Risk factors of unsuccessful minimally invasive surgical mitral valve repair with echocardiographic follow-up



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Background: It has become evident that mitral valve (MV) repair is the preferable treatment for the majority of patients presenting with severe mitral regurgitation (MR) The minimally invasive approach via right mini-thoracotomy is becoming the standard of care for surgery of the mitral valve. As any less invasive strategy, it entails an increased surgical complexity. We sought to identify risk factors of unsuccessful mitral valve repair for chronic mitral regurgitation.

Methods: Between 30.11.2006 and 06.11.2018 214 patients underwent minimally invasive mitral valve repair. 196 patients were evaluated and included in our study. 18 remaining patients did not respond to our follow-up invitation.Out of 196 patients 111 were male (56.6%), mean age was 57.2 years, mean EuroSCORE I reached 4.7%±1.3. The main cause of valve dysfunction was degenerative: 62% (n=123), dilated cardiomyopathy: 16.6% (n=31), endocarditis: 9.2% (n=18), congenital: 5.6% (n=11), rheumatic fever: 4.6% (n=9) and ischemic: 2% (n=4). 89.3% (n=175) of the patients had severe MR and 10.7% (n=21) moderate MR. Ring annuloplasty was performed in all patients together with chordae repair/replacement: 55.6% (n=109), quadrangular/triangular resection on the posterior leaflet: 50% (n=98), sliding leaflet technique: 22.4% (n=44), triangular resection on the anterior leaflet: 11.2% (n=22), and Alfieri technique: 1.5% (n=3). Median follow-up was 14.7±3.0 months.

Results: There was no in-hospital death. 1.5% (n=3) of the patients required re-operation due to bleeding complications. Severe MR occurred in 6.6% (n=13) of the patients. Statistical analysis revealed that the length of coaptation (LC), New York Heart Association (NYHA) class IV and high EuroSCORE I were predictors of postoperative MR. We observed that surgical performance depends on LC (cut-off 6.0mm, $p<0.05$) and left ventricular geometry and function LVEDVI (cut-off 62.6 ml/m², $p<0.05$), LVESVI (cut-off 51.2ml/m², $p<0.05$), LVEF (cut-off 35%, $p<0.05$).

Conclusions: Minimally invasive mitral valve surgery is a feasible method that can be performed safely and effectively. We identified clinical and echocardiographic parameters associated with MV repair failure. Now we are be able to select patients that should undergo MV replacement rather than MV repair.