Mitral valve repair for atrial functional mitral valve regurgitation due to atrial fibrillation

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Vohra et al. [1] have reported on a rarely studied form of functional mitral regurgitation due to atrial fibrillation. Atrial fibrillation is not an uncommon cause of functional mitral valve regurgitation, the mechanism being annular dilatation which accompanies dilatation of the atrium (Carpentier Type I dysfunction). Although Vohra et al. [1] have suggested that this is a rare condition, we suspect that it is actually common, but that it is often unrecognized or undocumented. Considering that atrial fibrillation has an estimated prevalence of ~1% in adults with up to 3 million being affected in the USA alone [2], there are probably several million affected adults at any time with atrial remodelling as a consequence of atrial fibrillation, a substantial minority of whom probably have mitral regurgitation. One study has found a 6.4% incidence of functional mitral valve regurgitation in patients at first presentation of atrial fibrillation [3]. It is therefore likely that this condition is much more common than appreciated.

Vohra et al. [1] have reported on 20 such patients who underwent mitral valve repair with ring annuloplasty. The median ring size was 30 mm, distinguishing it from the typical form of functional mitral valve regurgitation, secondary to left ventricular dysfunction, which is generally treated with smaller annuloplasty rings. The authors have demonstrated the resolution of significant mitral valve regurgitation in all patients and reverse modelling of the left atrium immediately after surgery. The long-term echocardiographic data were not available. The cohort of 20 patients has been identified retrospectively from hospital charts, making it difficult to be certain as to whether atrial fibrillation was the aetiology of the mitral valve regurgitation, as aetiology for mitral valve regurgitation is notoriously difficult to classify retrospectively [4]. Sufficient information is rarely available in the operative reports to allow for the classification of the cases. A more robust approach would have been a prospective means of classifying such patients such as defining and documenting the aetiology of the mitral valve regurgitation at the time of the mitral valve repair or preoperative evaluation. With the retrospective classification, it is almost inevitable that some patients were misclassified and erroneously included or excluded from the cohort [4]. Although the authors have suggested that indications for surgery have followed standard guidelines, there are several suggestions that their cohort represents a very sick patient group in which surgery was inappropriately delayed—for example, 85% of patients were severely symptomatic (New York Heart Association III or IV), the average age was 77 years and 35% had impaired left ventricular dysfunction. The goal of current practice guidelines is that surgery is undertaken before patients are severely symptomatic and have left ventricular dysfunction [5]. The authors are, therefore, to be commended for achieving such excellent results in a very sick cohort, with no mortality or major morbidity despite a predictive EuroSCORE of 8.1. However, clearly, measures to allow for earlier access to mitral valve surgery are necessary in their referral population. There may have been the potential for better medical management of atrial fibrillation in these patients in the months or years preceding surgery. For example, percutaneous ablation had not been attempted in any of these patients—this could have averted the onset of severe mitral valve regurgitation in some patients.

Some aspects of their surgical management could be challenged—for example, if atrial fibrillation was deemed to be the cause of the regurgitation, then why was the appendage ligated in only 12 of 20 patients and an ablative procedure performed in only 10? Is the surgery not essentially an operation for atrial fibrillation and its consequences? An analogy would be repairing functional ischaemic mitral regurgitation without addressing coronary stenosis. It may well be that, as this was a retrospective study, the critical role of the atrial fibrillation may not have been appreciated in all patients at the time of surgery. We would generally almost always attempt a ‘cure’ of atrial fibrillation, if that was felt to be aetiology of the regurgitation. Also the choice of pulmonary vein isolation in some patients may be insufficient to treat the chronic atrial fibrillation necessary to induce functional mitral regurgitation—if the atrial fibrillation was paroxysmal in those three cases, then it is less probable to have been the primary aetiology of the regurgitation, as advanced atrial remodelling is not a usual characteristic of paroxysmal atrial fibrillation [6].

Although the authors have demonstrated excellent results with this patient group, it should be noted that there are recent data suggesting that conversion to sinus rhythm alone can lead to a substantial reduction in the severity of functional mitral regurgitation [3]. With conversion to sinus rhythm, the atrium can reverse the remodel, as can the mitral annulus, leading to a reduction or an elimination of mitral regurgitation. In patients with no other indication for surgery, therefore, attempts at cardioversion and catheter ablation may be warranted prior to surgery. A prospective study comparing an initial rhythm restoration approach to mitral valve repair in atrial functional mitral regurgitation may identify which is the preferred strategy. Certainly, in elderly and high-risk patients, an attempt at restoring sinus
rhythm is worthwhile before proceeding to high-risk cardiac surgery. Failure to achieve sinus rhythm with medical and catheter therapy is, however, a poor prognostic sign and should prompt a surgical referral in patients with severe mitral regurgitation. A large left atrium is also an adverse risk factor as it predisposes to recurrence of atrial fibrillation, and the subsequent worsening of mitral valve regurgitation [7]. As Vohra et al. [1] have demonstrated, the surgical treatment for this condition is straightforward, almost never requires a valve replacement, and is associated with low morbidity. There should, therefore, not be any hesitation to offer surgery for these patients, even in the elderly. Because atrial fibrillation affects both atria, the tricuspid annulus is also similarly dilated and in most of the cases, our approach aims to repair the tricuspid valve and to perform a full biatrial maze. The data from Gertz et al. [3] also make it imperative that attempts at surgical ablation should be made at the time of mitral valve repair in a bid to halt the atrial remodelling process. While atrial remodelling is unlikely to result in the recurrence of mitral regurgitation if the annulus has been fixed by a ring, there can still be other negative consequences of continued atrial dilatation. An enlarged left atrium is an independent predictor of adverse cardiovascular events in patients with atrial fibrillation [8], so mitral valve repair alone may not be adequate to prevent progression to cardiovascular morbidity and mortality in these patients if the patients remain in atrial fibrillation and the atrium continues to remodel.

The data from Vohra et al. [1] on this small group of patients are a useful start in evaluating the role, safety and efficacy of surgery in atrial mechanism functional mitral valve regurgitation. Surgeons should be aware of this sub-classification of functional mitral valve regurgitation, and identify and document these patients prospectively at the time of surgery. Larger studies with a long-term follow-up are necessary to identify the long-term prognosis in these patients and the impact of successful mitral valve repair, with and without a successful conversion to sinus rhythm, on the natural history.

REFERENCES