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Abstract

□ NON-INVASIVE VENTILATION VERSUS HIGH-FLOW NASAL CANNULA OXYGEN THERAPY WITH APNOEIC OXYGENATION FOR PREOXYGENATION BEFORE INTUBATION OF PATIENTS WITH ACUTE HYPOXAEMIC RESPIRATORY FAILURE: A RANDOMISED, MULTICENTRE, OPEN-LABEL TRIAL.

Frat JP, Ricard JD, Quenot JP, et al. *Lancet Respir Med*. 2019;7:303-312

Endotracheal intubation is a commonly performed procedure in the critically ill patient and is associated with the risk of peri-intubation hypoxemia. These authors attempted to determine if there is an advantage to preoxygenation with non-invasive ventilation versus highflow nasal cannula, which has not previously been studied.

Investigators conducted a randomized, parallel group, non-blinded, open-label multicenter trial across 28 intensive care units in France. Statistical analysis was performed under an intention to treat protocol. Study participants were patients with hypoxemic respiratory failure that required intubation via rapid sequence induction. Eligible patients were over 18 years of age and had a respiratory rate >25, signs of distress, or a PaO2/FiO2 ratio of <300. The main exclusion criteria included cardiac arrest, declining mental status with GCS <8, pregnancy, intubation prior to arrival in ICU, recent airway or gastrointestinal surgery, or significant facial fractures. Once patients met inclusion criteria they were randomized and categorized as mild or moderate to severe hypoxemia using a cut off of PaO2/FiO2 ratio of >200mmHg and <200mmHg respectively. In the patients receiving non-invasive ventilation, the ventilator was set to pressure support with a tidal volume between 6ml/kg and 8ml/kg based on ideal body weight, PEEP 5cm H20 and FIO2 of 1.0. These patients received non-invasive ventilation throughout pre-oxygenation and induction until larygoscopy. In the patients receiving high flow nasal cannula it was set at 60 L/min with an FiO2 1.0 and a jaw thrust was performed to ensure airway patency. In the nasal cannula group, the patient received high flow throughout intubation until tube placement was confirmed. Both groups were preoxygenated for 5 minutes. The primary outcome investigated was severe peri-intubation hypoxemia, defined as pulse oximetry < 80% for five seconds or more during the period between rapid sequence intubation and 5 minutes after endotracheal tube placement was confirmed. Multiple secondary safety and efficacy outcomes were recorded, including lowest peri-intubation Sp02 duration of laryngoscopy, number of laryngoscopy attempts, episodes of a systolic pressure <90mmHg, feasibility of the pre-oxygenation method, and others.

Over the course of eight months, 2079 patients were intubated, of which 745 patients met eligibility criteria and 322 patients were randomized. In the non-invasive ventilation group, 23% of patients had severe hypoxia compared to 27% in the high flow group (absolute difference -4.2, 95% CI [-13.7-5.5]). In the sub-group of moderate to severe hypoxemia, severe hypoxia occurred at 24% with non-invasive ventilation and 35% with high-flow (absolute difference -11.3, 95% CI [-22.3-0.3]). In the mild to moderate hypoxemia sub-group there was no difference between non-invasive ventilation and high flow oxygen. Overall and in analyses of the sub-groups, there were no differences for any of the secondary outcomes.

The authors concluded that when choosing a preoxygenation strategy between high-flow nasal cannula or non-invasive ventilation, overall there were no differences in the rates of peri-intubation hypoxia or late complications.

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Comments: These results show no difference overall between HFNC and non-invasive ventilation, but in severely hypoxemic patients, this trial appeared to favor non-invasive ventilation over high flow. This makes sense physiologically, understanding that in the critically ill patients there is an element of shunt physiology that is mitigated with alveolar recruitment measures, which non-invasive ventilation provides. While the authors state there is no difference, we should interpret these negative findings with caution, as confidence intervals are wide. Additionally, there were more cardiac arrest events in the HFNC group than in the non-invasive group and since this was still a rare occurence, the difference was not significant but likely underpowered. Knowing the above limitations, we do not feel this changes current practice, but would tend to choose non-invasive ventilation based on these findings.

□ OUTCOMES OF CHILDREN WITH BRONCHIOLITIS TREATED WITH HIGH-FLOW NASAL CANNULA OR NONINVASIVE POSITIVE PRESSURE VENTILATION.

Clayton JA, McKee B, Slain K, et al. *Pediatr Crit Care Med*. 2019;20(2):128-135