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Commentary: In harm's way: The circumflex artery and mitral surgery

Patrick M. McCarthy, MD

For decades, we have known that the circumflex artery may run a course close to the mitral valve annulus and is at risk of injury during a mitral valve procedure. The article by Caruso and colleagues¹ adds to the body of knowledge by reporting on 95 patients who underwent coronary computed tomography (CT) angiography with calculations made of the distance from the circumflex artery to the posterior mitral annulus between the commissures. They divided this into 5 zones and, unsurprisingly, found that the closest distance was between the anterolateral commissure and along segment P1. What was surprising was just how close the artery was in that high-risk zone (defined as <3 mm), with 25% falling into that range and a mean distance of only 1.94 ± 0.8 mm. In addition, as expected, the left dominant and codominant circulations had a shorter distance along each zone.

So what do we do with these data? The authors suggest that choosing a sternotomy instead of right thoracotomy approach may be warranted in the high-risk group. Circumflex injury certainly creates a difficult clinical scenario when performing surgery via thoracotomy.² That is a prudent choice. But there is a disconnect between the 25% risk and the actual perceived low occurrence of perioperative myocardial infarction (MI). Most enthusiasts of the right thoracotomy approach, and mitral surgeons in general, observe a 1% to 2% occurrence of perioperative MI. No

Patrick M. McCarthy, MD

CENTRAL MESSAGE

From the anterior commissure, along P₁, the distance of the circumflex artery to the mitral annulus was high risk for injury in 25% (1.94 ± 0.8 mm). Proper suture placement is key to avoid injury.

technique can eliminate the risk of circumflex injury, but it can be reduced from 25% by attention to detail. In any surgical approach, proper suture placement is key, and in each case the surgeon should assume that the circumflex is at risk near the commissure and P₁ (and P₂ for patients with a left dominant circulation). Thus, preoperative coronary CT angiography is not necessary. The repair sutures should enter and exit the tissue as close as possible and into the annular tissue, using various needle loads and angles to accomplish this, but avoiding suture placement into leaflet tissue, as the leaflet may tear and lead to an mitral regurgitation jet that hits the ring and causes hemolysis. Replacement sutures should enter through the annulus or on the edge of the annulus, and the needle should exit through the annulus or free edge of the remaining leaflet tissue (in a chord-sparing procedure). There are many potential pitfalls in mitral surgery; this report reminds us of a common concern and provides excellent new data.

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From the Division of Cardiac Surgery, Department of Surgery, Bluhm Cardiovascular Institute, Northwestern University Feinberg School of Medicine and Northwestern Medicine, Chicago, Ill.

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Address for reprints: Patrick M. McCarthy, MD, Division of Cardiac Surgery, Northwestern University, 676 North Saint Clair St, Suite 730, Chicago, IL 60611 (E-mail: Patrick.McCarthy@nm.org).

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