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## 50 Emergency Department Management and Outcomes of COVID-19 Acute Hypoxemic Respiratory Failure During the New York City Surge

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Study Objectives: Delays in intensive care unit (ICU) admission for critically ill patients are associated with worse outcomes, but the effect of "boarding" during the COVID-19 pandemic has not been well characterized. This study describes the emergency department (ED)-based care for patients presenting with COVID-19-related acute hypoxemic respiratory failure (AHRF) to five hospitals in a large, academic health system during the initial surge in New York City, examining both respiratory support, we also aimed to explore the association between ED boarding time and patient morbidity and mortality.

Methods: We conducted a retrospective cohort study of ED patients presenting from 3/1/2020 to 7/10/2020 with COVID-19-related AHRF and requiring ICU admission at any time during their hospitalization. Patient demographics, comorbidities, severity of illness (Mortality Probability Model III on admission), clinical course, including the use, settings (initial and changes), and duration of respiratory support modalities (ie, noninvasive ventilation [NIV], high flow nasal cannula [HFNC], invasive mechanical ventilation [IMV]), as well as hospital site, were collected through validated electronic query and standardized manual chart abstraction. AHRF severity was defined using a PaO2/FiO2 ratio (PF): 200-300 (mild), 100-199 (moderate), and <100 (severe). For patients without a PaO2, the PF was imputed using SpO2/FiO2 ratio using previously validated non-linear conversion. Boarding was defined as the time interval from ED request for admission to ED departure. The primary outcome was a composite outcome of ICU admission, intubation, or mortality within 48 hours of ED arrival. Descriptive analyses stratified by boarding duration and AHRF were completed. Multivariable logistic regression modelling was used to determine the association between ED boarding and the primary outcome.

Results: A total of 679 ED patients with COVID-19 AHRF required ICU admission during the study period. They were managed with low flow oxygen only (261, 38.4%), or with NIV (120, 17.7%), HF (51, 7.5%), and/or IMV (99, 14.6%),

with setting ranges detailed in Table 1. Of the patients with a known PF ratio (N=418), 110 (26.35%) had mild, 34 (5.0%) had moderate, and 274 (40.4%) had severe AHRF. Of these patients, 279 (41.1%) had a change documented to their settings, with increased likelihood of adjustments with longer boarding time (p<0.001) and higher AHRF severity (p<0.001). Median boarding duration across all site was 9.5 hours (IQR 5.3-16.9 hours) with site variation. AHRF severity and support modality were not associated with differences of boarding time (p = 0.77 and p=0.54). Controlling for age, sex, race, and severity of illness, boarding time was not associated with worse patient outcomes in 48 hours (OR 0.85, 95% CI 0.67-1.08, p=0.17)

Conclusion: During the COVID-19 pandemic, critically ill patients presented to the ED and boarded for long periods of time, requiring prolonged ventilatory management. Despite the surge state and resource limitations, boarding times did not worsen post-ED outcomes for patients managed with non-invasive modalities.

Table 1: Range of respiratory support used for

managing COVID-19-related acute hypoxemic			
respiratory failure in the ED.			
	Median	IQR	Range
HFNC (N=50)			
FiO2 (%)	100	100 - 100	40 - 100
Flow (LPM)	40	40 - 55	30 - 60
NIV (N=113)			
FIO2 (%)	100	80 - 100	40 - 100
IPAP (cm H2O)	13	10 - 15	5 - 25
EPAP (cm H2O)	6	5 - 10	4 - 30
IMV (N=95)			
FiO2 (%)	100	99 - 100	30 - 100
TV/kg (ml/kg)	7	6.2 - 7.95	5 - 13.1
PEEP (cm H2O)	10	7 - 15	2 - 25
*Complete setting details missing from 1 patient on HFNC, 7			

on NIV and 4 on IMV