Multimodality imaging to evaluate mitral regurgitation

Multimodality imaging answers the main questions that need to be evaluated in patients with mitral regurgitation: 1) mechanism of mitral regurgitation; 2) severity of mitral regurgitation; 3) risk stratification and 4) type of therapy. The mechanism of mitral regurgitation are 2: primary (due to lesion of the mitral leaflets) and secondary (due to dilation and dysfunction of the left ventricle). The mechanism of mitral regurgitation is basically assessed with echocardiography. Recently, population-based data have shown that among patients with secondary mitral regurgitation there are patients with small left ventricular cavity, good left ventricular systolic function but mainly dilation of the left atrium. These patients are frequently old women with high prevalence of atrial fibrillation and importantly, they have as bad outcome as patients with secondary mitral regurgitation due to left ventricular dilation. After defining the mechanism of mitral regurgitation, the severity should be assessed. Echocardiography is also key in this assessment. However, sometimes the echocardiographic parameters to define severe mitral regurgitation do not coincide and therefore other imaging techniques should be used. Cardiovascular magnetic resonance is frequently used the reference standard to assess the regurgitant volume. Three-dimensional echocardiography has shown to be more accurate than 2-dimensional echocardiography to quantify the regurgitant volume when cardiovascular magnetic resonance is used as reference standard. Exercise echocardiography is also important when discordances between symptoms and echocardiography occur since mitral regurgitation varies with the loading conditions. In addition, assessment of left ventricular systolic function is important for risk stratification but strain imaging and assessment of myocardial fibrosis with cardiovascular magnetic resonance have shown to be prognostically important. Finally, in transcatheter mitral valve interventions for mitral regurgitation, the use of computed tomography is key to decide the suitability for each therapy. Fusion imaging between echocardiography and computed tomography is a promising technological development.