

# CORRELATION OF COLOUR M-MODE PROPAGATION VELOCITY WITH LEFT VENTRICULAR DIASTOLIC FUNCTION PARAMETERS IN ACUTE HEART FAILURE PATIENT WITH PRESERVED EJECTION FRACTION

\* Andrianto<sup>1</sup>, Ivan Satria Pratama<sup>1</sup>, Agus Subagjo<sup>1</sup>, Fahrur Nisa'i Fatimah<sup>1</sup>, Muhammad Ramadhan<sup>1</sup>, and Ricardo Adrian Nugraha<sup>1</sup>

<sup>1</sup>Universitas Airlangga Departemen Kardiologi dan Kedokteran Vaskular

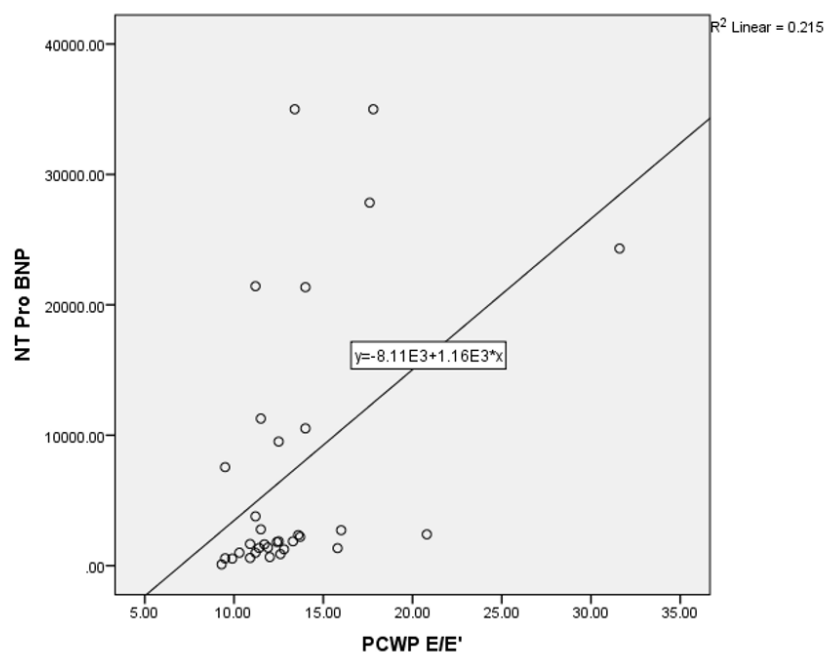
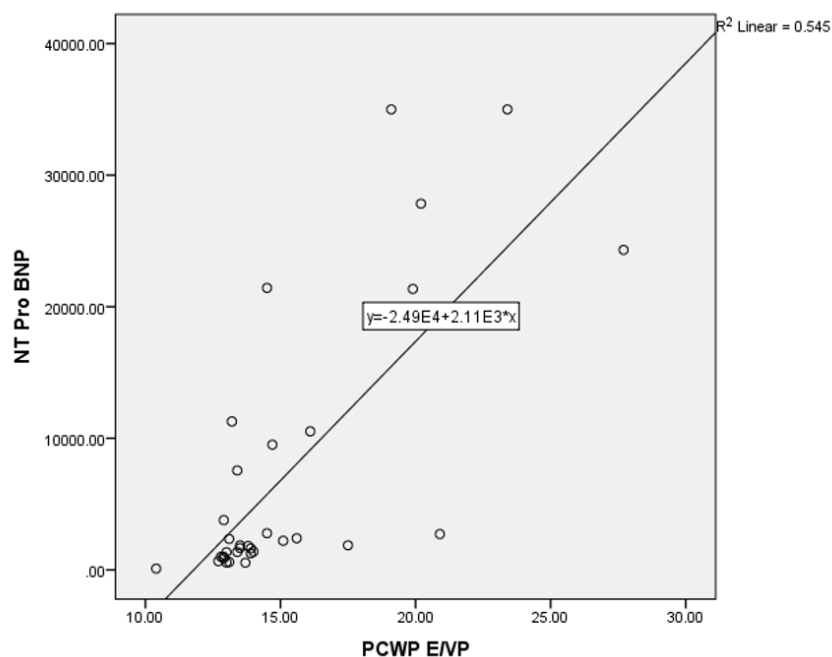
June 8, 2023

## Abstract

**BACKGROUND:** Colour M-mode propagation velocity (Vp) is an echocardiographic parameter that represents relaxation of the left ventricular (LV) and the ratio of peak E-wave velocity and flow propagation velocity (E/Vp) can be used to measure pulmonary capillary wedge pressure (PCWP) estimation which is almost equivalent to invasively measured PCWP. The correlation between propagation velocity (Vp) with standard left ventricular diastolic function parameters and E/Vp with PCWP in patients with acute heart failure with preserved ejection fraction (HFpEF) has not been widely studied. This study aimed to determine the correlation of Vp in the assessment of left ventricular diastolic function in acute heart failure patients with HFpEF. **METHODS:** This research is an observational analytical study using a cross-sectional study design conducted from April to June 2022. The subjects of this study were patients diagnosed with acute HFpEF and treated at Dr. Soetomo General Academic Hospital, Surabaya. Patients with heart rhythm disturbances, moderate to severe valvular heart disease, and congenital heart defects were excluded from this study. Patients were measured for diastolic function including mitral valve early mitral inflow velocity (MV E Velocity), mitral peak velocity of early filling (E') (E' Septal and E' Lateral), left atrial volume index (LAVI), The maximal tricuspid regurgitation velocity (TR V Max), Vp, the ratio of early diastolic mitral inflow velocity to early diastolic mitral annulus velocity (E/E'), the ratio between early and late ventricular filling velocity (E/A) and E/Vp Ratio. N-terminal-pro hormone B-type natriuretic peptide (NT-ProBNP) examination was also performed on study subjects as an additional diagnosis of acute heart failure. **RESULTS:** There were 33 patients who met the inclusion and exclusion criteria and were included in our study. There were 26 patients (78.8%) with grade I diastolic dysfunction, 4 patients (12.1%) with grade II diastolic dysfunction, and 3 patients (9.1%) with grade III diastolic dysfunction. There is a strong positive correlation between Vp with parameters E' Septal ( $p = < 0.001$ ;  $r = 0.636$ ) and E' Lateral ( $p = < 0.001$ ;  $r = 0.650$ ). Vp is negatively correlated with the ratio E/E' ( $p = 0.029$ ;  $r = -0.37$ ). The PCWP estimate with E/Vp ratio had a strong correlation with the NT-Pro BNP value  $> 300$  pg/ml in acute HFpEF patients ( $p = < 0.001$ ;  $r = 0.726$ ) compared to the PCWP estimate with E/E' ( $p = < 0.001$ ;  $r = 0.549$ ). There is no correlation between Vp value and degree of diastolic dysfunction in patients with acute HFpEF. **CONCLUSION:** Vp has a strong correlation in the assessment of left ventricular diastolic function parameters with acute HFpEF. PCWP estimation using E/Vp ratio has a strong correlation with NT-ProBNP  $> 300$  pg/ml. Measurement of Vp value and E/Vp ratio can be used to assess diastolic function and estimate PCWP in patients with acute HFpEF.

## Hosted file

Manuscript.docx available at <https://authorea.com/users/626927/articles/648084-correlation-of-colour-m-mode-propagation-velocity-with-left-ventricular-diastolic-function-parameters-in-acute-heart-failure-patient-with-preserved-ejection-fraction>



## Hosted file

Table 1.docx available at <https://authorea.com/users/626927/articles/648084-correlation-of-colour-m-mode-propagation-velocity-with-left-ventricular-diastolic-function-parameters-in-acute-heart-failure-patient-with-preserved-ejection-fraction>

### Hosted file

Table 2.docx available at <https://authorea.com/users/626927/articles/648084-correlation-of-colour-m-mode-propagation-velocity-with-left-ventricular-diastolic-function-parameters-in-acute-heart-failure-patient-with-preserved-ejection-fraction>

### Hosted file

Table 3.docx available at <https://authorea.com/users/626927/articles/648084-correlation-of-colour-m-mode-propagation-velocity-with-left-ventricular-diastolic-function-parameters-in-acute-heart-failure-patient-with-preserved-ejection-fraction>

### Hosted file

Table 4.docx available at <https://authorea.com/users/626927/articles/648084-correlation-of-colour-m-mode-propagation-velocity-with-left-ventricular-diastolic-function-parameters-in-acute-heart-failure-patient-with-preserved-ejection-fraction>