Post-Discharge Health Resource Use in Pediatric Survivors of Prolonged Mechanical Ventilation for Acute Respiratory Disease

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Background

- Respiratory failure remains one of the most common reasons for children to be admitted into the pediatric intensive care unit (PICU).
- Intubation and prolonged mechanical ventilation expose children to risks related to ventilator associated lung injury, sedation, and immobility.
- It is poorly understood what long-term effects children face following survival of acute respiratory disease.
- The objective of this study was to characterize hospitalization and emergency department (ED) visits during the post-discharge year and identify risk factors associated with these health care visits.

Methods

- Study design: Retrospective cohort study
- Patients: Critically ill children admitted to the Children’s Hospital of Colorado (CHOC) PICU on or after January 1, 2013 and discharged before January 1, 2017
- Inclusion Criteria: Required mechanical ventilation >= 3 days, did not have tracheostomy prior to admission, survived to discharge, and had post-discharge insurance eligibility in the Colorado All Payer Claims Database (APCD).
- Database: Data collected from our hospital’s Virtual Pediatric Systems (VPS) database
- Analysis: Multivariable logistic regression

Primary outcomes

- Hospital admission and ED visit within one year of discharge

Secondary outcomes

- Pulmonary outpatient visits
- Medication prescription use

Results

Percent of cohort and sub-cohorts who experienced a hospital readmission, ED visit, outpatient pulmonary visit, or had a pulmonary medication filled during post-discharge year

<table>
<thead>
<tr>
<th>Health Care Visit</th>
<th>Odds Ratio (95% CI)</th>
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<tbody>
<tr>
<td>Hospital readmission (n=82)</td>
<td>0.99 (0.87, 1.11)</td>
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<tr>
<td>ED Visit (n=22)</td>
<td>1.06 (0.98, 1.41)</td>
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<tr>
<td>Hospital readmission or ED Visit</td>
<td>0.95 (0.76, 1.18)</td>
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<tr>
<td>Pulmonary Outpatient Visit (n=47)</td>
<td>5.53 (1.79, 19.09)</td>
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<tr>
<td>Pulmonary Medication (n=55)</td>
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* ED visit: p = 0.02
  * Hospital admission or ED visit: p < 0.01
  * Pulmonary outpatient visit: p < 0.01

Multi-variable model to identify risk factors for hospital readmission or ED visit during post-discharge year

Discussion

- Children who survive prolonged mechanical ventilation for respiratory disease experience high rates of post-discharge health resource use, particularly those surviving severe ARDS.
- During the post-discharge year, one in four patients experienced a hospital readmission, more than half of the patients had an ED visit, and more than half of the patients filled a prescription for a pulmonary medication.
- Severe ARDS was independently associated with a 5.53-fold increased risk of readmission or ED visit compared with patients without severe ARDS.
- Study strength includes use of insurance data to reduce systemic bias associated with loss to follow-up.
- Limitations include small sample size and use of Berlin ARDS definition rather than the more contemporary Pediatric Acute Lung Injury Consensus Conference definition.

Implications

- Pediatric patients, particularly those surviving severe ARDS, are at high risk for persistent pulmonary impairments and unplanned post-discharge healthcare needs.
- Consistent follow-up for these patients is vital to mitigating long-term consequences of severe respiratory disease.

Disclosures

- None