HEART VALVE DISEASE

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Prognosis of carcinoid heart disease: value of tissue Doppler imaging

N. Mansencal 1; E. Mitry 1; P. Lacombe 1; P. Rougier 1; O. Dubourg 1

1Institute of Cardiology, II Coronary Artery Disease Dept., Warsaw, Poland; 2Department of Medicine, Kobe, Japan;

Background: Carcinoid heart disease (CHD) may occur in patients with digestive endocrine tumor and carcinoid syndrome. No previous studies have assessed the use of tissue Doppler imaging (TDI) in CHD. The aim of this prospective study was to evaluate the prognostic value of TDI in CHD.

Methods: We prospectively studied 56 consecutive patients (1998-2005) with proved digestive endocrine tumor and carcinoid syndrome. Patients with previous history of heart disease were excluded. All patients underwent several echocardiographic studies for the assessment of CHD and the CHD progression (echocardiographic scoring system). Furthermore, we systematically calculated the mitral inflow to annulus ratio (E/E' ratio) using PW Doppler (mitral inflow) and TDI (lateral mitral annulus). Survival rate was collected at the end of the study.

Results: Mean age was 59±9 years. Mean follow-up was 27±16 months. A right-CHD was found in 30 patients (54%) and a left-CHD in 13 patients (23%). The prevalence of right- and left-CHD significantly increased during follow-up (p=0.002). Right- and left-CHD were not associated with a significant increase of death (p=NS).

Conclusions: This prospective study demonstrates that tissue Doppler imaging allows to detect high-risk patients with carcinoid syndrome. Patients with E/E' ratio >8 should be cautiously monitored during follow-up.

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Transthoracic and transesophageal echocardiographic evaluation of the hemodynamic mitral regurgitation heart function

A. Labecka 1; B. Firek 1; P. Szymanski 1; I. Kowalik 1; H. Szwed 1; T. Pasierski 2

1Institute of Cardiology, II Coronary Artery Disease Dept., Warsaw, Poland; 2Department of Medicine, Kobe, Japan;

Background: Transthoracic and transesophageal echocardiography are the major imaging tests for the assessment of valvular diseases, including mitral regurgitation (MR). The aim of the study was to evaluate the factors determining the mitral regurgitation in patients with left ventricular remodelling after myocardial infarction.

Methods: We studied 52 consecutive patients (mean age 62±11 years) with mild to moderate ischemic mitral regurgitation due to prior myocardial infarction underwent transthoracic echocardiographic examination. By means of Doppler echocardiography we evaluated the mitral regurgitant volume (RV), the regurgitation fraction (RF) and the effective regurgitant orifice area (EROA). 35 patients also underwent transesophageal echocardiographic examination in order to evaluate the geometry of the subvalvular mitral apparatus. In the transgastric 2-chamber view (90°) we measured the length of the shortest chordae tendineae from the head of the posterior papillary muscle (PM) to their anchoring point on the valve between the segments P3 and A2 of the mitral leaflets (Z2) and, respectively, from the head of anterior papillary muscle (AL) to the anchoring point on the valve between the segments P1 and A2 (Z1). The displacement of the papillary muscles was evaluated by the measurement of the distance from PM and AL to the respective opposite point on the mitral annulus (PMA and, respectively, ALA). We also determined the distance between PM and Z1 (PMR) and, respectively, between AL and Z2 (ALR).

Results: There was a significant correlation of the mitral annular area (MA) with RV (p=0.462, p=0.0006) and EROA (p=0.350, p=0.0453). The correlation with EROA was more significant for EROA <0.3 cm² (p=0.613, p=0.0019). MA significantly correlated with RF only for RF from 30% to 60% (r=0.478, p=0.0075). EROA showed no dependence on the length of the chordae tendineae and the parameters of the papillary muscles displacement. The PMA/PMR ratio, a marker of the leaflets restriction at the level of the point Z1, correlated very well with EROA >0.4 cm² (p=0.0001) only for EROA >0.4 cm² (5 patients).

Conclusion: In patients with ischemic mitral regurgitation after myocardial infarction, the mitral annulus enlargement is one of the determinants of the regurgitant volume and of the effective regurgitant orifice area. It seems that in the case of the mitral regurgitation with smaller regurgitant orifice area (<0.3 cm²), the importance of the regurgitation depends mainly on the enlargement of the annulus, on the other hand, in the case of the mitral regurgitation with larger regurgitant orifice area (>0.4 cm²) the leaflets restriction determined by the posterior papillary muscle displacement plays a very significant role.

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Ischemic mitral valve: value of papillary muscle disease

F. Roshanal 1; M. A. Youssefnia 1; M. H. Mandegar 1

1Day General Hospital, Tehran, Iran (Islamic Republic of)

Objective: Ischemic mitral regurgitation is a complex lesion to repair and successful management requires an understanding of its mechanism and severity. Ring annuloplasty is currently the most common surgical treatment for ischemic mitral regurgitation. Failure rates for this technique may be as high as 30% in patients with functional ischemic MR. Papillary muscle disease (PMD) could be a clue indicating annuloplasty alone is not sufficient in this subgroup.

Material and methods: We evaluated PMD (distance between papillary muscles in systole) in 100 patients with chronic moderate to severe ischemic MR that were operated on CABG and mitral valve annuloplasty with acceptable result and followed them for two years.

Results: After two years there were 24 patients with significant MR (equals or more than 2+) in 94 alive patients. Baseline PMD was significantly greater in patients with late MR compare with patients without MR (27 versus 15 mm, p=0.001).

Conclusion: PMD is a reliable index of significant dysfunctional subvalvular apparatus in patients with ischemic MR and can predict late MR after repair and provide implications for valve repair.

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Reduction of functional mitral regurgitation is associated with improving inferior myocardial systolic function with low-dose dobutamine assessed by tissue Doppler imaging

K. Tamaki 1; H. Kawai 1; M. Furuki 1; T. Kataoka 1; T. Onishi 1; H. Tanaka 1; M. Yokoyama 1

1Kobe University Graduate School of Medicine, Cardiovascular and Respiratory Medicine Dept., Kobe, Japan; 2Kobe University Graduate School of Medicine, Kobe, Japan;

Background: It has been shown that functional mitral regurgitation (MR) was associated with mitral annular enlargement, leaflet tethering, and left ventricular (LV) dilatation, sphericization, and dysfunction. However, the quantitative evaluation of relationship between functional MR and regional myocardial function has not been done. Dobutamine has been known to have the ability to decrease MR volume, but mechanism for beneficial effects of dobutamine has not been clarified. The purpose of this study was to investigate whether improving regional myocardial function with low-dose dobutamine might affect functional MR assessed by tissue Doppler imaging.

Methods: We studied 18 patients with reduced LV ejection fraction (34±9.5%) secondary to ischemic (12 patients) or nonischemic (6 patients) cardiomyopathy and MR. Standard 2-dimensional echocardiography was performed and apical 4-chamber, 2-chamber and long-axis views were recorded with tissue Doppler imaging at rest and during dobutamine infusion (10μg/kg/min). We obtained LV ejection fraction, MR volume fraction, tenting area of mitral valve (enclosed between the annular plane and leaflets on the 4-chamber view) and, as indices of regional myocardial function, LV longitudinal peak systolic strain rate (SR; absolute value) in the anterior, anteroseptal, posteroseptal, inferior, posterior and lateral segments at the mid ventricular level.

Results: Dobutamine increased heart rate, systolic blood pressure, LV ejec- tion fraction and SR in all segments, and decreased tenting area and MR volume fraction. The decrease in MR volume fraction with dobutamine showed a significant correlation with decrease in tenting area (r=0.76, p<0.05).

Conclusions: This prospective study demonstrates that tissue Doppler imaging allows to detect high-risk patients with carcinoid syndrome. Patients with E/E' ratio >8 should be cautiously monitored during follow-up.