

THE USE OF HIGH FLOW NASAL CANNULA OUTSIDE OF THE PEDIATRIC INTENSIVE CARE UNIT



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BACKGROUND

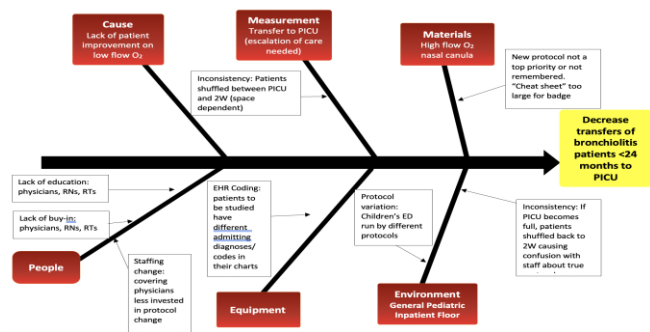
- Bronchiolitis is a common lung disease characterized by inflammation of the pediatric lower airway, but can be extremely severe in children ≤ 24 months
- No proven treatment protocol: current treatments are supportive therapy- hydration, airway clearance, supplemental oxygen
- High flow nasal cannula (HFNC) can be used as respiratory support for children with bronchiolitis.
- Studies have shown the use of HFNC decreases rates of intubation & mechanical ventilation
- use of HFNC is effective & safe both inside and outside the Pediatric Intensive Care Unit (PICU)

PROJECT AIM

The use of a new HFNC policy allowing higher flows (1-1.5 L/kg) outside the PICU, for respiratory support of bronchiolitis patients up to two years of age, is

- 1) safe
- 2) results in at least a 25% reduction in transfers to the PICU and length of stay

PROJECT DESIGN/ METHODS



RESULTS/ OUTCOMES

Table 1. Patient characteristics by period among patients on high-flow nasal cannula.

Characteristic	Baseline (N=11)	Post-intervention (N=19)	P
	Median (IQR) or N (%)	Median (IQR) or N (%)	
Age (months)	2 (1, 3)	6 (2, 14)	0.078
Sex			0.643
Female	5 (45%)	7 (37%)	
Male	6 (55%)	12 (63%)	
Race/ethnicity			>0.999
Non-Hispanic Black	3 (27%)	6 (32%)	
Non-Hispanic White	6 (55%)	9 (47%)	
Other or unknown	2 (18%)	4 (21%)	
Weight (kg)	5 (4, 9)	7 (6, 9)	0.282
RSV infection	7 (63%)	16 (84%)	0.372

IQR, interquartile range; RSV, respiratory syncytial virus

Table 2. Patient outcomes by period among patients on high-flow nasal cannula.

Characteristic	Baseline (N=11)	Post-intervention (N=19)	P
	Median (IQR) or N (%)	Median (IQR) or N (%)	
Admitted to PICU	6 (55%)	5 (26%)	0.122
Intubated	0	0	>0.999
Length of stay (days)	5 (3, 7)	3 (2, 4)	0.066
Maximum O ₂ flow rate (LPM)	8 (4, 12)	8 (4, 14)	0.983
Maximum PEWS score ^a	7 (4, 9)	6 (4, 7)	0.081

^a Data missing for 2 cases in the post-intervention period. IQR, interquartile range; LPM, liters per minute; PEWS, pediatric early warning signs; PICU, pediatric intensive care unit

CONCLUSION/ DISCUSSION

- 50 patients ≤ 24 months admitted to the general pediatric floor
- Pre intervention period: 11/50 on HFNC
- Post intervention period: 19/52 on HFNC
- Those with respiratory diagnoses consistent with bronchiolitis were selected.
- The new protocol for HFNC was introduced in Dec. 2019, to begin in Jan. 2020

- Fewer patients in the post-intervention cohort required admission to the PICU (26% vs. 55%, p=0.122; Table 2).

- Median hospital length of stay was shorter post-intervention (3 vs. 5 days, p=0.066).

-No patients on HFNC required intubation in either period and there were no deaths.

-The use of a new HFNC policy in the general pediatric floor is safe and resulted in a 47% reduction in transfers to the ICU. -Average length of stay in patients with bronchiolitis was shortened from 5 days, to 3 days. -Continued lit review: a systematic review published in 2020 showed HFNC is a safe mode of respiratory support that can be positioned between standard of therapy (SOT) and nCPAP as rescue therapy for children not adequately supported by SOT -It does not seem to shorten the duration of oxygen need nor the duration of hospital admission. HFNC is being used increasingly in the context of infant bronchiolitis. However, evidence on efficacy and safety are limited.

NEXT STEPS

- COVID complicated our next PDSA cycle, as we had fewer pediatric patients admitted overall in 2021
- Consider changing the protocol to reflect new data and literature findings to allow increase to 2L/kg outside of the PICU
- Consider another PDSA cycle/continuing research Post-COVID



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