Author has nothing to disclose with regard to commercial support.

THE DEVIL IS EVERYWHERE, INCLUDING THE DETAILS OF THE RING Reply to the Editor:

I read with interest the insightful commentary of Tomšič and colleagues¹ exploring the influence of annuloplasty prosthesis type on postoperative valvular gradients after mitral repair for degenerative disease, as reported by Ma and associates.² As duly outlined by Tomšič and colleagues,¹ providing detailed characteristics of the type of prostheses, both complete and partial, used in the study would provide greater clarity to the presented data. Ignoring the potential difference in annular reduction between partial and complete annular prostheses, however, may be a comparable fallacy. In ovine experiments,³ complete flexible rings demonstrated annular area approximately 0.5 cm² smaller than flexible partial bands, even though complete ring size was larger (30.4 ± 1.0 mm vs 29.9 ± 0.8 mm). This difference in orifice area may be related to better maintenance of 3-dimensional annular shape and annular flexion observed with partial bands,³ because no difference in annular dynamics has been shown between flexible and rigid prostheses.⁴ Whether such a difference may be present with rigid prostheses is unknown, although my own group's limited data may provide some insight. We analyzed outcomes of 160 patients with ischemic mitral regurgitation undergoing isolated mitral annuloplasty with either the semirigid CG Future Band (n = 91; Medtronic, Minneapolis, Minn) or the semirigid CG Future Ring (n = 69; Medtronic) and found similar clinical results but higher peak transvalvular gradients with the complete prosthesis (12.7 median [7.7 interquartile range] mm Hg vs 9.5 median [6.0 interquartile range] mm Hg; *P* = .03; unpublished data). In a smaller study of ischemic annuloplasty repairs, other investigators⁵ reported significantly higher mean transmitral gradients with the classic Carpentier-Edwards ring (Edwards Lifesciences, Irvine, Calif) versus the semirigid CG Future Band (5.7 ± 0.9 mm Hg vs 4.2 ± 0.9 mm Hg; *P* = .001), corroborating our data. Although these were not degenerative repairs, the data suggest that prosthesis type may influence postoperative valvular gradients. As such, use of partial or complete prostheses in degenerative valvuloplasty may differentially predispose to higher postoperative gradients when annular undersizing, cleft closure, or leaflet approximation is incorporated in the

repair. The results of Ma and colleagues² challenge the mitral surgeon to move beyond valvular competence as the singular end point and examine how repair techniques affect subtler yet important clinical outcomes. To this end, the detail of the ring should not be ignored, because nothing is without consequence, and the devil lurks everywhere.

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References

1. Tomšič A, Palmen M, Klautz RJ. The devil is in the details, not the ring. *J Thorac Cardiovasc Surg.* 2019;157:e249-50.
2. Ma W, Shi W, Wu W, Ye W, Kong Y, Zhu D, et al. Elevated gradient after mitral valve repair: the impact of surgical technique and relevance of postoperative atrial fibrillation. *J Thorac Cardiovasc Surg.* 2019;157:921-7.
3. Dagum P, Timek TA, Green GR, Daughters GT, Liang D, Ingels NB Jr, et al. Three-dimensional geometric comparison of partial and complete flexible mitral annuloplasty rings. *J Thorac Cardiovasc Surg.* 2001;122:665-73.
4. Glasson JR, Green GR, Nistal JF, Dagum P, Komeda M, Daughters GT, et al. Mitral annular size and shape in sheep with annuloplasty rings. *J Thorac Cardiovasc Surg.* 1999;117:302-9.
5. Onorati F, Rubina AS, Marturano D, Pasceri E, Mascaro G, Zinzi S, et al. Mid-term echocardiographic results with different rings following mitral annuloplasty for ischaemic cardiomyopathy. *Eur J Cardiothorac Surg.* 2009;36:250-60; discussion 260.

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RING VERSUS BAND: ALL ROADS LEAD TO ROME

Reply to the Editor:

We thank Dr Tomšič and colleagues for their response to our study investigating the risks of elevated transmitral gradient (TMG) and its association with late atrial fibrillation (AF).^{1,2}

One of their concerns was the device-specific difference in prosthetic orifice area, because rings with the same labeled diameter did not have the same area. We agree with this point, and in our last study we used prosthetic orifice area as the key variable instead of ring size in subgroup analysis of patients undergoing full ring annuloplasty. Dr Tomšič and colleagues² suggested that the specific brand of annuloplasty device be included in the multivariable models to eliminate potential bias. We performed a univariable logistic regression analysis including the 4 implanted devices as dummy variables, but the results did not indicate that any 1 device leads to elevated TMG (all *P* > .10). In the study by Kawamoto and colleagues,³ full ring was not identified as a significant risk factor for elevated TMG, but that was probably because the definition of “mitral stenosis/high TMG” was 5 mm Hg