

Regional Myocardial Function in Patients With Coronary Artery Disease Before And After Coronary Intervention By Tissue Doppler Study

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ABSTRACT

BACKGROUND: Percutaneous coronary intervention (PCI) is an established procedure for the treatment of coronary artery disease. Its usefulness in symptom relief is well established. However, the effect of PCI on systolic and diastolic function in patients with preserved baseline left ventricular systolic function is unknown. Recently, tissue Doppler echocardiography has emerged as a sensitive and quantitative measure of both systolic and diastolic longitudinal myocardial function. Furthermore, it has been reported that impaired left ventricular longitudinal function may precede circumferential ventricular dysfunction in patients with coronary artery disease. We hypothesized that although not evident on standard 2-dimensional echocardiography or contrast ventriculography, reduced regional contractile function distal to coronary artery stenosis may be present in patients with chronic stable angina and that PCI would have the potential to improve ventricular systolic and diastolic function after successful angioplasty. To test this hypothesis, we used tissue Doppler parameters known to sensitively detect systolic and diastolic dysfunction. Measurements were taken before, immediately after, and 6 weeks after PCI to assess whether early effects due to improved perfusion, if present, would persist over time.

AIM OF THE WORK: To determine the impact of percutaneous coronary intervention (PCI) on myocardial function assessed by tissue Doppler Echocardiography in patient with coronary artery disease.

PATIENTS METHODS: This study included (40) subjects who were classified into two groups: Patients group: This group included 30 patients with ischemic heart disease (stable angina) who underwent elective PCI. These patients included 19 male (63 %) and 11 female (37%) with ages ranged from 42 to 65 years with mean age of 54.7 ± 6.1 years. Control group: This group included 10 apparently healthy subjects (4 males and 6 females) "40 % and 60 % respectively", ranging in age from 47 to 65 years old with a mean of 54.2 ± 6.3 years with normal findings on the resting ECG, at Echocardiography and normal coronary angiography which was done to evaluate their chest pain with equivocal results of stress test. Then we grouped the patients according to the vessel upon which the stent is implanted into 3 subgroups, Subgroup (1): The patients who performed PCI to LAD. Subgroup (2): The patients who performed PCI to LCX. Subgroup (3): The patients who performed PCI to RCA. Ventricular diastolic function (Transmitral & Transtricuspid Doppler Velocities) assessed by conventional Echocardiography done for patients 1 day Before, 1 day & 6 weeks after PCI as a pulsed-wave Doppler mitral and tricuspid inflow velocities, including E, A and E deceleration time wave peak velocities (in centimeters per second). Tissue Doppler evaluation of systolic & diastolic function for control group and for patients group 1 day before and 1 day after PCI, and 6 weeks after PCI: Systolic velocity (S_m), Early diastolic velocity (E_m), Late diastolic velocity (A_m). They were measured with the sample volume positioned at the septal, lateral, inferior, and anterior angles of the mitral annular ring. It also positioned on the lateral angle of the tricuspid valve to assess the right ventricular function.

RESULTS: As regards to subgroup (1): Our study showed that as regard to systolic function, early diastolic, late diastolic function the PTD Echocardiographic variables revealed significant difference in S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to LAD in which we found significant improvement in the septal & anterior walls. However we found that the inferior, lateral & right walls showed non-significant improvement as regards S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to LAD. -As regards to subgroup (2): Our study showed that as regard to systolic function, early diastolic, late diastolic function the PTD Echocardiographic variables revealed significant difference in S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to LCX in which we found significant improvement in the lateral wall. However we found that the inferior, anterior, septal & right walls showed non-significant improvement as regards S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to LCX. -As regards to subgroup (3): Our study showed that as regard to systolic function, early diastolic, late diastolic function the PTD Echocardiographic variables revealed significant difference in S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to RCA in which we found significant improvement in the inferior & right walls. However, we found that the lateral, septal & anterior walls showed nonsignificant improvement as regards S_m , E_m & A_m between patients 1 day before and 1 day, 6 weeks after PCI to RCA.

CONCLUSION: Tissue Doppler echocardiography is a noninvasive and widely available diagnostic technique that allows the sensitive detection of myocardial dysfunction. Our work clarifies its potential in detecting the effect of successful angioplasty on myocardial function. Myocardial function improved within hours after intervention, even in the absence of evident baseline systolic dysfunction, potentially reflecting the presence of hibernating myocardium. The potential of tissue Doppler–derived parameters in ascertaining the acute and long-term success of myocardial revascularization merits further study.

KEY WORDS: PTD (Pulsed Tissue Doppler), TDI (tissue doppler imaging), LAD (left anterior descending artery), LCX (lateral circumflex artery), RCA (right coronary artery), PCI (percutaneous coronary intervention).

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