

High Flow Nasal Cannula Oxygen in COVID-19; still an important role to play

Goodchild K¹, Spencer S¹, Brain L¹, Loh B¹, Rossdale J², Leadbetter A², McKerr C², Morey T², Deakin H³, Rickard F³, Swinburne H¹, Maybin R¹, Laver S¹, Mason R², Suntharalingam J², Georgiou A¹ (1: Intensive Care Unit, 2: Respiratory Department, 3: Elderly Care, Royal United Hospital Bath)

Introduction

High flow nasal cannula oxygen (HFNC) has a firm evidence base in the management of hypoxaemic respiratory failure. It has been shown to reduce mortality and increase ventilator free days when compared with use of standard oxygen or continuous positive airway pressure (CPAP), and it has been shown to reduce intubation rates in patients with a P:F ratio of <200mmHg [1]. However, provisional data from the use of HFNC in COVID-19 suggest no significant reduction in intubation rates and no mortality benefit over conventional oxygen therapy or CPAP. [2] Recent NICE guidance recommends not routinely offering HFNC as monotherapy respiratory support in patients suitable for escalation to mechanical ventilation, favouring CPAP non-invasive respiratory support in this group. [3] These contradictory findings complicate our understanding of any potential role for HFNC in COVID-19.

In our organisation, all patients with COVID-19 who remained hypoxic despite standard oxygen therapy were initially managed with HFNC and only if they failed this modality were then trialled on CPAP or intubated for invasive mechanical ventilation. HFNC was provided on our physician led Respiratory Support Unit (RSU) with daily critical care input.

Our approach differs to that employed in the most recent multicentre trial of respiratory support in COVID-19 and therefore offers the opportunity to understand how HFNC may be of benefit in patients with COVID-19. We aim to explore the potential role and safety for HFNC in COVID-19.

Methods

Retrospective analysis of all patients with COVID-19 admitted to a single NHS acute Trust between March 2020 and February 2021, who required escalation of respiratory support to HFNC with or without subsequent CPAP or intubation (n=168). Data collected included patient demographics, comorbidities including clinical frailty score, respiratory support requirements, ceiling of treatment and outcomes (ICU admission, intubation, death or discharge). Logistic regression analysis was used to compare mortality rates for patients who did or did not receive HFNC.

Results

One hundred and sixty eight (168) patients met the inclusion criteria, of whom 80 (48%) were managed solely on the Respiratory Support Unit (RSU). Thirty patients (18%) had HFNC as their ceiling of care, of whom 12 died (40%), indicating a survival rate of 60% in this group of significantly higher age, frailty and comorbidities.

Of those patients for full escalation of care, 59 (35%) had HFNC only and 24 (29%) subsequently required intubation after a trial of HFNC, of whom 4 died (17%). The relative risk of mortality for patients who received HFNC prior to intubation compared to those who were intubated without HFNC was 0.48 (95% CI 0.26-0.89).

There was no significant difference in mortality between HFNC initiated in RSU compared to ICU, including patients who then required intubation (5% vs 12%, p=0.28, 95% CI 0.54-2.33).

There were no safety concerns associated with HFNC.

Conclusions

Our data suggests that HFNC may offer survival benefit in those with care limitations in organ support, as demonstrated by our survival rate of 60% in this patient cohort, a group whom otherwise would have received conservative oxygen therapy and symptom relief alone. Further assessment needs to be made of those patients who received dexamethasone. HFNC is generally well tolerated and is associated with fewer adverse events than other forms of non-invasive respiratory support. HFNC can be employed as a safe tool for assessing patients' respiratory support requirements and monitoring trajectory in RSUs, sparing ICU capacity in healthcare systems under strain and potentially avoiding adverse outcomes from intubation. Furthermore, it is associated with a favourable mortality profile in those who subsequently require intubation, particularly when compared with the UK national average for mortality in COVID-19 ventilated patients (50%). HFNC may therefore still have a role in the management of patients with COVID-19 with acute hypoxaemic respiratory failure and this warrants further examination.

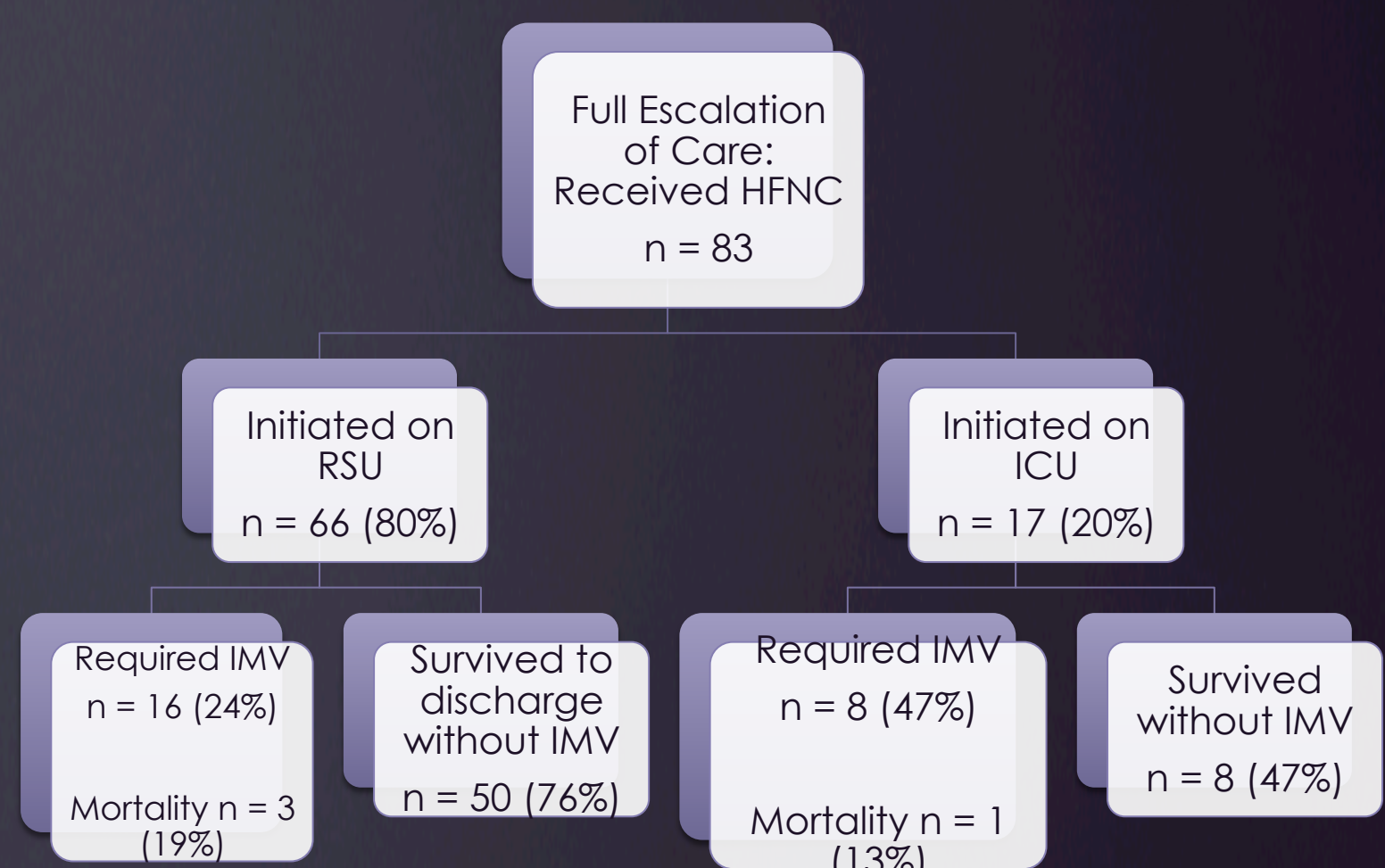


Figure 1: Outcomes for patients who received HFNC only (without CPAP) and deemed suitable for full escalation

References

[1] Frat et al. High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure. *N Engl J Med* 2015; 372:2185-2196 DOI:0.1056/NEJMoa1503326

[2] Perkins et al. An adaptive randomized controlled trial of non-invasive respiratory strategies in acute respiratory failure patients with COVID-19. medRxiv preprint doi: <https://doi.org/10.1101/2021.08.02.21261379>

[3] National Institute for Health and Care Excellence (2021) COVID-19 Rapid Guideline: Managing Covid-19. Available at: <http://www.nice.org.uk/guidance/ng191>