Predictors for Invasive Home Mechanical Ventilation Duration in Chronic Lung Disease of Prematurity

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Abstract

Background Children with chronic lung disease (CLD) of prematurity who require invasive home mechanical ventilation (iHMV) are medically vulnerable and experience high caregiving and healthcare costs. Predictors for duration of iHMV remain unclear, which can make prognostication and decision-making challenging. **Methods** A retrospective cohort study of children with CLD of prematurity requiring invasive iHMV was conducted from an independent children's hospital records (2005-2021). The primary outcome was iHMV duration, defined as time from initial discharge home on iHMV until cessation of positive pressure ventilation (day and night). Two new variables were included: corrected tracheostomy age (CTA) (chronological age at discharge minus age at tracheotomy) and level of ventilator support at discharge (minute ventilation per kg per day). Univariable Cox regression was performed with variables of interest compared to iHMV duration. Significant nonlinear factors ($P<0.05$) were included in the multivariable analysis. **Results** One-hundred-and-nineteen patients used iHMV primarily for CLD of prematurity. Patient median index hospitalization lasted 12 months (IQR 8.0,14.4). Once home, half of patients were weaned off iHMV by 36.0 months and 90% by 52.2 months. Being Hispanic/Lantix ethnicity (HR 0.14 (95% CI 0.04, 0.53), $p<0.01$) and having a higher CTA were associated with increased iHMV duration (HR 0.66 (CI 0.43, 0.98), $p<0.05$). **Conclusions** Disparity in iHMV duration exists among patients using iHMV after prematurity. Prospective multisite studies that further investigate new analytic variables, such as CTA and level of ventilator support, and address standardization of iHMV care are needed to create more equitable iHMV management strategies.

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