

COMPARISON OF HEATED HUMIDIFIED HIGH FLOW NASAL CANNULA AND NON-INVASIVE VENTILATION ON POST- EXTUBATION OUTCOME IN HIGH RISK CHILDREN - A RANDOMIZED CLINICAL NON-INFERIORITY TRIAL

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Abstract

Objective: It was hypothesized that heated humidified high flow nasal cannula (HFNC) is non-inferior to non-invasive ventilation (NIV) for preventing reintubation in high risk children. Design: Prospective randomized clinical non-inferiority trial Setting: Single centre study in a 12-bed multidisciplinary paediatric intensive care unit (PICU) in Delhi. Patients: All children (1month-18years) receiving invasive mechanical ventilation longer than 48 hours and ready for scheduled extubation. Intervention: Heated humidified high flow nasal cannula(HFNC) or Non-invasive ventilation (NIV) Measurements and Main Results: Of total 230 patients enrolled, 139 were analysed (3 left against medical advice), out of which 70 (50.4%) received NIV and 69 (49.6%) HFNC. Mean duration of intubation was 150.8 ± 74.3 hours in NIV group vs 138.5 ± 81.9 hours in HFNC group ($p=0.16$). Out of 139 children, 15(10.8%) were re-intubated; 6 (8.6%) in the NIV group vs 9 (13%) in the HFNC group (absolute difference 4.4%; $p=0.42$). Median time to re-intubation did not differ between the group; NIV group 4 hours (IQR 1.7-12.5hours) vs HFNC group 3.7 hours (IQR 2-4hours) (absolute difference, 0.3 hours; $p=0.50$). Mean post extubation PICU length of stay was significantly lower in HFNC group (3.5 ± 2.5 days) vs NIV group (4.1 ± 2.3 days; $p=0.01$). There were multiple reasons for failure of assigned intervention which were comparable in both groups. These included : stridor, impaired consciousness (fall in GCS>2), haemodynamic instability, inability to clear airway, increased work of breathing, hypoxemia, respiratory acidosis. There was no mortality in either group within 48 hours of extubation. Conclusion: Among high-risk children who had undergone extubation, HFNC therapy was found to be non-inferior to NIV with respect to the re-intubation rate.

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