

Plethysmographic Variability Index (PVI) Accuracy in Predicting Fluid Responsiveness in Anesthetized Children.

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Introduction

Plethysmographic Variability Index (PVI) has been shown to accurately predict responsiveness to fluid loads in adults. The goal of this study was to evaluate PVI accuracy when predicting fluid responsiveness during noncardiac surgery in children.

Material and Methods

Children aged 2-10 years scheduled for noncardiac surgery under general anesthesia were included. PVI was assessed concomitantly with stroke volume index (SVI). A response to fluid load was defined by an SVI increase of more than 15%. A 10 ml·kg⁻¹ normal saline intravenous fluid challenge was administered before surgical incision and after anesthetic induction. After incision, fluid challenges were administered when SVI values decreased by more than 15% or where judged necessary by the anesthesiologist. Statistical analyses include receiving operator characteristics (ROC) analysis and the determination of gray zone method with an error tolerance of 10%.

Results

Fifty-four patients were included, 97 fluid challenges administered and 45 responses recorded. Area under the curve of ROC curves was 0.85 [0.77-0.93] and 0.8 [0.7-0.89] for baseline PVI and SVI values, respectively. Corresponding gray zone limits were [10-17%] and [22-31 ml·m⁻²], respectively. PVI values exhibited different gray zone limits for pre-incision and postincision fluid challenges, whereas SVI values were comparable. PVI value percentages in the gray zone were 34% overall and 44% for challenges performed after surgical incision.

Discussion

This study found both PVI and prechallenge SVI to be accurate when used to predict fluid load response during anesthetized noncardiac surgery in children. However, a third of recorded PVI values were inconclusive.