

Oral Feeding Management in Infants who are Dependent on Respiratory Support via High Flow Nasal Cannula

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Introduction

High flow nasal cannulas (HFNC) are used increasingly within the paediatric population for respiratory support in the context of acute and chronic respiratory conditions.¹ However, HFNC is relatively new to practice and its influence on oral feeding safety in infants is poorly understood, resulting in inconsistencies in oral feeding practice.^{2,3}

In acute respiratory conditions managed with HFNC such as bronchiolitis, infants have shown to tolerate oral feeding, with adverse events such as aspiration rarely occurring.^{4,5}

In the context of chronic cardiorespiratory conditions such as chronic neonatal lung disease, infants are supported on prolonged HFNC support which is usually initiated at or shortly after birth. Oral feeding safety in prolonged HFNC use is not currently known and is hence, often avoided in this population due to safety concerns. This leads to developmental delays/disorders related to oral feeding as a result of missed opportunity. Therefore, eliciting the safety profile of oral feeding in infants supported with prolonged HFNC has the potential to improve their management and developmental outcomes.

Aims

Conduct a retrospective study to characterise the feeding profile and care pathways for infants who were HFNC-dependent at Queensland Children's Hospital (QCH) during 2021.

Methods

Data was collected retrospectively from medical records of HFNC-dependent infants (<6 months of age at commencement of HFNC) at QCH during 2021. Infants with acute respiratory conditions that precipitated their need for HFNC support (e.g., bronchiolitis) were excluded. Demographic information, respiratory support history, medical history, feeding history, admission details, and dysphagia profiles as reported by speech pathology were extracted from medical records.

Results

Table 1. Study population demographics

Parameter	Total frequency (n, %)
Gender	
Male	16 (64)
Gestational age at birth	
<28 weeks	6 (24)
28-32 weeks	1 (4)
32-37 weeks	3 (12)
>37 weeks	15 (60)
Hospital admission	
Chronological age at admission in weeks (median, range)	9.3 (0.1 – 53)
Length of admission in days (median, range)	84 (27 – 280)
Specialties involved in care	
Respiratory	25 (100)
General paediatrics	25 (100)
Cardiology	10 (40)
Neurology	4 (16)
Gastrointestinal	8 (32)
Other (surgery, genetics)	8 (32)
Number of body systems involved (per patient)*	
1	10 (40)
2	7 (28)
3	6 (24)
4	2 (8)
Mortality	2 (8)

All measures reported as frequency (n, %) unless otherwise indicated. *Body systems included respiratory, neurology, gastrointestinal, renal, and cardiac.

Table 2. Respiratory characteristics and outcomes

Parameter	Frequency (n, %)
Ventilation history	
History of invasive ventilation	
Yes	14 (56)
Longest period of invasive ventilation in days (median, range)	14 (1 – 86)
History of CPAP	
Yes	10 (40)
Longest period of CPAP in days (median, range)	11 (1 – 62)
HFNC use during admission	
Length of continuous HFNC use in days (median, range)	34 (8 – 188)
Maximum rate (L/Kg)	
2	15 (60)
>2	10 (40)
Maximum FiO2 delivered (%)	
21	5 (20)
22-30	8 (32)
31-50	11 (44)
>50	1 (4)
Minimum FiO2 delivered (%)	
21	17 (68)
22-30	6 (24)
>30	2 (8)
Weaning attempts from HFNC support (median, range)	2 (1 – 6)
Transcutaneous CO2 monitoring undertaken	
Yes	20 (80)
Discharge	
Discharged home on oxygen*	
Yes	15 (65.2)
Flow of O ₂ on discharge in litres (median, range)	0.5 (0.2 – 1.50)
≤0.25L	4 (26.7)
0.26-0.5L	6 (40)
>0.5L	5 (33.3)

*Oxygen on discharge was recorded in 23 (92.7%) infants due to the mortality of 2 (8%) infants. CPAP, continuous positive airway pressure; HFNC, high flow nasal cannula.

Table 3. Feeding outcomes and speech pathology referral

Parameter	Frequency (n, %)
Feeding	
Feeding prior HFNC commencement	
Full tube	12 (48)
Combination tube and oral	7 (28)
Full oral	6 (24)
Feeding one week after ceasing HFNC*	
Full tube	3 (12.5)
Full tube with small tastes	14 (58.3)
Combination tube and oral	5 (20.8)
Full oral	2 (8.3)
Any oral feeding during HFNC episode	
Yes	16 (64)
Modifications used during oral feeds	
LFNC	14 (87.5)
Small volumes only	2 (12.5)
Speech pathology	
Speech pathology referral during HFNC episode	
Yes	24 (96)
Days to speech pathology referral from admission (median, range)	10.5 (0 – 189)
Days to speech pathology referral from HFNC commencement (median, range)	4 (0 – 189)
# Speech pathology sessions (median, range)	9 (0 – 45)

*Feeding one week after HFNC episode recorded in 24 (96%) infants due to the mortality of 1 (4%) patient. HFNC, high flow nasal cannula; LFNC, low flow nasal cannula.

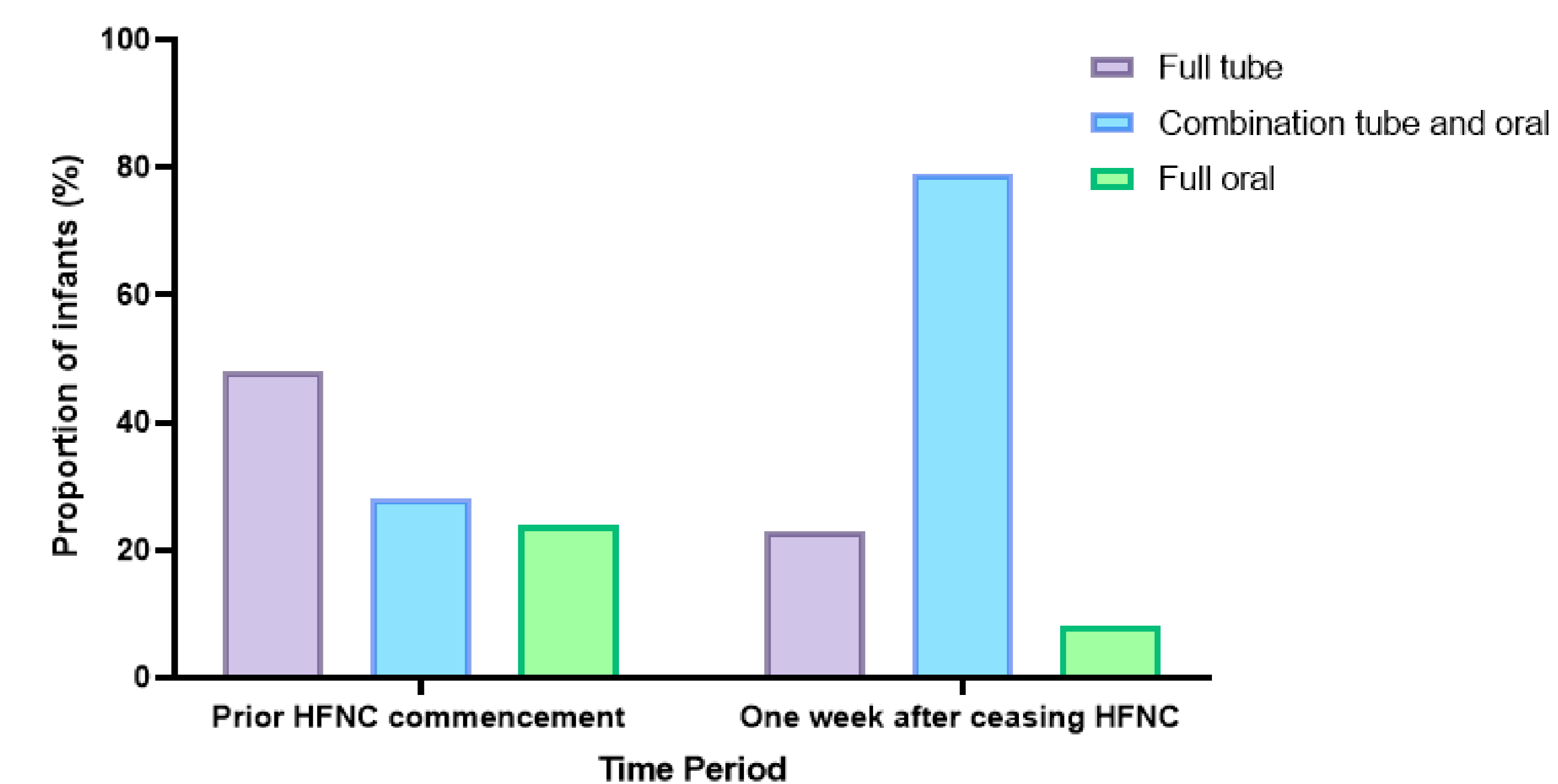


Figure 1. Feeding practice before HFNC commencement and after HFNC is ceased.

Key findings:

- Infants on prolonged HFNC at QCH were clinically complex patients with 60% of the infants having a diagnosis in more than one body system (table 1).
- Majority of infants were on HFNC for more than 34 days at a rate of 2L/Kg (60%; table 2).
- Majority of infants were fully tube fed before HFNC episode (48%) and were fully tube fed with some small tastes one week after cessation of HFNC (58.3; table 3). However, the approach to feeding at the two time points varied substantially (figure 1).
- 64% of infants were orally fed whilst on HFNC and the most common modification was to feed on low flow nasal cannula (87.5%; table 3).

Conclusion

Preliminary analysis of the data has shown that the oral feeding practice for infants managed with prolonged HFNC at QCH is inconsistent. Missed opportunities as a result of delaying oral feeding in this cohort of infants may result in developmental delays/disorders related to oral feeding. Therefore, establishing an oral feeding protocol for infants managed on prolonged HFNC respiratory support would be beneficial to ensure positive clinical and developmental outcomes for these patients.

This study forms a part of a larger project that will examine the influence of a oral feeding protocol on oral feeding outcomes.

References

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