

Different mechanisms of ischemic mitral regurgitation in patients with inferior and anterior myocardial infarction

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Background: Basic mechanism of ischemic mitral regurgitation (MR) is displacement of papillary muscles (PMs) due to left ventricular (LV) remodeling. Variability in LV remodeling can potentially cause heterogeneous PM displacements.

The aim of this study is to compare the mitral valve complex geometry in patients with ischemic MR due to inferior and anterior myocardial infarction (MI).

Methods: In 33 patients with prior inferior MI, 61 with anterior MI, and 22 controls, LV volume, mitral annular area, PM tethering distance, and MR were quantified by echocardiography.

Results: Significant MR (MR fraction > 20%) was observed in 12 of the 33 with inferior MI and 7 of the 61 with anterior MI. In patients with MR due to inferior MI, tethering distance was significantly longer in medial compared to lateral PM (42.6 +/- 4.9 vs. 36.1 +/- 1.7 mm, $p < 0.001$), demonstrating asymmetric medial PM displacement. Patients with MR due to anterior MI had comparable increases in both PM tethering distances (41.0 +/- 2.4 vs. 41.4 +/- 1.8 mm, not significant), demonstrating symmetric bilateral PM displacement.

Conclusions: Although patients with ischemic MR due to inferior MI have asymmetrically predominant medial PM displacement, those with ischemic MR due to anterior MI have symmetric bilateral PM displacements

Tissue Doppler imaging in valvular heart diseases

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Background: Assessment of left atrial and left atrial appendicular systolic and diastolic function by non invasive method can be useful in determining the regional function of the atrial musculature and left ventricular filling pressure in relevant valvular heart diseases.

Methods: Study included 120 patients. Two groups one with control population and one with mitral stenosis were compared for the study of left atrial regional function. TDI parameters were recorded by 2D Echo. 20 patients with mitral stenosis were subjected to study for left atrial appendage function before and after percutaneous transluminal mitral commissurotomy (PTMC). Another three group of 20 patients with mitral regurgitation, aortic stenosis, and aortic regurgitation E/E' ratio was recorded from both medial and lateral annulus of the mitral valve and were compared to left ventricular end diastolic pressure that was recorded during cardiac catheterization.

Results: S'E'A' velocities of left atrium in mitral stenosis was significantly reduced for medial wall (S' -10.83±2.25 to 6.77±0.56, E' -11.05±1.66 to 5.65±0.74, A' -7.95±1.16 to 3.45±0.46) for lateral wall (S' -13.67±2.11 to 6.33±0.56, E' -14.83 ±2.88 to 4.91±0.88, A' 11.37±2.84 to 3.85±0.63) for inferior wall (S' -12.75±2.30 to 6.43±0.69 E' -14.21±2.86 to 4.98±0.55, A' 11.16±2.25 to 3.17±0.49) for lateral wall (S' 10.77±1.35 to 6.51±0.61, E' 10.67±1.92 to

4.39±0.61, A' -8.2±1.38 to 3.28±0.48). Left atrial appendage velocities were increased after PTMC. ELAA velocity was increased from 4.13±0.48 to 7.54 and ALAA was increased from 7.07±1.30 to 11.1±0.97. Mitral annular velocity E/E' were high in aortic stenosis, aortic regurgitation and mitral regurgitation ratio was compared to LV end diastolic pressures they were increased.

Conclusion: Left atrial regional function and appendage function is impaired in mitral stenosis and mitral E/E' ratio is increased in relevant heart diseases that gives an indirect evidence of raised LV filling pressure.

Echocardiographic assesment of cardiac function in patients of hepatic cirrhosis

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Background: Cirrhosis is associated with spectrum of circulatory disturbances, although the association of cirrhosis and impaired cardiac function has been noted in many studies over past three decades, investigators had previously ascribed impaired cardiac function to a sub clinical or overt alcoholic cardio myopathy. The present study was conducted to assess cardiac function in patients of hepatic cirrhosis.

Methods: A total of 81 persons participated in the study .41 patients of cirrhosis in the age group of 20-70 [group A (21) alcoholic cirrhotics and group B (20) non alcoholic cirrhotics] and 40 age and sex matched controls (group c) (healthy persons with no h/o of alcohol intake) were included in the study. Patients with conditions which could alter cardiovascular status were excluded from the study. All the subjects were subjected to Transthoracic colour Doppler echocardiography.

Results: Echocardiographic analysis in both group A (alcoholic cirrhotics) and groupB(non alcoholic cirrhotics) as compared to groupC (controls), revealed hyper dynamic circulation as revealed by shorter ejection times (LVET, RVET)& higher peak flow aortic and pulmonary velocity (AV max, PV max) and increased LV ejection fraction, significant Left ventricle Diastolic dysfunction was revealed by reversed MVE/A ratio(0.98±0.27in cirrhotics vs 1.55±0.45in controls($p < 0.001$). There was no difference in these parameters between alocoholic vs non alcoholic cirrhotics .

Conclusion: Patients with cirrhosis have hyperdynamic circulation, significant diastolic dysfunction of left ventricle but no significant systolic dysfunction and there was no significant difference between alcoholics and non alcoholic cirrhotics Cardiac diastolic dysfunction is due to cirrhosis per se irrespective of etiology of cirrhosis (alcoholic vs non non alcoholic).

A study of ventricular function in angiographically proven slow flow/normal epicardial coronaries using newer indices of echocardiography

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Aim: Assessment of global left ventricular function by using automated functional imaging from echocardiography in

angiographically proven normal/slow flow in normal epicardial coronaries.

Background: The coronary slow flow phenomenon is an angiographic finding characterized by delayed distal vessel opacification in the absence of significant epicardial coronary disease. In coronary slow flow, although there is no occlusive lesion in epicardial coronary arteries, myocardial functions are shown to be affected. It is an important clinical entity because it may be the cause of angina at rest or during exercise, acute myocardial infarction and hypertension. This study was designed to assess left ventricular functions with the use of conventional, tissue Doppler echocardiography, 2D strain of automated functional imaging (AFI) in patients with coronary slow flow phenomenon (CSFP) & normal flow and also this phenomenon to look for any association of left ventricular function.

Methods: The study consisted of 30 patients with angiographically diagnosed coronary slow flow phenomenon but otherwise normal coronary arteries & 20 subjects with angiographically normal coronary arteries constituted the control group. The corrected TIMI frame count was obtained by dividing the number of frame for the LAD by 1.7. Normal TIMI frame count and CTFC for the LAD artery are 36 ± 3 and 21 ± 2 , respectively. For LCx TIMI frame count is 22 ± 4 For the RCA, TIMI frame count is 20 ± 3 .

Results: 30 patients had slow epicardial flow (patient group). 20 patients had normal epicardial coronaries (control group). Patients with coronary slow flow phenomenon had E, A reversal (66 ± 11 cm/s vs 79 ± 16 cm/s, $p < 0.005$), E/A (1.1 ± 0.3 vs 1.3 ± 0.5 , $p < 0.01$), but longer IVRT (91 ± 8 ms vs 70 ± 4 ms, $p < 0.001$) as compared to the control group. The overall global strain of myocardium (-19 ± 2.7 vs -20 ± 2.8) is decreased in coronary slow flow phenomenon as compared to the control group. AFI method of strain analysis shows significantly decreased myocardial strain in two major segments of LAD group, i.e., basal anteroseptum (-17 ± 4.2 & -20.9 ± 4.5 , $p < 0.005$) & mid anteroseptum (-17.9 ± 5.0 & -23.1 ± 4.4 , $p < 0.001$) as compared to the control group ($p < 0.001$). Also shows significantly decreased myocardial strain in apico lateral segment (-19.5 ± 4.7 & -21.2 ± 4.9 , $p < 0.02$) which are mainly supplied by LCx artery as compared to the control group.

Conclusions: The coronary slow flow phenomenon is associated with myocardial function impairment, even though conventional method of echocardiography shows normal left ventricular function. Newer indices of echocardiography plays major role to determine left ventricular myocardial function precisely & to predict myocardial diseases & prognosis. Automated functional imaging method of calculating myocardial strain to determine coronary slow flow phenomenon is more reliable, non-invasive echocardiographic technique to determine myocardial flow impairment.

Echocardiographic evaluation in non-alcoholic fatty liver disease in population in an industrial hospital.

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Background: Due to the changing life style and better economic status, Nonalcoholic fatty liver disease (NAFLD) has become a major public health problem in the industrial population. As, number of studies has linked Nonalcoholic fatty liver disease (NAFLD) with various cardiovascular diseases like coronary heart

disease, we aimed at this study to investigate the association of Echocardiographic abnormalities in individuals with NAFLD (Group I) compared to individuals without NAFLD (Group II).

Methods: Seventy patients (age group 35 to 56 years) who were diagnosed as NAFLD by Ultrasonography were selected for this study. Apart from routine clinical, biochemistry, Ultrasonography and ECG, Echo Doppler study was done in all the patients along with 70 controls of similar age. Patients with known hypertension, coronary heart disease, heart failure, diabetes and renal disease were excluded from the study. Using M-mode Echocardiography, morphological parameters and systolic time interval were determined. Doppler indices were then measured. The maximum early and late diastolic flow velocity (VE, VA), E/A ratio, LV mass and LV end diastolic and end systolic measurements and LV ejection fraction were estimated in all the groups.

Results: There was no difference in the parameters like LV systolic function, LA or AO diameter, LV end diastolic and end systolic diameters between the two groups. In the individuals of NAFLD (Group -I), 60% of the individuals showed a reduction in early diastolic filling ($VE = 0.53 \pm 0.06$ m/sec vs 0.72 ± 0.04 m/sec; $p < 0.01$) as compared to only 15% in control Group-II. The E/A ratio 0.9 ± 0.15 was seen in 66% in Group-I compared to 22% in Group II with $p < 0.01$. Similarly, the mean IVRT was 129 ± 23 msec in Group I compared to mean IVRT of 78 ± 6 msec in Group II with $p < 0.001$. The mean DT in the two Groups are 248 ± 27 ms vs 188 ± 8 ms respectively with $p < 0.01$. There was no difference in LV mass between the two groups.

Conclusions: Even younger patients with NAFLD with normal LV systolic function suffer from an impaired filling defects of LV which serves as a marker of diastolic dysfunction. These changes were more marked in individuals with higher stage of NAFLD. Because of the sedentary life style and increased obesity coupled with exposure to petroleum vapours inside the industry could be the factors for higher prevalence of NAFLD and Echocardiographic abnormality as detected in this group. Echo Doppler study with measurement of LV systolic and diastolic parameters appears to be a suitable investigation for evaluating the cardiac status of people working in petroleum industry.

Can right ventricular myocardial infarction occur without right ventricular dysfunction in inferior wall myocardial infarction?

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Background: Patients with right ventricular infarction (RVI) in Inferior Wall Myocardial Infarction (IWMI) continue to be at high risk of complications when compared to patients without involvement of right ventricle. The relationship between electrocardiographic (ECG) diagnosis of RVMI and right ventricle (RV) dysfunction in echocardiogram is not linear. In this context, the study is done to find out the incidence of RV dysfunction in patients with ECG diagnosis of Inferior and RV infarction.

Methods: The study was conducted in the Dept of Cardiology Rajiv Gandhi Govt General hospital during the period of June to July 2014. A total of 50 consecutive patients with First Acute IWMI were included in the study. All patients were thrombolysed with streptokinase. Echocardiographic assesment of RV function was done within 12 hrs of admission by a single operator. RV