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Abstracttitel: Accuracy of non-invasive cardiac-output monitoring in cardiac surgery

Purpose:

Accurate non-invasive monitoring of the cardiac output, especially as our population is getting older and sicker, is important for making treatment decisions. Nyboer suggested already 1940 a correlation between thoracic impedance and cardiac output. Since that time, the algorithm has been modified. A new development -called velocimetry- promise a precise and stable measurement with use of three conventional ECG-electrodes.

We hypothesised that the accuracy of this method is inferior to the golden standard – the pulmonary artery catheter - especially when patients are spontaneous breathing.

Methods:

We included 13 patients randomly out of our cardiac surgical population. They were anaesthetised following the local standards. All received a pulmonary artery catheter with continuous cardiac output monitoring (CCO-vigilance-Edwards). After arrival on the ICU patients were connected to the electrical velocimetry monitor (Aesculon®-Osypka Medizintechnik Germany) the way recommended by the manufacturer. Measurements were done 10 times per patient.

Results:

Ventilated patients (n=7) had a mean cardiac output of 3.39 l/min (thermodilution) versus 3.88 l/min (aesculon) (r=0,712). Non-ventilated patients (n=6) presented with a mean of 3,19 l/min and 4,14 l/min respectively (r=-0,21). Multivariate repeated measures analysis revealed difference between the two techniques (p=0.019). This was stable over time (p=0.42).

Conclusion:

The correlation between vigilance and bioimpedance for spontaneous breathing patients is low. This could indicate that this tool is less relevant for treatment decisions in spontaneous breathing patients. More research on a larger population is necessary.