

Dynamic Airway Driving Pressure and Outcomes in Children With Acute Hypoxemic Respiratory Failure

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Background & Objectives: Current knowledge in adults states that airway driving pressure (DP) correlates with mortality in patients with ARDS. The commonly proposed safety threshold of driving pressure in adults is 15 cm H₂O. There is a lack of data about the effect of driving pressure on mortality in pediatric ARDS. **This study aimed to evaluate the effect of driving pressure on morbidity and mortality of children with acute hypoxemic respiratory failure.**

Methods: Retrospective cohort study, performed in a tertiary level pediatric ICU. Children who received invasive mechanical ventilation for acute hypoxemic respiratory failure (defined as PaO₂ = FiO₂ < 300 within 24 h after intubation), in a 2-y period were included. The cohort was divided into 2 groups based on the highest dynamic driving pressure (DP, calculated as the difference between peak inspiratory pressure and PEEP) in the first 24 h, with a cut-off value of 15 cm H₂O.

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

Pediatric Evidence And Research Learning Snippet



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Results: • 101 children were enrolled. In comparison to the group with high DP (ie, < 15 cm H₂O), children in the group with low DP (ie, < 15 cm H₂O) had significantly lower median (interquartile range) duration of ventilation (5 [4–6] d vs 8 [6–11] d, P < .001), ICU length of stay (6 [5–8] d vs 12 [8–15] d, P < .001), and more ventilator-free days at day 28 (23 [20–24] vs 17 [0–22] d, P < .001).
• Logistic regression analysis suggested driving pressure as an independent predictor of morbidity after adjusting for confounding variables. However, there was no statistically significant difference in mortality between the 2 groups (17% in low DP vs 24% in high DP, P = .38).

Conclusion: Below a threshold of 15 cm H₂O, DP was associated with significantly decreased morbidity in children with acute hypoxemic respiratory failure.

Key message: In children with ARDS, dynamic driving pressure with a safety cut-off of 15 cm H₂O was associated with lower morbidity as evidenced by shorter duration of ventilation and shorter ICU and hospital length of stay.

Driving pressure (ΔP) can be calculated at the bedside as: plateau pressure minus positive end-expiratory pressure (P_{plat} – PEEP)

EXPERT COMMENT

“Driving pressure (DP) is elegant concept that promises to simplify the optimization of mechanical ventilation in children with ARDS. This study confirms the safety threshold of DP as 15 cm of H₂O and re-affirms that DP provides a better estimate of lung stress than tidal volume. It is emphasized to monitor DP as one of the way of lung protective ventilation in ARDS children, for better results. More prospective studies in pediatric population are still needed on this aspect.”

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With warm regards,

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Reference

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