Dexmedetomidine Sedation in Mechanically Ventilated Critically Ill Children: A Pilot Randomized Controlled Trial (Pediatr Crit Care Med 2020; 21:e731-e739)

Background & Objectives: Optimal sedation is an integral component of the comprehensive medical care of the critically ill child. However, there is no universally accepted approach to the sedation of mechanically ventilated children. The objective of the study is to assess the feasibility, safety, and efficacy of a sedation protocol using dexmedetomidine as the primary sedative in mechanically ventilated critically ill children.
Methods: This is an open-label, pilot, prospective, randomized, controlled trial conducted in Six tertiary PICUs in Australia and New Zealand. Critically ill children, younger than 16 years old, expected to be mechanically ventilated for at least 24 hours were enrolled. Children randomized to dexmedetomidine received a dexmedetomidine-based algorithm targeted to light sedation (State Behavioral Scale -1 to +1). Children randomized to usual care received sedation as determined by the treating clinician (but not dexmedetomidine). The primary outcome was the proportion of sedation scores in the target sedation range in the first 48 hours. Safety outcomes included device removal, adverse events, and vasopressor use. Feasibility outcomes included time to randomization and protocol fidelity.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet

Dexmedetomidine vs usual sedation practice in mechanically ventilated children: Is it feasible, safe and efficacious?

Results:
Sedation with dexmedetomidine as the primary sedative resulted in a greater proportion of sedation measurements in the light sedation range (State Behavioral Scale -1 to +1) over the first 48 hours ([71%] vs [58%]; p = 0.04) and the first 24 hours (66/103 [64%] vs 48/116 [41%]; p < 0.001) compared with usual care. Cumulative midazolam dosage was significantly reduced in the dexmedetomidine arm compared with usual care (p = 0.002). There were more episodes of hypotension and bradycardia with dexmedetomidine but no difference in vasopressor requirements. Median time to randomization after intubation was 6.0 hours (IQR, 2.0-9.0 hr) in the dexmedetomidine arm compared with 3.0 hours (IQR, 1.0-7.0 hr) in the usual care arm (p = 0.24).

Conclusions:
A sedation protocol using dexmedetomidine as the primary sedative was feasible, appeared safe, achieved early, light sedation, and reduced midazolam requirements. The findings of this pilot study justify further studies of sedative agents in critically ill children.

Key message: Children sedated with dexmedetomidine as the primary sedative achieved target sedation levels following initiation of mechanical ventilation when compared with usual care. Results demonstrate that a strategy using dexmedetomidine was feasible, practical, and safe.

EXPERT COMMENT

"Randomized trials in pediatric critical care sedation have proven difficult, mainly due to recruitment issues. This pilot study showed that randomization of ventilated children in intensive care to alternative sedation arms is feasible and that a treatment algorithm with dexmedetomidine may be superior to achieve more rapid safe sedation levels. A large, multinational trial is required to confirm these findings and to understand optimal sedation practice in improving long-term outcomes for critically ill children."

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Reference

Erickson SJ, Millar J, Anderson BJ, et al. Baby SPICE Investigators and the Australian and New Zealand Intensive Care Society Paediatric Study Group (ANZICS-PSG). Dexmedetomidine Sedation in Mechanically Ventilated Critically Ill Children: A Pilot Randomized Controlled Trial. Pediatr Crit Care Med. 2020 Sep;21(9):e731-e739. doi: 10.1097/PCC.0000000000002483. PMID: 32740192.