



Should We Administer Fluids to Prevent Peri-Intubation Cardiovascular Collapse?

Key Article: Janz DR, et al. *Effect of a fluid bolus on cardiovascular collapse among critically ill adults undergoing tracheal intubation (PrePARE): a randomized controlled trial. Lancet Respir Med. 2019. Epub ahead of print.*

Background

- As many as 1 in 4 critically ill patients undergoing ETI have CV collapse (shock, cardiac arrest, death) during the procedure or immediately afterwards. Possible mechanisms include:
 - Hypovolemia
 - Impaired SVR
 - Receipt of sedative medications
 - Reduced venous return from positive-pressure ventilation (PPV)
- Peri-intubation CV collapse is associated with increased in-hospital mortality
- Many recommend administering IVFs before induction to prevent CV collapse during RSI
 - One observational study that demonstrated a 10-item pre-intubation checklist (1 of which was IVFs) decreased incidence of CV collapse
 - About 50% of critically ill patients undergoing ETI get IVFs
- There are no randomized controlled trials that have examined the effect of IVFs on outcomes of RSI and ETI.

Objective – The PrePARE Trial

- Assess whether the administration of a fluid bolus reduces the incidence of CV collapse compared with no IVF bolus during ETI.

Study

- Pragmatic, multicenter, unblinded, randomized trial
- 8 ICUs and 1 ED (LSU, Vanderbilt, Univ of Alabama, Burlington Massachusetts, Univ of Washington, Lincoln Medical Center in NY)
- Patients
 - Included
 - Adults ≥ 18 years of age
 - Undergoing ETI
 - Excluded
 - If awake intubation was planned
 - If intubation was immediately needed
 - If treating clinician felt IVFs required or contraindicated for optimal care
 - Patients may also have been co-enrolled in the PreVent Trial (BMV during Tracheal Intubation)
- Randomization
 - 1:1 ratio
 - Fluid Bolus

- Treating team administered 500 ml of crystalloid before induction
 - Infused through induction and laryngoscopy
 - No Fluid Bolus
 - Study protocol recommended against any new crystalloid infusion between enrollment and 2 min after completion of ETI
 - IVF that was initiated as part of clinical care before enrollment was continued in both study groups if applicable
 - All aspects of the intubation were at the discretion of the treating team
- Primary Outcome
 - Composite
 - SBP newly < 65 mm Hg during or within 2 min after ETI
 - New or increased vasopressor use during or within 2 min after ETI
 - Cardiac arrest within 1h of ETI
 - Death within 1h of ETI
- Secondary Outcomes
 - Any additional IVFs given to either group between induction and 2 min after ETI
 - Lowest SBP between induction and 2 min after ETI
 - Change in SBP from induction to lowest SBP
 - Number of laryngoscopy attempts
 - Number of ventilator-free days
 - Number of ICU-free days
 - In-hospital mortality over a 28-day follow up period
- Primary analysis was an unadjusted, intention-to-treat comparison

Results

- 537 critically ill adults intubated at the 9 sites during enrollment
 - 511 met inclusion criteria
 - 337 patients enrolled and randomized
 - Fluid group: 168 patients
 - 98% received the full 500 ml bolus
 - Median volume of fluid infused before induction 200 ml
 - No Fluid group: 169
 - 99% did not receive the fluid bolus
 - Post-randomization procedural characteristics did not differ between groups
- **Trial stopped early by Data Safety Monitoring Board**
- Primary Outcome – Composite CV Collapse
 - Fluid group: 20%
 - No Fluid group: 18%
 - P=0.76
 - Incidence of each component of the composite outcome did not differ significantly between the two groups
- Secondary Outcomes – no significant difference between the two groups
- *For patients receiving PPV (NIV or BMV), fluid bolus administration appeared to decrease the incidence of CV collapse. For patients not receiving PPV, fluid bolus appeared to increase the incidence of CV collapse.

Limitations as described by Authors

- Non-blinded trial – may have influenced use of vasopressors or other interventions
- Incidence of primary outcome (17%) was lower than other studies on the peri-intubation CV collapse
- Trial stopped early by Data Safety Monitoring Board for futility
- Performed in 8 ICUS and 1 ED – generalizability?
- Volume of IVF received by patients before enrollment not recorded
- Volume of 500 ml may not have been adequate
- Timing of bolus before induction and infusing during procedure may have affected results

Take Home Points

- Administration of IVF bolus during ETI of critically ill patients did not affect the incidence of CV collapse compared with no fluid bolus.
- Finding of decreased incidence of CV collapse in patients receiving PPV is hypothesis generating.