Plethysmographic Variation Index Predicts Fluid Responsiveness in Ventilated Patients in the Early Phase of Septic Shock in the Emergency Department: A Pilot Study

**Purpose**
Feasibility study examining whether plethysmographic variability index (PVI) can predict fluid responsiveness in mechanically ventilated patients in the early phase of septic shock in the emergency department.

**Materials and Methods**
Monocentric, prospective, observational study that included 31 mechanically ventilated and sedated patients with septic shock in whom volume expansion was planned. The patients were equipped with a pulse oximeter that automatically calculated and displayed PVI. The intervention consisted in infusing 8 mL/kg of hydroxylethyl starch over a 20-minute period. Before and after intervention, we recorded PVI and measured the aortic velocity-time integral (VTIao) using transthoracic echocardiography. Responders were defined as patients who increased their VTIao by 15% or higher after fluid infusion.

**Results**
Sixteen patients were classified as responders, and 15 as nonresponders. Mean PVI values before intervention were significantly higher in responders vs nonresponders (30% ± 9% vs 8% ± 5%, P < .001). Plethysmographic variability index values before intervention were correlated with percent changes in VTIao induced by intervention (R2 = 0.67; P < .001). A PVI threshold value of 19% discriminates responders from nonresponders with a sensitivity of 94% and a specificity of 87% (area under the curve, 0.97; P < .001).

**Conclusion**
Our study suggests that PVI is a feasible and interesting method to predict fluid responsiveness in early phase septic shock patients in the emergency department.