

# Pediatrics and Neonatal Nursing: Open Access

Open Access

## Heated Humified High Flow Nasal Cannulae (HHHFNC), in The Beginning it was the Flow!

**Mohamed Osama Hussein\***

Hospital Director Department of Pediatrics El Nasr Children's Hospital, Egypt

### Editorial

Since 1889, when Doctor Bonnaire wrote the first article describing the use of oxygen for premature infants, flow was the only parameter to be used in oxygen therapy [1].

Later, oxygen continued to rescue neonates with respiratory compromise, till 1964, when Papadopoulos described use of ventilator in preterm ventilation, and still the flow was among parameters used to modify ventilator settings and achieve optimum ventilation [2].

Then at 1971, Gregory described use of Use of continuous positive airway pressure (CPAP) for respiratory distress syndrome (RDS), opening the door for the new era of non invasive ventilation [3]. CPAP have proved to be a more physiologic mode of assisted ventilation, with less parameters to be adjusted and less complications [4]. CPAP parameters included the flow together with FiO<sub>2</sub> and PEEP as the adjustable CPAP parameters [5].

And again, flow was used as the only parameter in the newly discussed mode of non invasive ventilation: Heated humidified high flow nasal cannula (HHHFNC). As early as 2001, Sreenan found that a PEEP of 6 cm H<sub>2</sub>O could be reliably delivered to neonates using a high flow nasal cannula that proved to be useful in the management of apnea of prematurity [6]. In older children, Wing found at 2012 that High-flow nasal cannula used early in the development of acute respiratory insufficiency (ARI) was associated with a decreased need for intubation and mechanical ventilation [7]. At 2012, Arora have stated that increasing flow rates of HHHFNC therapy was associated with linear increases in nasopharyngeal pressures in bronchiolitis patients, opening the door for a new mode of respiratory support for bronchiolitis infants [8]. At 2013, Manley have mentioned that the efficacy of HHHFNC was similar to that of nasal CPAP (NCPAP) as respiratory support for very preterm infants after extubation [9]. At 2013, Collins have shown in a randomized controlled study (RCT) that HHHFNC have resulted in significantly less nasal trauma during the post-extubation period than NCPAP [10]. Also, it has found that parents were more comfortable using HHHFNC than NCPAP [11]. In the same time another simplification was added to the non invasive ventilation by using a nasal cannula that was simpler and less traumatic than classical CPAP nasal interface, named RAM nasal cannula. It's a modification of the classical nasal catheter to accommodate the patient circuit which made nasal ventilation, NCPAP and lately HHHFNC application more comfortable and less traumatic [12]. The use of the Ram cannula added to the easiness of HHHFNC and then was used later with other modes of non invasive ventilation. Now commercial devices are available in the market to be used for application of HHHFNC, and are being used widely in many countries, e.g. UK [13].

Now who can benefit from HHHFNC? Obviously from the accumulated evidence that cases extubated from ventilator, moderate to severe apnea and also as a primary mode for RDS management, in addition to its benefit in the older children with bronchiolitis and other children with respiratory compromise, can benefit from HHHFNC. In addition to those suggested indications, use in the delivery room care may be equally as effective as NCPAP that was added to the delivery room management algorithm recently in the American academy of pediatrics (AAP) recommendations [14].

### References

1. Bonnaire E (1891) Inhalation of oxygen by the new born. J De Med, 102: 316.

**Article Type:** Editorial**\*Corresponding author:**

Mohamed Osama Hussein, Hospital Director  
Department of Pediatrics El Nasr Children's  
Hospital, Egypt,  
E-mail: [portsaidnicus@gmail.com](mailto:portsaidnicus@gmail.com)

**Volume:** 1.1**Received date:** 27 December, 2014.**Accepted date:** 5 January, 2015.**Published date:** 12 January, 2015.

**Citation:** Hussein MO (2015) Heated Humified High Flow Nasal Cannulae (HHHFNC), in The Beginning it was the Flow!. *Pediatr Neonatal Nurs Open Access* 1.1: <http://dx.doi.org/10.16966/2470-0983.e101>

**Copyright:** © 2015 Hussein MO. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

2. Delivoria-Papadopoulos M, Swyer PR (1964) Assisted Ventilation in Terminal Hyaline Membrane Disease. *Arch Dis Child*, 39: 481-484.
3. Gregory GA, Kitterman JA, Phibbs RH, Tooley WH, Hamilton WK, et al. (1971) Treatment of the Idiopathic Respiratory-Distress Syndrome with Continuous Positive Airway Pressure. *N Engl J Med* 284:1333-1340.
4. Walk J, Dinga P, Banda C, Msiska T, Chitsamba E, et al. (2014) Non-invasive ventilation with bubble CPAP is feasible and improves respiratory physiology in hospitalised Malawian children with acute respiratory failure. *Paediatr Int Child Health*, 2046905514Y0000000166
5. Chen A, Deshmukh AA, Richards-Kortum R, Molyneux E, Kawaza K, et al. (2014) Cost-effectiveness analysis of a low-cost bubble CPAP device in providing ventilatory support for neonates in Malawi: a preliminary report. *BMC Pediatr*, 14: 288.
6. Sreenan C, Lemke RP, Hudson-Mason A, Osiovich H (2001) High-flow nasal cannulae in the management of apnea of prematurity: a comparison with conventional nasal continuous positive airway pressure. *Pediatrics*, 107: 1081-1083.
7. Wing R, James C, Maranda LS, Armsby CC (2012) Use of high-flow nasal cannula support in the emergency department reduces the need for intubation in pediatric acute respiratory insufficiency. *Pediatr Emerg Care*, 28: 1117-1123.
8. Arora B, Mahajan P, Zidan MA, Sethuraman U (2012) Nasopharyngeal airway pressures in bronchiolitis patients treated with high-flow nasal cannula oxygen therapy. *Pediatr Emerg Care*, 28: 1179-1184.
9. Manley BJ, Owen LS, Doyle LW, Andersen CC, Cartwright DW, et al. (2013) High-flow nasal cannulae in very preterm infants after extubation. *N Engl J Med*, 369: 1425-1433.
10. Collins CL, Holberton JR, Barfield C, Davis PG (2013) A randomized controlled trial to compare heated humidified high-flow nasal cannulae with nasal continuous positive airway pressure postextubation in premature infants. *J Pediatr*, 162: 949-954.
11. Klingenberg C, Pettersen M, Hansen EA, Gustavsen LJ, Dahl IA, et al. (2014) Patient comfort during treatment with heated humidified high flow nasal cannulae versus nasal continuous positive airway pressure: a randomised cross-over trial. *Arch Dis Child Fetal Neonatal Ed*, 99: F134-137.
12. Ramanathan R, Paz P, Biniwale M (2013) Non-Invasive Ventilation and Surfactant Therapy. *J Pulmon Resp Med* S13:006.
13. Ojha S, Gridley E, Dorling J (2013) Use of heated humidified high-flow nasal cannula oxygen in neonates: a UK wide survey. *Acta paediatrica (Oslo, Norway: 1992)* 102: 249-253.
14. (AAP) recommendations NRP instructor update VOL 21 NO 1 spring/summer 2012