IAP - IJPP CME 2018

HIGH FLOW NASAL CANNULA OXYGEN THERAPY - DOES IT CHANGE OUR PRACTICE?

*Priyavarthini Venkatachalapathy

Abstract: High flow nasal cannula oxygen therapy is a relatively new form of respiratory support in children that provides high flows of heated, humidified blended air and oxygen non-invasively. It is well studied in acute viral bronchiolitis and is found to reduce the need for escalation of respiratory support. Though evidence is very sparse, it is also increasingly used in other conditions of respiratory distress like pneumonia, asthma, cardiac failure, etc. Remarkable patient comfort, coupled with good safety profile, ease of use and efficacy has made high flow nasal cannula oxygen therapy a popular initial choice of respiratory support in children with moderate to severe respiratory distress, both within and outside the intensive care environment.

Keywords: High flow nasal cannula, Bronchiolitis, Respiratory distress, Respiratory support.

* Consultant, PICU and ER, Apollo Children's Hospital, Chennai. email: priyavarthiniv@gmail.com

Points to Remember

- Heating and humidification are the key determinants of efficacy and tolerance of HFNC.
- HFNC decreases the need for invasive mechanical ventilation in bronchiolitis.
- Improved patient comfort and tolerance are the principal reasons for HFNC being used in children with moderate to severe respiratory distress of any etiology, although evidence for its efficacy and safety are scanty.
- HFNC is not a replacement for invasive mechanical ventilation.
- Undue reliance on HFNC without repeated clinical assessments and timely escalation of care can potentially increase mortality.

References

- 1. Milési C, Boubal M, Jacquot A, Baleine J, Durand S, Odena MP, et al. High-flow nasal cannula: recommendations for daily practice in paediatrics. Ann Intensive Care 2014; 4:29.
- 2. Lee JH, Rehder KJ, Williford L, Cheifetz IM, Turner DA. Use of high flow nasal cannula in critically ill infants, children, and adults: a critical review of the literature. Intensive Care Med 2013; 39:247-257.
- 3. Nishimura M. High-flow nasal cannula oxygen therapy in adults: physiological benefits, indication, clinical benefits, and adverse effects. Respir Care 2016; 61(4):529-541.
- 4. Slain KN, Shein SL, Rotta AT. The use of high-flow nasal cannula in the pediatric emergency department. J Pediatr (Rio J) 2017; 93(s1):36-45.
- Rubin S, Ghuman A, Deakers T, Khemani R, Ross P, Newth CJ. Effort of breathing in children receiving highflow nasal cannula. Pediatr Crit Care Med 2014; 15:1-6.
- 6. Mikalsen IB, Davis P, Oymar K. High flow nasal cannula in children: a literature review. Scand J Trauma Resusc Emerg Med 2016; 24:93.
- 7. Ramnarayan P, Schibler A. Glass half empty or half full? The story of high flow nasal cannula therapy in critically ill children. Intensive Care Med 2017; 43:246-249.
- 8. Miller AG, Gentle MA, Tyler LM, Napolitano N. High-Flow Nasal Cannula in Pediatric Patients: A Survey of Clinical Practice Respir Care 2018; 63(7):894-899.

- Goligher EC, Slutsky AS. Not just oxygen? Mechanisms of benefit from high-flow nasal cannula in hypoxemic respiratory failure. Am J Respir Crit Care Med 2017; 195(9):1128-1131.
- 10. Sinha IP, McBride AKS, Smith R, Fernandes RM. CPAP and high-flow nasal cannula oxygen in bronchiolitis. Chest 2015; 148 (3):810-823.
- 11. Milesi C, Baleine J, Matecki S, Durand S, Combes C, Novais AR, et al. Is treatment with a high flow nasal cannula effective in acute viral bronchiolitis? A physiologic study. Intensive Care Med 2013; 39:1088-1094.
- Franklin D, Babl FE, Schlapbach LJ, Oakley E, Craig S, Neutze J, et al. A randomized trial of high-flow oxygen therapy in infants with bronchiolitis. N Engl J Med 2018; 378:1121-1131.
- Cambonie G, Pons-Odena M, Baleine J, Milési C. High flow nasal cannulae for acute viral bronchiolitis in young infants: evidence-based medicine is underway to define target populations and optimal flows. J Thorac Dis 2017; 9(7):1763-1766.
- 14. Milési C, Essouri S, Pouyau R, Liet JM, Afanetti M, Portefaix A, et al. High flow nasal cannula (HFNC) versus nasal continuous positive airway pressure (nCPAP) for the initial respiratory management of acute viral bronchiolitis in young infants: a multicenter randomized controlled trial (TRAMONTANE study). Intensive Care Med 2017; 43(2):209-216.
- 15. Kline J, Kalburgi S, Halley T. High flow nasal cannula therapy for bronchiolitis across the emergency department and acute care floor. Clin Pediatr Emerg Med 2018; 19(1):40-45.
- Mayfield S, Jauncey-Cooke J, Hough JL, Schibler A, Gibbons K, Bogossian F. High-flow nasal cannula therapy for respiratory support in children. Cochrane Database Syst Rev 2014; Issue 3:CD009850.
- 17. Fedor KL. Noninvasive Respiratory Support in Infants and Children. Respir Care 2017; 62(6):699-717.
- Inata Y, Takeuchi M. Complex effects of high-flow nasal cannula therapy on hemodynamics in the pediatric patient after cardiac surgery. J Intensive Care 2017; 5:30.
- 19. Mayfield S, Bogossian F, O'Malley L, Schibler A. Highflow nasal cannula oxygen therapy for infants with bronchiolitis: pilot study. J Paediatr Child Health 2014; 50(5):373-378.
- Riese J, Porter T, Fierce J, Riese A, Richardson T, Alverson BK. Clinical outcomes of bronchiolitis after implementation of a general ward high flow nasal cannula guideline. Hosp Pediatr 2017; 7(4):197-203.
- 21. Coletti KD, Bagdure DN, Walker LK, Remy KE, Custer JW. High-flow nasal cannula utilization in pediatric critical care. Respir Care 2017; 62(8):1023-1029.
- 22. Ten Brink F, Duke T, Evans J. High flow nasal prong oxygen therapy or nasopharyngeal continuous positive

- airway pressure for children with moderate to severe respiratory distress? Pediatr Crit Care Med 2013; 14:e326-331
- 23. Papoff P, Luciani S, Barbàra C, Caresta E, Cicchetti R. High-flow nasal cannula to prevent desaturation in endotracheal intubation: a word of caution. Crit Care Med 2015; 43(8):e327-e328.
- Joseph L, Goldberg S, Shitrit M, Picard E. High-flow nasal cannula therapy for obstructive sleep apnea in children. J Clin Sleep Med 2015; 11(9):1007-1010.
- 25. García-Salido A, Mastro-Martínez I, Cabeza-Martín B, Oñoro G, Nieto-Moro M, Iglesias-Bouzas MI, et al. Respiratory failure in children with hematooncological diseases admitted to the PICU: a single center experience. J Pediatr Hematol Oncol 2015~ 37(6):449-454.