COMPARISON OF TONOMETRY-DERIVED VERSUS INTRA-ARTERIAL CATHETER-DERIVED ARTERIAL BLOOD PRESSURE AND RESPIRATORY VARIATION IN NEUROSURGICAL PATIENTS

Lauren K. Dunn, MD, PhD, Andrew Boryan, MD, Douglas A. Colquhoun, MB, ChB, MSc, Marcel E Durieux, MD, PhD, David L. Bogdonoff, MD, Robert H. Thiele, MD

UVA Health System, Charlottesville, VA

Introduction: Intraarterial catheters allow for continuous beat-to-beat monitoring of arterial blood pressure, as well as an estimation of fluid responsiveness, as determined by arterial respiratory variation. However, intraarterial catheter placement may be complicated by infection and thrombosis, and may be technically challenging in some patients. The T-line® Tensymeter is a potential non-invasive alternative to intraarterial blood pressure monitoring. We compared estimates of mean arterial pressure (MAP) and pulse pressure variability (PPV) from the T-line® with measurements of MAP and PPV taken from a radial artery.

Methods: Twenty-two patients undergoing major spinal surgery were recruited for the study. Intraoperative blood pressure was monitored by radial artery catheter in one arm and T-line on the contralateral arm. Mean arterial pressure and pulse pressure variation were calculated every minute and compared using Bland-Altman analysis, with adjustments for repeated measures.

Results: 4676 minutes of data were available for analysis from twenty-one patients. Analysis of MAP showed a mean bias of 6.3 mm Hg, and limits of agreement of -29 and 42 mm Hg, respectively (Figure 1, left). Analysis of PPV showed a mean bias of 7.7%, and limits of agreement of -12 and 28%, respectively (Figure 1, right). Trend analysis suggested that changes in MAP and PPV were concordant in 93 and 55% of non-excluded minutes, respectively.

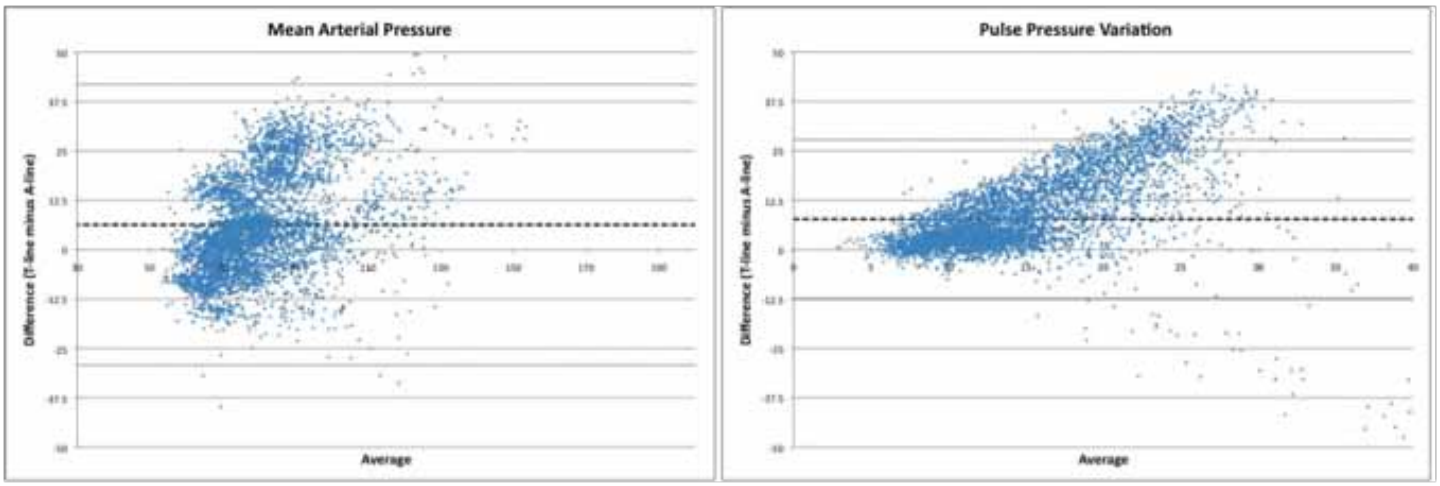

Figure 1: Bland-Altman analysis of mean arterial pressure (left) and pulse pressure variation (right)

Conclusions: The T-line® Tensymeter is an acceptable blood pressure trend monitor, but the limits of agreement between invasive and tonometrically derived absolute values are wide.