Assessment of fluid balance after neonatal cardiac surgery: Intake/output vs. weight-based methods

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On behalf of the NEPHRON Investigators

Introduction

- Fluid overload associates with poor outcomes after neonatal cardiac surgery.
- Consensus does not exist for the most clinically relevant method of measuring fluid balance (FB).
- While weight-change based FB (FB-W) is standard in neonatal intensive care units, weighing infants after cardiac surgery may be challenging.

Study Aims

1. Identify characteristics associated with obtaining weights after neonatal cardiac surgery.
2. Describe how intake/output-based FB (FB-IO) and FB-W compare in the early postoperative period in this population.

Methods

Observational retrospective study of 2235 neonates undergoing cardiac surgery from 22 hospitals comprising the Neonatal and Pediatric Heart and Renal Outcomes Network (NEPHRON) database.

Results

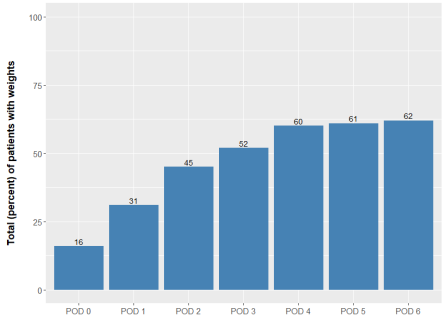

Figure 1. Less than half of all patients were weighed from POD 0 – 2. Percentage of patients weighed increased from POD 0 – 6, but did not change significantly after POD 4.

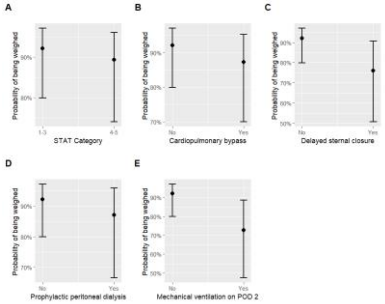

Figure 2. Marginal effects plot of patient characteristics associated with lower probabilities of being weighed in our logistic regression model. Error bars show the 95% CI.

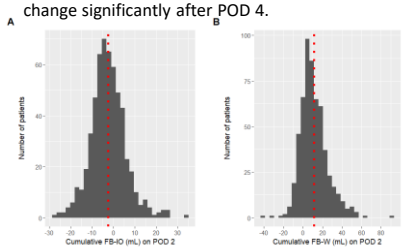

Figure 3. Mean FB is denoted by the dotted red line. FB-IO showed a modestly negative FB on POD2 for the cohort, while paired assessments with FB-W demonstrated a positive FB for the same time point.

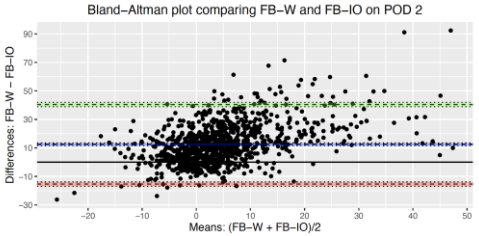

Figure 4. There is poor agreement between FB-W and FB-IO measurements. Mean bias 12.52 (95% CI 11.64 – 13.41); SD of bias 14.24 (95% LOA -15.39 – 40.43) .

Conclusions

- Weighing neonates early after cardiac surgery is uncommon. There is significant practice variation among centers in our cohort.
- Patients with increased severity/complexity of illness are less likely to be weighed.
- FB-W and FB-IO have weak correlation.
- Further study is needed to determine which cumulative FB metric most associates with adverse outcomes in order to guide development of best practices and to identify interventions to influence outcomes.

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NEPHRON Neonatal and Pediatric Heart and Renal Outcomes Network

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