

Use of PVI for Guidance of Fluid Management during Major Abdominal Surgery

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Introduction

The validity of 'dynamic' preload parameters such as stroke volume variation or pulse pressure variation to predict volume responsiveness in patients under controlled positive pressure ventilation has been previously reported. [1]. These parameters can add to the guidance of intraoperative fluid management and improve clinical decision-making. Recently, Pleth Variability Index (PVI) – obtained noninvasively from a pulse oximeter's plethysmographic waveform – was commercially introduced [2]. According to the manufacturer, PVI is derived automatically from the changes in the perfusion index over the respiratory cycle. Objectives: We studied the ability of PVI to predict fluid responsiveness in the setting of major abdominal surgery.

Methods

Twenty consecutive patients were connected to a Radical-7 Pulse CO-Oximeter with PVI through an adhesive finger sensor (Masimo Corp., USA). Hemodynamic parameters such as stroke volume and corrected flow time were measured by an esophageal doppler device (CardioQTM, Deltex Medical, USA). In case of suspected hypovolemia (corrected flow time, 350 ms) a 250 ml colloid bolus (6% Hydroxyethyl Starch, 130/0.4) was administered. Study parameters (PVI and hemodynamic variables) were recorded before and 10 minutes after completion of fluid bolus administration. A positive fluid response was defined as an increase in stroke volume of 15% [1] to the first fluid bolus.

Results

The response to the first fluid bolus was studied in 10 female and 10 male patients with median age of 48 years (range: 41 – 67 years), and mean (+ SD) BMI of 26.2 kg/m² (+ 5.6 kg/m²). The mean (+ SD) duration of surgery was 247 min (+102 min). A positive fluid response was noted in 11 of 20 patients. PVI achieved an area under the receiver operating characteristic (ROC) curve of 0.67. A cut-off point for PVI (maximizing sensitivity and specificity) for the prediction of fluid responsiveness was found to be >8.0% (sensitivity: 100 %; specificity: 44 %; positive predictive value: 69 %; and negative predictive value: 100 %).

Conclusion

In the setting of major abdominal surgery, PVI may serve as useful tool for guiding intraoperative fluid management.

References 1. Marik PE, et al.: *Crit Care Med.* 2009; 2642–7 2. Cannesson M, et al.: *Br J Anaesth.* 2008; 2000–6