inventive antegrade and/or retrograde approaches with concomitant surgical revascularization.

elongated longitudinally and then bypassed with a vein conduit. Although the authors divided the drive shaft and retrieved it in a 2-step fashion (1 part through the aortotomy intraoperatively and 1 part from the femoral artery postoperatively), they also recognized that retrieval can be thoroughly achieved peripherally, without the need to perform an aortotomy.

Entrapment during RA occurs in relation to the presence of a diamond coating on the front, but not the back, of the bullet-shaped burr, which does not allow for retrograde ablation. Thus, if the burr passes distally to a narrow, unablated segment of a calcified plaque, proximal movements become impaired, and the device may be impossible to retrieve. A burr-to-artery diameter ratio of 0.5 to 0.6 and gradual burr advancement with a pecking motion have been reported to help avoid entrapment,⁸ but the incidence of burr entrapment still ranges from 0.5% to 1% of RA series.⁹

This complication is usually unraveled in a catheter-based fashion with several techniques (detailed elsewhere), which include balloon angioplasty (immediately proximal to the burr via the same or a coaxial guide catheter) and deep catheter intubation.⁸ Nevertheless, cardiac surgery consultation becomes mandatory if retrieval is unsuccessful and if severe coronary dissection or perforation occur simultaneously, with the dual goal of both retrieving the device and providing the area of myocardium downstream with collateral blood supply.

Waterford and colleagues⁷ must be congratulated for enriching the existing literature on this topic with an additional case report, and for simultaneously summarizing technical pearls for the surgical management of this rare, yet potentially severe, complication.

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