BRAINSTORMING ON RECURRENCE RATES AND UNDERLYING MECHANISMS OF FUNCTIONAL MITRAL REGURGITATION

To the Editor:

The recent publication by Kwon and colleagues highlighted the advantages of complete ring annuloplasty relative to partial ring annuloplasty in terms of increasing durability and decreasing recurrence rates. We appreciate the efforts of Kwon and colleagues to figure out the recurrence rate of functional mitral regurgitation and underlying factors that may help us to overcome special issues encountered during surgical treatment of the disease. After reading the article several times carefully, we would like to make further contributions to this issue in line with the statements of Kwon and colleagues but from a different point of view.

With regard to recurrence rates, the currently accepted surgical treatment option of undersized annuloplasty has not yet matured. Thus it can be assumed that there are still some missing points needing to be clarified.

It is well known that the mitral annulus is roughly circular in diastole, and it becomes kidney shaped with an anteroposterior (septolateral) diameter smaller than the transverse diameter during systole. A 26% ± 3% reduction of mitral orifice area during systole results from displacement of the aortomitral curtain toward the center of the orifice; accordingly, the maximum tension on the mitral annulus is at the A2 to P2 direction in diastole and is determined by septolateral dimension changes during the cardiac cycle. Partial rings cannot reduce the tension in the A2 to P2 direction. It may thus be speculated that they are insufficient to stop the ongoing septolateral dimension changes, not only at the annular level but also at the equatorial level of the left ventricle. Tibayan and associates have suggested that the main determinant of malcoaptation in functional mitral regurgitation is the increase in septolateral dimension. This
statement by Tibayan and associates\textsuperscript{4} gives supporting evidence for our hypothesis. Other suggestions may also provide alternative explanations for superiority of complete rings relative to partial ones.

As Kwon and colleagues\textsuperscript{1} mentioned, although complete rings are better for the treatment of functional mitral regurgitation, they need further advances in multiple aspects to be considered as the best treatment option, because recurrence rates are still high. We think that the complete rings are quite well in fixing septolateral dimension changes at the annular level; however, they are not adequate for fixing septolateral dimension changes at the equatorial level of the left ventricle. That is why increased preoperative left ventricular dimension with a left ventricular end-diastolic diameter greater than 65 mm is the most accepted preoperative risk factor for higher rate of recurrence after ring annuloplasty in functional mitral regurgitation, as Kwon and colleagues\textsuperscript{1} mentioned in their article.

We believe that brainstorming regarding the underlying mechanism of recurrence will improve our knowledge and understanding of functional mitral regurgitation.

References


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**INSERTION OF PAPILLARY MUSCLE INSTEAD OF LEFT VENTRICULAR REDUCTION**

To the Editor:

We congratulate Michler and colleagues\textsuperscript{1} on their successful surgery and excellent study recently reported online in the \textit{Journal}. We would also like to highlight some issues.

In the article’s Figure E4, A\textsuperscript{1}, LVESVI could be seen to drop as low as 30 mL/m\textsuperscript{2} (normal volume) in many patients undergoing CABG plus SVR. So although ischemia was relieved by CABG, some dilatation may remain as a result of the continuation of relative ischemia, according to Laplace’s law. SVR should therefore be expanded to include the mitral annulus and ventricular base. In addition, the existence of cases with a LVESVI drop to 20 mL/m\textsuperscript{2} in the article’s Figure E4, A\textsuperscript{1} leads us to think that an off-pump procedure should be preferred.

Instead of left ventricular reduction,\textsuperscript{2} the insertion of papillary muscle to the ventricular wall could be palpated from outside on the beating heart, and the apex could be plicated by inserting pledgeted sutures anteroposteriorly and mediolaterally at this level. The ventricular cavity thus could be reduced near the base externally (Figure 1).

\begin{figure}[h]
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\includegraphics[width=\textwidth]{Figure1.png}
\caption{Insertion of pledgeted sutures for external left ventricular plication.}
\end{figure}

Letters to the Editor