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THE IMPORTANCE OF THE CRITICAL MASS CONCEPT IN THE COX–MAZE PROCEDURE
To the Editor:

I have read with interest the article by McGilvray and colleagues1 in which they have reported the results after Cox–maze procedure (CMP), with special focus on 72 patients having a giant left atrium (GLA) at 5-year follow-up. They found no important difference in terms of freedom from atrial fibrillation (AF), regardless of whether the left atrial (LA) size was >6.5 cm or <6.5 cm (82% vs 84%), respectively. This finding deserves special attention in terms of the feasibility of CMP.

We should start by defining GLA to avoid misinterpretations and subsequent errors in the selection of optimal patients suitable for CMP. A GLA is commonly defined as measuring >8 cm by echocardiographic study.2 Therefore, there is a great difference between 8 cm and 6.5 cm, which can be defined as an enlarged left atrium.

There are theoretical reasons previously published to question the results by McGilvray and colleagues.1 After analyzing 99 patients underwent CMP, Chen and colleagues3 found in a multiple logistic regression analysis that LA diameter (odds ratio, 1.127 per 1-mm increment in LA diameter; 95% confidence interval, 2.29-23.98, P < .001) was an important predictor of sinus rhythm maintenance after CMP. Also, LA size >5.6 cm was related to an increase risk for recurrence AF (odds ratio, 7.41; 95% confidence interval, 2.29-23.98, P < .001), with 12.5% for each additional mm in increase.3 Such a statement means that there are ultimate limits on the cut-off value of the LA size for the best results after CMP in terms of freedom from AF, but it does not imply that the CMP is freely applicable to all cases of GLA. As a matter of fact, Sunderland and colleagues4 found that 6.0 cm of the LA size as the cut-off for surgical ablation of AF, in order to maintain a consistent postoperative sinus rhythm.

Atrial remodeling with an increase in atrial fibrosis is a pathologic condition in which the conduction velocity as well the effective refractory periods (ERPs) can be shortened in both atria. In fact, a multivariable logistical regression model demonstrated that the probability of AF increases as the amount of tissue available to fibrillate increases, as well as the ERPs becoming shorter. Hence, the likelihood of AF is highly associated with increasing tissue area and decreasing ERP.5 According to this concept, the larger the atria and greater the amount of fibrosis in the atrial tissue, the smaller the necessary atrial critical mass will be to fibrillate. This has theoretically much to do with the distance between incisions or burn lines of the CMP. As a result, any of the following actions may be applied, namely, (1) eliminate excess tissue (LA reduction) between incisions, or (2) perform additional incisions or lines, which is not in line with the pattern described for the CMP.

All the aforementioned information emphasizes the necessity to question the results by McGilvray and colleagues.1 The atrial critical mass (LA size) plays a fundamental role in the development of sustaining AF.

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