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Fluid therapy guided by cardiac output measurements is of particular importance for adequate cerebral perfusion and oxygenation in neurosurgical patients. We examined the usefulness of a noninvasive electrical velocimetry (EV) device based on the thoracic bioimpedance method for perioperative hemodynamic monitoring in patients after aneurysmal subarachnoid hemorrhage.

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PATIENTS AND METHODS: In total, 18 patients who underwent surgical clipping or endovascular coiling for ruptured aneurysms were examined prospectively. Simultaneous cardiac index (CI) measurements obtained with EV (CIEV) and reference transpulmonary thermodilution (CITPTD) were compared. A total of 223 pairs of data were collected.

RESULTS: A significant correlation was found between CIEV and CITPTD (r=0.86; P<0.001). Bland and Altman analysis revealed a bias between CIEV and CITPTD of -0.06 L/min/m, with limits of agreement of ±1.14 L/min/m and a percentage error of 33%. Although the percentage error for overall data was higher than the acceptable limit of 30%, subgroup analysis during the postoperative phase showed better agreement (23% vs. 42% during the intraprocedure phase). Four-guadrant plot and polar plot analyses showed fair-to-poor trending abilities (concordance rate of 90% to 91%, angular bias of +17 degrees, radial limits of agreement between  $\pm 37$  and  $\pm 40$  degrees, and polar concordance rate of 72% to 75%), including the subgroup analysis.

CONCLUSIONS: Absolute CI values obtained from EV and TPTD are not interchangeable with TPTD for perioperative use in subarachnoid hemorrhage patients. However, considering the moderate levels of agreement with marginal trending ability during the early postoperative phase, this user-friendly device can provide an attractive monitoring option during neurocritical care<sup>1)</sup>.

## 1)

Mutoh T, Sasaki K, Yamamoto S, Yasui N, Ishikawa T, Taki Y. Performance of Electrical Velocimetry for Noninvasive Cardiac Output Measurements in Perioperative Patients After Subarachnoid Hemorrhage. | Neurosurg Anesthesiol. 2018 Jun 22. doi: 10.1097/ANA.0000000000000519. [Epub ahead of print] PubMed PMID: 29939977.

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