Commentary: Tricuspid: The frustrating and unloved valve

Patrick M. McCarthy, MD

In this issue of the Journal, we have an overview of new information about the tricuspid valve (TV) and an observation that it is no longer forgotten. Braunwald and colleagues are credited with our long trend to ignore it at the time of mitral surgery because usually tricuspid regurgitation (TR) stays the same or decreases after mitral surgery. We learned better, though, and recognized that it can start as something annoying, like a leaky septic system smell in your basement that you can’t pinpoint, but you know there may be big trouble ahead. Quietly, TR causes fatigue, some edema, but nothing some diuretics can’t make look better. Eventually, ascites may become more visible, and the liver and kidney function are getting worse. Finally, cardiac cirrhosis sets in.

The results of surgery aren’t very good compared with other valves, so oftentimes patients aren’t referred to surgery until late, when the right ventricle is dilated and it doesn’t contract well. Late referral bias causes a loop that has been hard to break among primary care and general cardiologists. The risk is high because of the failed ventricle, vasoplegia after surgery, and multiorgan failure. The operative mortality of isolated tricuspid surgery, a simple operation to put a ring around the valve or replace it, is 8.8% and isn’t improving even now. For comparison, the risk for an ascending and arch aneurysm repair with circulatory arrest and antegrade or retrograde cerebral perfusion has been as low as 6.2% for more than 20 years. Echocardiography isn’t much help; the valve is not well visualized.

Functional TR has all the bad attributes of functional mitral regurgitation, extensive and asymmetric leaflet tethering and a high risk for failed repair, but also frequently a hugely dilated annulus, especially with atrial fibrillation, which is common in these patients. In some patients the TR is so bad that there is a new classification with grades worse than severe, including “torrential” and “massive.” The annulus doesn’t hold stitches well, or transcatheter anchoring mechanisms. If a surgeon performs a repair, then you can’t test it like you do a mitral repair; there isn’t a pulmonary artery crossclamp. If the surgeon is operating for mitral disease, then we’ve evolved our approach and always treat severe and even moderate TR. Now some may even treat TR before it occurs, when it is mild or nonexistent, using criteria based on anatomic criteria but based on limited evidence. The conduction system is nearby. We know where it is, but can’t see it, so the need for a pacemaker is greater than mitral operations alone. Occasionally the pacemaker wire crosses the valve and causes TR—which we were trying to prevent! The surgeon can throw up his or her hands and replace the valve, but then you might as well put pacer wires on the epicardium, and those don’t work well. The dysfunctional right ventricle doesn’t like having a big rigid valve replacement in the annulus, and it is suddenly forced to pump against an increased afterload.

Our surgical results have been so bad that there is considerable enthusiasm for a transcatheter approach. Placing a transcatheter TV adds another layer of technical and
imaging complexity and causes the same challenging physiologic effects with potential right ventricle failure. There is optimism that clipping the leaflets together, without an annular solution, may reduce torrential TR down to severe, or even moderate, and that may be enough. But we will see how successful that strategy is over time, as edge-to-edge approximation didn’t seem to work well with open surgery. Other transcatheter solutions include difficult-to-place annular devices, a balloon that floats in the middle of the leaflets and blocks the TR jet, and years ago we described the ultimate “throw your hands up and surrender” solution and described placing heterotopic valves in the inferior vena cava and superior vena cava. 1,12,13

It is said that Alain Carpentier had a love affair with the mitral valve. We understand that valve reasonably well, and we get good results with mitral surgery. No one loves the tricuspid valve. It’s true, though, the TV is no longer forgotten. We hope that some of the approaches well-described by Donatelli and Ailawadi, alone or in combination, will allow us to address the current shortcomings and that we will grow more fond of it. 1

References