Expert opinion is often hot air: It is not the air; it is the clinical evidence

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Dion¹ in this issue of the *Journal* provide a very good expert opinion article regarding the indications for tricuspid valve (TV) repair (TVr) performed concomitantly with mitral valve (MV) procedures (MV repair or replacement).

The main issue is to provide the clinical evidence for a safe and effective TVr to avoid the well-documented high surgical risks of a repeat procedure to treat tricuspid regurgitation (TR) that does not resolve after MV surgery.^{2,3} In addition, we seek a reliable measurement to avoid unnecessary surgery.

The goal is to perform early MV operations before the development of atrial fibrillation, pulmonary hypertension, and TR. Historically, surgeons have repaired or replaced the left-sided valve lesions and have not aggressively operated on the TV. The teaching was that the functional TR would resolve with time. Our clinical evidence has shown that this resolution of TR is not consistent, and the operative risk associated with reoperation can be greater than 10%.^{4,5}

The assessment of the TR is preload dependent. Our evaluation in the preoperative awake patient is different than in the patient under anesthesia. This has led to the search for a preload-independent measurement that can help reliably predict resolution of functional TR has focused on the TV annular size (TVA). Several investigations have demonstrated the utility of a TVA of at least 40 mm as a reliable surgical measurement to guide the surgical repair of the TV with a simple annuloplasty band or ring.⁶ This procedure is low risk and durable, and it improves the postoperative recovery as long as there is adequate right ventricular contractile function. The long-term benefit is avoidance of late reoperation on the TV.

I perform the TVr after removal of the aortic crossclamp, during reperfusion and rewarming. This approach reduces ischemic time of the procedure and allows observation of the cardiac rhythm during suture placement and tying to observe for the development of heart block.

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Central Message

Provide clinical evidence for a safe and effective tricuspid valve repair to avoid documented high surgical risks of repeat procedures.

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Occasionally, the annulus can be extremely large where ring dehiscence is a concern. Some patients in low-ejection fraction heart failure have had automatic implantable cardioverter defibrillators or biventricular pacemakers placed, and these have distorted the TV leaflets. Under these circumstances, a bioprosthetic TV replacement with chordal preservation of the septal and posterior leaflets provides an alternative approach. Possible future structural valve degeneration can be treated with a valve-in-valve strategy.

Dion¹ highlights the comments of Tirone David (Toronto) at the 2015 American Association for Thoracic Surgery annual meeting on the presentation by Chikwe and colleagues (from New York) on an aggressive approach to TVr (with a TV annulus of ≥ 40 mm) performed concomitantly with MV repair. This strategy resulted in TVr for 66% of the patients, which David described as “overkill,” commenting that the need should be less than 10% in his experience. David is a pioneer in the field and his comments are to be respected. His comments were from a floor microphone, perhaps preventing him from having had a chance to review his actual data for a similar subset of patients. The invited discussant, Gillinov from the Cleveland Clinic, and a report by Yilmaz from the Mayo Clinic⁷ reported a much more conservative approach also with a rate of approximately 7% to 10%. Although

concomitant TVr is performed in 7% to 10% of the patients at the Mayo Clinic and in Toronto, however, the incidence is 25% in Leipzig (Mohr) and 40% to 45% in Monaco (Dreyfus), with the experience in Leiden and Genk (Dion) more in line with the 65% rate in New York (Adams). The discrepancy and variation beg for resolution.

The wide discrepancy can perhaps be partially resolved with a new review of the Toronto experience and follow-up. Analysis of the subset of patients with TVA of at least 40 mm who did not undergo repair and their late follow-up would be very helpful.

We need to continue to focus on this issue, which is not resolved. We all agree that appropriate early MV surgery can avoid the TV problem. When functional TR exists, avoiding an unnecessary procedure is appropriate. However, leaving a residual lesion (TR) that may not resolve or eventually worsen requiring a risky re operation is the driver for the current TVA (≥ 40 mm) approach. This has reached the level of evidence where it appears in both the European and American College of Cardiology and American Heart Association guidelines.^{8,9}

The measurements must be made correctly. The degree of TR is best assessed with awake preoperative echocardiography and not only with intraoperative echocardiography with the patient under general anesthesia. The secondary clinical signs of TR (distended neck veins, pleural effusions, liver engorgement, echocardiographic flow reversal in the inferior vena cava, ascites, peripheral edema, etc) are significant findings that do not require TVA measurement to necessitate a TVr.

The TV has been rediscovered, and further investigation will resolve the questions. In addition, our patient population is becoming more complex. Atrial fibrillation, cardiomyopathy, right ventricular dysfunction, and reduced zone of leaflet coaptation or tethering are among the anatomic

and clinical elements that we must factor into our understanding the natural history of TR so that we can perform the most effective procedure at the appropriate time, minimizing risk and maximizing value.

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