

# Characterizing mitral regurgitation in a contemporary population: prognostic implications

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Online publish-ahead-of-print 20 June 2019

**This editorial refers to ‘Causes and mechanisms of isolated mitral regurgitation in the community: clinical context and outcome’<sup>†</sup>, by V. Dziadzko et al., on page 2194.**

Transcatheter therapies for mitral regurgitation (MR) have emphasized the need for accurate characterization of mitral valve anatomy and mechanism of dysfunction, as well as identification of severe MR. The results of recent randomized clinical trials and previous registries evaluating medical (including cardiac resynchronization therapy) and surgical treatments have shown that not all MR patients benefit from those therapies.<sup>1–5</sup> Furthermore, there are important gaps in knowledge and skills to diagnose and manage appropriately patients with MR that have been identified in previous studies.<sup>6</sup> To better understand how those gaps can be resolved, studies reporting on the characteristics and outcomes of patients with MR presenting in the community are important.

In the current issue of the *European Heart Journal*, Dziadzko et al.<sup>7</sup> provide a detailed description of a large, contemporary cohort of patients with isolated significant (moderate and severe) MR and investigate the association between type of MR and all-cause mortality. Of 727 patients with isolated significant MR, 475 (65%) were classified as having functional MR (without any structural abnormality of the mitral valve), 233 (32%) had organic MR (with structural abnormalities of the valve as primary cause of the valve dysfunction), and the remaining 3% had a mixed aetiology. Patients with functional MR were further subclassified as having predominantly left ventricular (LV) (59%) or left atrial (41%) remodelling leading to mitral valve malcoaptation (Figure 1). Among patients with organic MR, degenerative aetiology was the predominant cause of MR (72%) (Figure 1). These results contrast with the frequency of the various aetiologies reported in other studies.<sup>8,9</sup> Degenerative (organic) cause of MR was the most frequent aetiology in the Euro Heart Survey, accounting for

61% of the cases, while ischaemic aetiology (functional MR) was registered only in 7%.<sup>8</sup> In a recent report of the Cleveland Clinic on the aetiology of mitral valve disease in 23 806 patients undergoing surgery, degenerative aetiology was observed in 58% of patients whereas ischaemic aetiology was present in 12%.<sup>9</sup> The different study designs and definitions used preclude direct comparisons across the studies to understand the reasons for the discrepant results in terms of prevalence of each MR aetiology and highlight the need for accurate classification of the MR mechanism as well as a consensus on the terminology used to classify the aetiology.

Furthermore, the study by Dziadzko et al.<sup>7</sup> provides interesting findings on the characteristics of the patients. Patients within the group of functional MR caused by left atrial remodelling were the oldest and were more frequently women. In terms of symptoms, patients with organic MR presented with fewer symptoms and fewer comorbidities as compared with the other two groups, while patients with functional MR caused by left atrial remodelling had the highest prevalence of atrial arrhythmias. Perhaps the most interesting findings concern the echocardiographic characteristics of the MR groups and how these relate to the patient outcomes. While patients with functional MR due to LV remodelling showed the largest LV volumes, poorest systolic function, highest pulmonary pressures with small mitral effective regurgitant orifice area (EROA) and regurgitant volume (RVol), patients with organic MR showed modest LV dilation and lowest pulmonary pressures despite showing the largest EROA and RVol, while patients with functional MR due to atrial remodelling showed the smallest LV volumes, preserved LV ejection fraction, increased pulmonary pressures, and modest EROA and RVol. After a mean follow-up of almost 5 years, the event rates for all-cause mortality and hospitalization for heart failure were highest among patients with functional MR caused by LV remodelling followed by the group with MR caused by left atrial remodelling and the patients

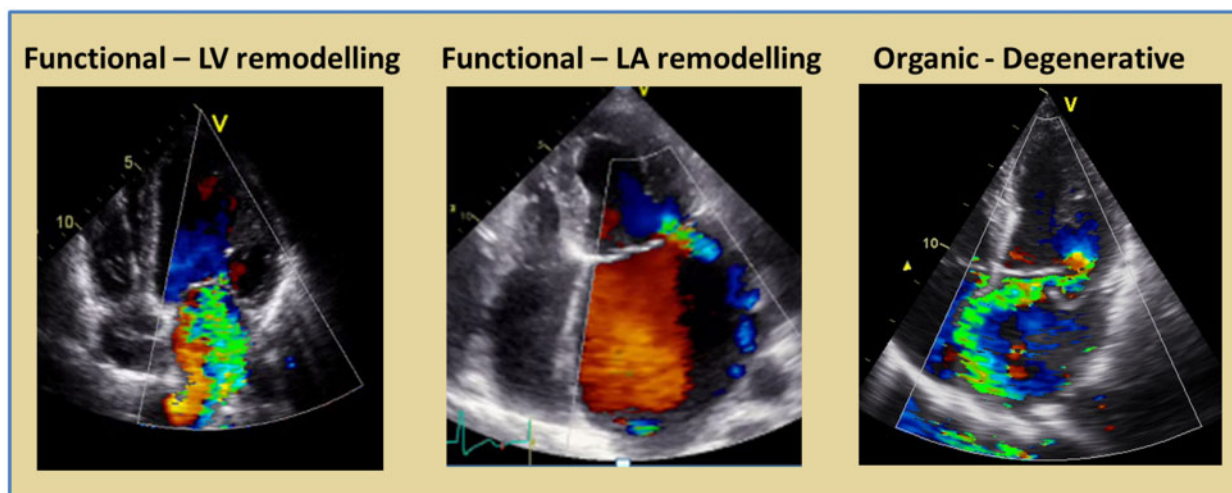
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<sup>†</sup> doi:10.1093/eurheartj/ehz314.

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**Figure 1** Mechanisms of mitral regurgitation.

with organic MR. These results raise the question of what are the main determinants of such poor outcomes: is it the severity of MR, based on EROA and RVol measures, or is the underlying mechanism of MR and the consequences of the volume overload? This cannot be fully elucidated from the present study, since the multivariate analysis investigating the independent associates of outcomes included only age, sex, LV ejection fraction, and MR mechanism. It would have been interesting to know if EROA, RVol, LV volume, and left atrial volume would have been associated with the outcomes independently of the underlying mechanism of MR. These parameters have been associated with clinical outcomes in selected populations. However, there has never been a direct comparison of the prognosis of patients with functional vs. organic MR matched for LV volumes, EROA, or RVol.

Another interesting finding of the present study is the low referral rate for surgical intervention.<sup>7</sup> Only 14% of patients underwent mitral valve surgery. This is understandable when one takes into consideration that 69% of the patients had moderate MR and current guidelines do not recommend intervention of the mitral valve as an isolated procedure. However, among those with severe MR ( $n = 222$ ), only 64 with organic MR were operated vs. 7 patients with functional MR, which confirms the very low referral rate particularly among patients with functional MR. The decision-making in patients with functional MR is more difficult than in patients with organic MR. Current guidelines recommend intervention when mitral valve repair is associated with coronary revascularization.<sup>10</sup> Will transcatheter mitral valve repair change this paradigm? While awaiting for the results of the Reshape-HF2 trial (A Clinical Evaluation of the Safety and Effectiveness of the MitraClip System in the Treatment of Clinically Significant Functional Mitral Regurgitation; <https://clinicaltrials.gov/ct2/show/NCT02444338>), the results of the COAPT (Cardiovascular Outcomes Assessment of the MitraClip Percutaneous Therapy for Heart Failure Patients with Functional Mitral Regurgitation)<sup>4</sup> and the MITRA-FR (Percutaneous Repair with the MitraClip Device for Severe Functional/Secondary Mitral

Regurgitation)<sup>3</sup> trials have shown that MitraClip may be effective in reducing MR and improving outcomes in selected patients with functional MR. However, there remain much controversy on how to identify the patients that will benefit from this therapy. Therefore, studies reporting on the characteristics of the patients with MR are always of interest.

**Conflict of interest:** The Department of Cardiology of the Leiden University Medical Center received unrestricted research grants from Biotronik, Medtronic, Boston Scientific, GE Healthcare, and Edwards Lifesciences. J.J.B. received speaker fees from Abbott Vascular and Boehringer Ingelheim. V.D. and N.A.M. received speaker fees from Abbott Vascular.

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## Corrigendum

doi:10.1093/eurheartj/ehz184

Online publish-ahead-of-print 30 March 2019

**Corrigendum to:** Ambulatory heart rate reduction after catheter-based renal denervation in hypertensive patients not receiving anti-hypertensive medications: data from SPYRAL HTN-OFF MED, a randomized, sham-controlled, proof-of-concept trial [*Eur Heart J* 40:743–751].

In the original version of this paper, there were errors in the units given in figure 1 and figure 2. These errors have now been corrected online.

The authors apologise for the error.

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