

The Effects of Epidural Anesthesia on Difference in Pulse Pressure (dPP) and Pleth Variability Index (PVI).

Fukui K., Latz B., Markstaller K., Ikeda M., Pestel G. *Proceedings of the 2011 Annual Meeting of the American Society of Anesthesiologists*. A867.

Background

General hemodynamic parameters are impaired by the onset of epidural anesthesia. Physiological considerations make us hypothesize that the onset of neuraxial blockade results in changes of general hemodynamics due to sympathicolysis, while heart-lung interaction parameters remain unchanged. Dynamic parameters, e.g. difference in pulse pressure (dPP), are superior to classical static parameters to predict fluid responsiveness (1). Pleth Variability Index (PVI) is a dynamic parameter, which is expected to predict fluid responsiveness non-invasively from respiratory changes in the plethysmography curve. Whether neuraxial blockade and sympathicolysis by epidural anesthesia effect dPP and PVI has not been evaluated yet. Therefore we measured changes in respiratory changes of arterial pulse pressure (dPP), and respiratory changes in the plethysmography curve (PVI) after starting epidural anesthesia in elective surgery patients and assessed whether the two methods are interchangeable.

Methods

After IRB approval and written informed consent, 24 patients scheduled for elective abdominal surgical procedures and qualifying for both a neuraxial blockade and an arterial line have been included in this observational study. After induction of anesthesia and achievement of normovolemia monitored by an Esophageal Doppler device, baseline hemodynamic parameters were recorded. A Respiratory Variation Monitor (2) was used to assess dPP continuously. PVI was assessed by a commercial device (Radical-7, Masimo Corp., Irvine, Ca.). Neuraxial blockade was achieved by dosage of 1% lidocaine according to clinical standards. Changes in hemodynamic parameters were recorded over 30 minutes at 2-minute intervals. Patients were excluded from further analysis if norepinephrine became necessary to keep decrease of mean arterial blood pressure within 20% of baseline level. PVI and dPP intend to measure the same quantity, so we assessed the equivalence of these methods using Bland-Altman analysis. Bias and limits of agreement are shown.

Results

In total 368 data pairs of dPP and PVI were compared (Figure 1) over a 30 minute period. Onset of epidural blockade occurred after 15 minutes. 184 data pairs of dPP and PVI before full onset of block were compared (Figure 2). 184 data pairs of dPP and PVI after onset of block were compared (Figure 3).

Conclusion

Although there is a fair bias between dPP and PVI, rather large limits of agreement exist both before and after full onset of epidural anesthesia. Therefore, we consider both methods not to be interchangeable.

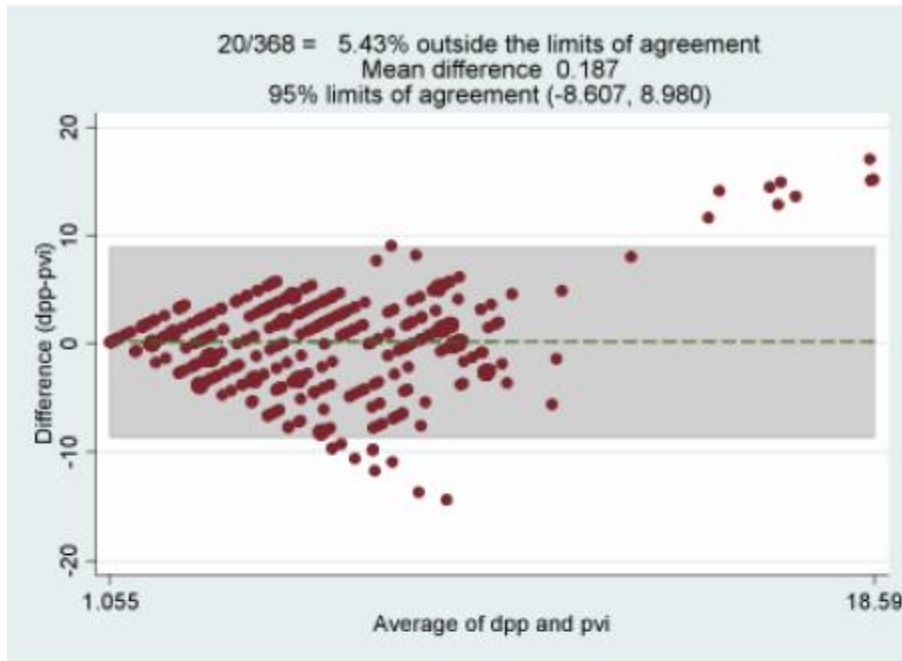


Figure 2

