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Pediatric nasal cannula flow rate

Is there an optimal flow rate for a high-flow nasal cannia in respiratory failure? The cutest nasal cannule (HFNC) is increasingly used to treat children with moderate to severe bronchiophritis, both in the intensive care unit (IIA) and in hospital wards. Studies have shown that it can allow children with bronchiculitis to avoid taking on IOM and intubation. In premature babies, it has been shown to reduce breathing. However, no previous studies have studied the optimisation of flow rates in individual patients, and there is significant heterogeneity in the selection of initial HFNC flow rates. Reliable measurement of respiratory effort has proved challenging. The placement of the pressure gauge in the esophagus makes it possible to measure a product with a pressure factor (PRP), a previously approved measure of respiratory effort calculated by multiplying the difference between the maximum and minimum pressure of the esophagus by the frequency of breathing.1 Increasing PRP indicates an increase in respiratory effort. The authors chose systems from Fisher & Paykel and Vapotherm for their tests. Study projectSingle-center prospective observational study. Setting up a 24-bed children's intensive care unit at the 347-bed city freestanding children's hospital. SynopsisA single center recruited patients aged 37 weeks adjusted gestational age to 3 years who were admitted to the IIA with respiratory failure. 54 patients met the inclusion criteria and 21 were enrolled and completed the study. Previous data suggested that a sample size of 20 would be sufficient to determine the clinically significant magnitude of the effect. The median age was 6 months. Thirteen patients had bronchiitis, three had pneumonia and five had other respiratory diseases. Each patient received HFNC delivered by both systems in sequence at a flow rate of 0.5, 1, 1.5 and 2 l/kg per minute up to a maximum of 30 l/min. After the studies, patients remained on HFNC in accordance with normal care with PRP measurements twice daily until HFNC was discontinued. There was a dose-dependent relationship between flow and PRP change, with the largest decrease in PRP at a flow of 2 l/kg per minute (P below 0.001) and a slightly smaller but similar reduction in PRP at 1.5 l/kg per minute. When de layering patients by weight, this effect was not statistically significant for patients heavier than 8 kg (P = 0.38), with all significant changes in patients weighing less than 8 kg (P below 0.001) with a median decrease in PRP of 25%. Further studies of these younger and lighter patients, the greatest reduction in PRP was in the lightest patients (less than 5 kg). Given the similarity of the decrease in PRP at 1.5 l/kg per minute and 2 l/kg per minute, the authors suggest that the flow rate produces a plateau effect and that a minimal further improvement would be seen with increasing flow rates. Speed 2 l/kg per minute selected as maximum a priori as it was considered that the highest level of HFNC patients could tolerate without worsening of agitation or air leakage. There was no difference between the two systems in the study. The authors did not report a fraction of the oxygen settings used, the size of the HFNC cannules, or how PRP changed within a few days when the HFNC was weased. The lower optimal HFNC rate to reduce breathing effort in children under 3 years of age is between 1.5 and 2 l/kg/min with the greatest expected improvement in children under 5 kg. CitationWeiler T et al. The relationship between high nasal spray flow and breathing effort in children. Journal of Pediatrics. October 2017 doi: 10.1016/j.jpeds.2017.06.006.Reference1. Argent AC, Newth CJL, Klein M. Breathing mechanics in children with acute severe work. Intensive Care Med. 2008;34(2):324-32. doi: 10.1007/s00134-007-0910-x.Dr. Stubblefield is a pediatrician at Nemours/Alfred I. duPont Hospital for Children in Wilmington, Del., and clinical assistant professor of pediatrics at Jefferson Medical College in Philadelphia. See related article, p 66 high flow of nasal cannias bronchilic inflammation of children CPAP (Continuous positive pressure in the airways), EOB (Breathing effort), HFNC (High flow of cannias to the nose), PRP (pressure-rate product), PTP (pressure time product) High flow of nasal cannia in children: literature review. Skand J Trauma Resusc Emerg Med. 2016; 24: 93Most in the article Scopus (58) PubMed Crossref Google ScholarH high nasal cannitis flow (HFNC) compared to continuous positive airway pressure (nCPAP) for the initial respiratory treatment of acute bronchilic viral bronchiitis in young infants: a multicenter randomized controlled study (TRAMONT study). Intensive Care Med. 2017; 43: 209-216Most in the article Scopus (92) PubMed Crossref Google ScholarNutrition and high flow of nasal cannules respiratory support in children with bronchionia. Hosp Pediatrician. 2017; 7: 256-262View in the article High flow of warm moistened oxygen compared to standard low-flow nasal canyon oxygen for moderate bronchiophritis (HFWHO RCT): open,phase 4, randomized controlled study. Lancet. 2017; 389: 930-939Ues of high-flow nasal cannual passage in the emergency department reduces the need for intubation in acute respiratory failure in children. 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Kawaguchi A, Yasui Y, deCaen A, Garros D. Clinical effect of heated, high-flow moistened nasal cannules on childhood respiratory failure. Pediatrician Crit Care Med. 2017;18:112-9. [PubMed] [Google Scholar] Page 2Regumented flow settings and cannuna sizes for the treatment of high-flow nasal cannules in the child's body (kg)Flow range (L/min)a)Recommended by the manufacturer of cannnel sizesFischer & Paykelb)Vapotherms≤1 Month<45-8S, mneonatal,= infant1= month–1= year4–108–20m,= lpediatric= small1–6= years10–2012–25l,= xlpediatric= small,= pediatric= (adult= small)6–12= years20–4020–30xl,= smallpediatric= (adult= small),12–18= years=>40 kg25–50Small, mediumPediatric (adult small), adult adult </45–8S,>

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