High Flow Nasal Cannula: ED & General Pediatric Units

Prior to HFNC in ED or General Pediatric Units:

- Failed supportive care with standard NC.
- Score, Suction, Score. (superficial acorn suctioning) – if bronchiolitis
- Pre-Huddle: RT, RN, Physician(s)
- Place on cardiorespiratory monitors and continuous pulse ox
- Consider transcutaneous CO2, Blood gas, and CXR

Initiate HFNC:

- Consider NPO, IV, NS bolus depending on clinical status (RR >60, FiO2 >40%, etc.)
- Start at 1 L/min/kg at prior FiO2 (min 30%), titrate every 15mins, and titrate up to max 2L/kg/min
- Titrate FiO2 to Keep SpO2 90-94% (max 50%)
  - Consider PICU admission/transfer if at non-critical care site
  - Reassess HR, RR, SpO2 q30 minutes
  - Bronchiolitis score if applicable
  - PAAS score if applicable

Consider exclusion criteria (bedside huddle)

- Preterm ≤ 34 weeks (corrected gestational age < 52 weeks), BPD, CLD, prior intubations for respiratory failure
- Neuromuscular disease & unstable cardiac disease
- Pertussis, tracheitis, epiglottitis
- Pneumothorax, pneumomediastinum
- Continuous nebulizer therapy (gen peds units)

Complications:

- Air leak syndromes: Pneumothorax, pneumomediastinum, subcutaneous emphysema
- Epistaxis
- Gastric distention

60 minutes after initiating HFNC:

- Re-Huddle: RN, RT, Physician(s)
- Clinical assessment for improvement?
- Re-evaluate HR, RR, temperature, physical exam

Improving

Admit/Remain on General Peds Unit:

- Continue consideration of cardiorespiratory monitor and/or continuous pulse ox
- Continue supportive care- SUCTION!
- RN ratio 1:3-4 (site dependent)
- Re-assess q30 min (either RT, RN, physician) x1hr, then q2hr until stable for 2-4h

NO Improvement/Worse

Admit/Transfer to PICU:

- ER: call PICU for admit
- ACH PR/OL: call RRT
- Non-critical care site: call for transfer
  - May need intubation prior to transfer

Weaning:

- Wean FiO2 as tolerated to 30% (keep O2 sat 90-94%).
- If stable/improving for 2-4 hrs, wean flow by 1-2 L/min q2 hrs until reach minimum 1L/min/kg, then transition to low flow oxygen delivery or RA
- Pulmonology consult if no improvement >72hrs

Reviewers:

Created by	Department	Creation Date	Version Date
T. He, R. Patel, L. Miskowicz	Pediatrics	12/2017	05/2023

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Education

- **What is HFNC?-** a humidified devise to deliver high flow oxygen via non-invasive nasal cannula. It is thought to be able to provide a form of positive pressure support that can reduce work of breathing, reduce intubation rates, reduce hospital LOS and total hospital charges, and decrease transfers to PICUs and tertiary care centers.
- **How it works?-** Maximal inspiratory flow that a healthy infant achieves during regular breathing is 0.8 L/kg/min for each breath. An infant with bronchiolitis generates higher inspiratory flow rates around 1-1.6 L/kg/min. The aim of HFNC is to match this maximal inspiratory flow. HFNC is proposed to provide low-level PEEP (2-5 cm H2O) and aid in lung recruitment. Provides CO2 "washout" of respiratory physiologic dead space. Warmth and humidity keep secretions moist, improve mucociliary clearance, and inhibits inflammatory reactions and bronchoconstriction reflexes triggered by cold and dry air.
- **Uses-** most pediatric research currently focuses on use in infants with bronchiolitis. This area continues to expand and guidelines are ever changing with uses expanding to acute respiratory failure, severe sepsis/septic shock, and asthma.

Nursing Care & RT Management	
Steps	**Additional Info**
Check that oxygen is flowing freely and that the tubing/nasal cannula is not blocked at least hourly Replace the nasal cannula if it becomes blocked with secretions/milk	A blockage in the tubing may manifest as: • An increase in respiratory effort • Respiratory distress • A fall in SpO2 levels
Check the tubing/nasal cannula for presence of condensation at least hourly and empty as necessary by draining back into the humidifier chamber	Water in tubing/nasal cannula may lead to aspiration.
Check water level in humidifier chamber and replace water bag as necessary	The flotation device will prevent overfilling

Bronchiolitis Scoring System			
Clinical Variable	0	1	2
Respiratory Rate (< 2y)	Less than 49	Greater than 50	
Accessory Muscle Use	None	Retractions (intercostal, substernal, subcostal)	Neck or abdominal muscles
Wheezes	Normal breath sounds or end expiratory	Entire expiratory phase	Entire inspiratory and expiratory phase
Air Exchange	Normal	Localized decreased	Diffuse decrease

Summary of Bronchiolitis Scoring System

1. Scoring should be assessed by therapist post-suction
2. Consider nebs or MDI if score is equal or greater than 3. SABA neb/MDI Q3hrs for up to 3 treatments, discontinue SABA if no improvement in the score
3. A decrease in score of greater or equal to 2 is considered significant improvement, suggestive of continued inhaled treatments
4. If pre-treatment score is less than 3, neb/MDI not indicated

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https://www.advocatechildrenshospital.com/healthcare-professionals/peds-pathways

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Protocols: Seattle Children's, Texas Children's West Campus, PCH/Riverton Children's (Utah), University of New Mexico Children's, Ministry of Health NSW North Sydney, Northshore Pediatrics Inpatient pathways, PHM listserve review