

Accuracy of pleth variability index compared with inferior vena cava diameter to predict fluid responsiveness in mechanically ventilated patients

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In the intensive care unit (ICU), stable hemodynamics are very important. Hemodynamic intervention is often effective against multiple organ failure, such as in tissue hypoxia and shock. The administration of intravenous fluids is the first step in regulating tissue perfusion.

The main objective of this study is to compare the performance between 2 methods namely pleth variability index (PVI) and IVC distensibility index (dIVC).

In this study, the hemodynamic measurements were performed before and after passive leg raising (PLR). Measurements were obtained, including, PVI, dIVC, and cardiac index (CI). Both CI and dIVC measurements were evaluated by transesophageal probe and convex probe respectively. The dIVC measurements were taken using M-mode, 2 cm from junction between the right atrium and the inferior vena cava. The PVI was measured by Masimo Radical-7 monitor, Masimo.

A total of 72 patients were included. The dIVC at a threshold value of >23.8% provided 80% sensitivity and 87.5% specificity to predict fluid responsiveness and was statistically significant ($P < .001$), with an AUC 0.928 (0.842–0.975). The PVI at a threshold value of >14% provided 95% sensitivity and 81.2% specificity to predict fluid responsiveness and was statistically significant ($P < .001$), with an AUC 0.939 (0.857–0.982).

Both PVI and dIVC can be used as a noninvasive method that can be easily applied at the bedside in determining fluid responsiveness in all patients with mechanical ventilation in intensive care.