ENCOURAGING OUTCOMES AFTER MITRAL VALVE REPAIR WITH THE GEOFORM ANNULOPLASTY RING. AN EXTRAORDINARY RING OR A VERY GOOD PATIENT SELECTION?

To the Editor:

We read with great interest the results published by Timek and colleagues¹ regarding the implantation of the GeoForm ring (Edwards Lifesciences Corporation, Irvine, Calif) for ischemic mitral regurgitation (MR). Surprisingly, according to the Kaplan-Meier curve, the freedom from recurrent 2+ MR at 4 years was 100% (see the original Figure 2). These formidable results differ from the almost 30% recurrent MR rate at 1 year reported in a recent trial.² Timek and colleagues¹ speculate whether the use of this specific ring, characterized by a greater reduction of the anteroposterior distance and the 3-dimensional elevation of the P2 segment, could be the main cause for these better outcomes.

We would like to highlight other reasons that could explain these diverging results. Whereas in the study of Timek and colleagues¹ almost a third of patients had only 2+ MR at the time of the operation, in the previously mentioned trial² all patients had severe MR. Moreover, Timek and colleagues¹ reported that a quarter of the surviving patients had no echocardiography beyond 6 months, and it is not known whether this subgroup

could be associated with worse functional class or significant MR.

Nevertheless, from our point of view, there is a critical factor that can accurately predict recurrence of MR after a repair. Neither of the studies mentioned here accounted for this strong predictor, mitral leaflet tethering. Laplace's law (pressure is proportional to wall stress divided by radius of curvature) implies that once MR is initiated, end-diastolic left ventricular volume and wall stress increase in parallel with preload. The increase in load stress leads to further left ventricular remodeling, which culminates in a spiraling, self-perpetuating cycle of leaflet tethering. Recurrent MR after an initially successful mitral annuloplasty may be related to continuing left ventricular remodeling with its consequent increase in the tethering.³ Tethering can be quantified by echocardiographic measurements, such as interpapillary muscle distance, coaptation depth, and left ventricular end-diastolic index. Interestingly, in one report³ more than 95% of patients with recurrent MR during a midterm follow-up period had previously demonstrated an interpapillary muscle distance of more than 20 mm.

Thus although there is high evidence^{3,4} that patient selection plays a key role in the recurrence of MR, neither of these studies^{1,2} reported the factors taken into account to select patients for repair. It is therefore likely that the main reason for this great divergence in results lies in the different criteria used to select patients as candidates for mitral ring annuloplasty.

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Reply to the Editor:

My colleagues and I greatly appreciate the thoughtful commentary provided by Hernández-Vaquero and colleagues on our study "Five-year real world outcomes of GeoForm ring implantation in patients with ischemic mitral regurgitation." Although our clinical series offers encouraging results with the use of the GeoForm ring in patients with severe left ventricular (LV) dysfunction and ischemic mitral regurgitation, we agree that there is more in play than the reparative technique alone. Despite their paucity, the available clinical data on the use of the GeoForm ring deserve closer examination to interpret our results in the proper context. In the first published cohort of 74 patients implanted with the GeoForm ring, De Bonis and colleagues¹ found that freedom from 2+ or greater mitral regurgitation (MR) at 3.5 years was 75%, but 2+ or greater MR was present in only 9% of patients (5/56) with symmetric leaflet tethering and central MR jets on preoperative echocardiography. Indeed, asymmetric leaflet tethering with restriction of the posterior was found to be the only independent predictor of recurrent

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