Ischemic mitral regurgitation: the role of the »edge-to-edge« repair

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14.1 Introduction

Mitral insufficiency is considered to be ischemic in origin when the valve leaflet and chordae are structurally normal and the valve dysfunction is caused by the consequences of myocardial infarction. The main mechanism responsible for ischemic mitral regurgitation (IMR) is tethering of the leaflets which may result either from localized or diffuse left ventricular dysfunction with changes in geometry of the left ventricle (LV) and displacement of one or both papillary muscles. Annular dilatation is often concomitantly present, particularly when the valve insufficiency is severe and long-standing and the LV is remarkably dilated. The diagnosis of IMR is provided by echocardiography, which is able to show the location of the regurgitant jet, the presence of global and regional ventricular wall motion abnormalities, and the severity of MR. Since the mitral valve is structurally normal in the majority of patients with IMR, inspection during the operation is not helpful, and the surgical procedure is guided by the information provided by echocardiography.

14.2 Surgical treatment of IMR

From a surgical point of view, an undersized annuloplasty is the treatment of choice for patients with IMR and dilated cardiomyopathy. The procedure is simple and easily reproducible. In appropriately selected patients, a well-performed restrictive annuloplasty is associated with low operative mortality and is effective in eliminating MR, promoting left ventricular reverse remodeling, reducing symptoms, and improving quality of life. However, patient selection is crucial. Indeed, it has been clearly demonstrated that the ideal candidate for annuloplasty alone is a patient in the early stage of the disease, with a short history of heart failure, and a left ventricle which is not excessively dilated [1, 2]. On the other hand, when the tethering of the leaflets is severe (as typically occurs in patients with a long history of congestive heart failure and advanced left ventricular remodeling), residual/recurrent MR can frequently occur. Such an event has been reported in 20–30% of the patients 1 year after surgery and is strictly related with an unfavorable outcome in terms of heart failure and mortality during follow-up [3, 4]. Therefore, it is extremely important to avoid either residual or recurrent MR. When the preoperative clinical and echocardiographic data suggest that annuloplasty alone is unlikely to be successful and durable, additional surgical procedures should be used to enhance the effectiveness of mitral valve repair. Left ventricular restoration, resection of secondary chordae of the anterior leaflet, external plication or buttressing of the left ventricle, leaflet patch extension, relocation of the tip or the base of the papillary muscles, and the edge-to-edge technique have been proposed.

14.3 The role of the edge-to-edge technique

The edge-to-edge technique was introduced by our group for mitral valve repair in the early 1990s as a simple method to conveniently correct MR in the presence of some complex lesions. The idea behind the edge-to-edge approach is that the competence of a regurgitant mitral valve can be effectively restored with a »functional« rather than an »anatomical« repair. The key point is to identify the location of the regurgitant jet. Exactly at that point, the free edge of one leaflet is sutured to the corresponding edge of the opposing leaflet, thereby, elimi-