Publication Brief

Pressure Recording Analytical Method for Measuring Cardiac Output in Critically Ill Children: A Validation Study

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OBJECTIVE
The researchers sought to compare cardiac output (CO) as measured by a novel arterial pulse, contour-based pressure recording analytical method (PRAM) with that using a transpulmonary dilution method (COstatus®) in a group of critically ill children.

STUDY
• Forty-eight, mechanically ventilated children were measured in a single center PICU as soon as possible within the first 24 hours after cardiac surgery.
  - median age: 17 months (range 4.5 - 47.3)
  - median weight: 10.7 kg (range 5.5-15)
  - with arterial and central venous catheters in situ were studied.
• CO was measured simultaneously using PRAM and transpulmonary ultrasound dilution (UD);
• Single paired measurement were compared and analyzed with Bland-Altman plots.
• To track changes in CO, polar plots were used to assess the agreement between the two methods.
• Measurements were repeated before and after therapeutic interventions that were intended to augment CO (e.g. fluid bolus).

RESULTS
• 210 paired measurements were compared.
  • Ultrasound Dilution mean CO was 1.9 (1.2) litre min(-1); PRAM mean CO was 1.92 (0.5) litre min(-1);
  • There was a 116% percentage error with a mean bias of 0.02 litre min(-1) with wide limits of agreement, ±2.21 litre min(-1);
  • The correlation between PRAM and UD for measuring changes in CO was also poor, with only 37% of measurements falling within the pre-defined polar plot limits of ±30°.

STUDY’S CONCLUSIONS
There was an unacceptable poor agreement between UD and PRAM. The authors do not recommend the use of PRAM for measuring CO in critically ill children with the current algorithm.

TRANSONIC TAKE HOME
• This study used ultrasound dilution (COstatus®) as the reference method.
• The authors report that the Transonic ultrasound dilution method has been described as approaching a gold standard for bedside paediatric measurement.
• First large-scale study in children with COstatus®.

REFERENCES