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EDITORIAL COMMENTARY

When is tricuspid valve annuloplasty necessary during mitral valve surgery?

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New functional tricuspid regurgitation (TR) following mitral valve (MV) replacement is a puzzling and an unresolved problem, particularly in patients with rheumatic disease. I used to perform tricuspid valve annuloplasty (TVA) whenever there was moderate or severe TR at the time of MV replacement. Dreyfus and colleagues¹ concept that annular dilation is irreversible and precedes the occurrence of functional TR shed welcome light onto this problem. We have adopted their recommendation during MV replacement but we have not yet examined the late outcomes of this intervention in our patients. What we already know is that many patients who developed severe TR years after MV replacement for rheumatic MV disease had tricuspid annulus <40 mm in diameter at the time of surgery. Thus, performing TVA whenever there is moderate and severe TR or a tricuspid annulus diameter ≥ 40 mm does not entirely prevent new functional TR. Furthermore, other factors play a role in its development. Longstanding atrial fibrillation is 1 of those factors.

Are patients who undergo MV repair for degenerative disease of the MV likely to develop functional TR if there is only trivial or mild TR before surgery? We are certain that some patients do, but it does not appear to be as common as in patients who undergo MV replacement for rheumatic disease. Is it solely because the incidence of atrial

fibrillation is higher in patients with rheumatic heart disease?

We have been repairing MVs for degenerative disease for more than 3 decades and we have followed patients prospectively with echocardiography.^{2,3} When we first started repairing MVs for degenerative disease we believed that only severe TR should be addressed at the time of surgery.² Thus, in a series 841 patients undergoing operation from 1985 to 2004 the proportion of patients who had concomitant TVA was 3.7%.² During a mean follow-up of 10.4 years (with periodic echocardiograph studies) we found that 38 patients had moderate-to-severe or severe TR and 78 had moderate TR at some time, including patients who died. Influenced by the experience of Dreyfus and colleagues¹ we adopted a more aggressive approach and began to address moderate TR at the time of MV repair.³ Indeed, the proportion of TVA at the time of MV repair in our practice doubled.³ In a recently study on MV

Tricuspid valve.

Central Message

New functional tricuspid regurgitation after mitral valve surgery remains an unresolved problem.

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annuloplasty,³ 337 patients underwent operation from 2005 to 2010 and the rate of TVA was 7%. The mean follow-up in this series was only 4.1 years and postoperative echocardiographic studies revealed 4 patients with moderate-to-severe or severe TR and 17 with moderate TR.

Chikwe and colleagues⁴ from Mount Sinai Hospital in New York examined a consecutive series of 645 patients who had MV repair for degenerative disease and performed TVA in 419 of them (65%) because of moderate or severe TR or tricuspid annulus ≥ 40 mm. The mean follow-up was 3.7 years and freedom from moderate or severe TR at 7 years was 97% in patients who had TVA and 91% in those who did not have TVA (despite the fact they had no TR preoperatively and the tricuspid valve annulus was < 40 mm—again suggesting that the above approach does not prevent the problem entirely).

Yilmaz and colleagues⁵ from the Mayo Clinic examined a series of 699 patients who underwent MV repair for degenerative disease and the preoperative incidence of moderate or severe TR was 16% and no concomitant TVA was performed.⁵ During a mean follow-up of 5.5 years, the authors⁵ documented a reduction in TR postoperatively, but it began to increase again after 5 years. TR had no effect on patients' survival.

Why do surgeons who perform large numbers of MV repairs for degenerative disease have such different approaches regarding the tricuspid valve? In some series like that from Mount Sinai in New York the incidence of TVA was as high as 65%⁴ whereas in Toronto it was 7%³ and at the Mayo Clinic it was 0.⁵ We do not believe that our patients are so different; what is different is our approach to the tricuspid valve during MV repair.

We have to find out why functional TR develops after MV replacement in patients with rheumatic heart disease as well as after MV repair in degenerative disease. Annular diameter may be a good indicator for TVA in patients with rheumatic heart disease, but we do not believe that the same measurement is applicable to degenerative disease except

perhaps in patients with fibroelastic deficiency, which is usually associated with small leaflets and annuli. Most of our patients have myxomatous degeneration of the MV and a high proportion has advanced degenerative changes in the leaflets of the mitral and tricuspid valves that are often associated with larger annuli. Thus, Dreyfus and colleagues'¹ 40-mm marker may not be applicable to all pathologies. Perhaps that value should be lower for patients with rheumatic valves and larger for those with advanced myxomatous degeneration of the leaflets. Perhaps every patient with longstanding atrial fibrillation should have TVA at the time of MV surgery. Finally, we have to consider that recurrent TR is common after TVA for functional TR.⁶

The time has come to have a carefully designed multicenter randomized clinical trial on this issue for both MV replacement and MV repair for various diseases. In addition to the size and type of MV rings and valves, preoperative quantification of TR, diameter of the annulus, pulmonary artery pressure, size and function of the right ventricle, and other parameters will have to be measured and entered into stratification before randomization.

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