

Reliability of bioactance and pulse power analysis in measuring cardiac index during cytoreductive abdominal surgery with hyperthermic intraperitoneal chemotherapy (HIPEC)

Ylikauma LA, Tuovila MJ, Ohtonen PP, Erkinaro TM, Vakkala MA, Takala HT, Liisanantti JH, Kaakinen TI. *BMC Anesthesiol.* 2023 Jan 31;23(1):38. doi: 10.1186/s12871-023-01988-3.

Purpose: Various malignancies with peritoneal carcinomatosis are treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC). The hemodynamic instability resulting from fluid balance alterations during the procedure necessitates reliable hemodynamic monitoring. The aim of the study was to compare the accuracy, precision and trending ability of two less invasive hemodynamic monitors, bioactance-based Starling SV and pulse power device LiDCOrapid with bolus thermodilution technique with pulmonary artery catheter in the setting of cytoreductive surgery with HIPEC.

Methods: Thirty-one patients scheduled for cytoreductive surgery were recruited. Twenty-three of them proceeded to HIPEC and were included to the study. Altogether 439 and 430 intraoperative bolus thermodilution injections were compared to simultaneous cardiac index readings obtained with Starling SV and LiDCOrapid, respectively. Bland-Altman method, four-quadrant plots and error grids were used to assess the agreement of the devices.

Results: Comparing Starling SV with bolus thermodilution, the bias was acceptable ($0.13 \text{ l min}^{-1} \text{ m}^{-2}$, 95% CI 0.05 to 0.20), but the limits of agreement were wide (-1.55 to $1.71 \text{ l min}^{-1} \text{ m}^{-2}$) and the percentage error was high (60.0%). Comparing LiDCOrapid with bolus thermodilution, the bias was acceptable ($-0.26 \text{ l min}^{-1} \text{ m}^{-2}$, 95% CI -0.34 to -0.18), but the limits of agreement were wide (-1.99 to $1.39 \text{ l min}^{-1} \text{ m}^{-2}$) and the percentage error was high (57.1%). Trending ability was inadequate with both devices.

Conclusion: Starling SV and LiDCOrapid were not interchangeable with bolus thermodilution technique limiting their usefulness in the setting of cytoreductive surgery with HIPEC.