

Estimation of Left Ventricular End Diastolic Pressure by Tissue Doppler Image in Patients with Coronary Artery Disease

Abstract

The left ventricular end diastolic pressure (LVEDP) is an important parameter which reflects volume status in critically ill patients. Noninvasive assessment by Doppler echocardiography provides a safe and reproducible investigation comparable with invasive pressure monitoring.

Aim: This study was designed to evaluate the role of tissue Doppler imaging (TDI) variables in the assessment of LVEDP.

Methods: Patients scheduled for cardiac catheterization were studied with Doppler echocardiography immediately before the procedure. Early and late mitral inflow velocity (E, A wave respectively) and peak diastolic velocity from medial and lateral mitral annulus (Ea medial, Ea lateral) were obtained. Invasive measurement of LVEDP was obtained with a fluid filled pigtail catheter. The results were blinded to the interpreter.

Results: There were 50 patients (mean age 53.6 ± 9.7 years, mean ejection fraction [EF] $57.7 \pm 11.9\%$). Significant coronary lesions were found in 84% of this group. The correlation between LVEDP and E, Ea medial or Ea lateral were significant ($r = 0.20$, $p=0.0001$; $r = -0.7$, $p<0.0001$ and $r = -0.4$, $p=0.01$ respectively). The ratio of E/Ea medial had the strongest correlation with LVEDP ($r = 0.8$, $p< 0.0001$). $E/E_{amedial} > 10$ accurately predicted LVEDP > 15 mmHg with 77% sensitivity and 88.7% specificity. In patients with EF $> 50\%$, the correlation between E/Eamedial and LVEDP was still significant ($r = 0.7$, $p< 0.0001$).

Conclusion: E/ Ea medial correlates well with LVEDP and can be used to estimate LVEDP in coronary artery disease patients even in patients with normal LVEF.

Key Words: Tissue Doppler, LVEDP, mitral annular velocity.