



## NIPPV for Severe Asthma Exacerbation?

### Key Article

- Abbot MR, et al. Association between noninvasive positive pressure ventilation use and clinical outcomes during a severe asthma exacerbation: a cohort study. *Crit Care Med.* 2026; 54:519-531.

### Background

- Acute asthma exacerbations account for nearly 1.5 million ED visits in the US annually.
- Of these, approximately 180,000 are admitted to the hospital, of which approximately 10% are admitted to the ICU. Approximately 2% of hospitalizations are intubated and placed on mechanical ventilation.
- In-hospital mortality increases by nearly 100x when an asthmatic is intubated.
- NIPPV is well known to reduce mortality and hospital LOS for patients with acute COPD and ACPE exacerbations.
- In contrast, the data regarding NIPPV for severe asthma exacerbations in the ICU is limited and remains controversial.
- Recent international practice guidelines were unable to give a recommendation regarding the utility of NIPPV for the treatment of acute respiratory failure from severe asthma.

### Objective

- Describe the trends in NIPPV use, endotracheal intubation, and in-hospital mortality among adult and pediatric patients hospitalized for asthma.
- Describe the association between NPPV use and receipt of endotracheal intubation and in-hospital mortality among patients admitted to the ICU for asthma.

### Methods

- Observational analysis of patients hospitalized for asthma within the New York and Florida State Inpatient Databases using Healthcare Cost and Utilization Project
  - New York: 2005-2018
  - Florida: 2005-2019
- Patients - Included
  - Ages 5-80 years
  - Admitted to the ICU for severe asthma exacerbation
- Patients – Excluded
  - Concomitant diagnosis of COPD, neuromuscular disease, OSA, or asthma/COPD overlap
  - Admitted to a rehab or long-term care hospital
  - Did not report residence in NY or FL
  - Those who received NIPPV for post-extubation support
- Exposure – receipt of NIPPV
- Primary Outcomes
  - Endotracheal intubation

- In-hospital mortality
- Statistical analysis
  - Determined the annual trend of NIPPV use, endotracheal intubations, and in-hospital mortality as a proportion of the total asthma hospitalizations
  - Used propensity-matched ICU cases for those receiving and not receiving NIPPV

## Results

- Authors identified 296,788 hospitalizations for asthma exacerbation
  - Adults
    - 27,655 patients admitted to the ICU for asthma
    - 2,579 (9.3%) received NIPPV
      - More likely to be younger (18-40 yrs of age), male, identify as Black/African American, have Medicaid, and be admitted to the hospital for asthma 3 or more times during the preceding year
      - More likely to be treated in a teaching facility and within a hospital with > 500 beds
  - Pediatrics
    - 14,247 patients admitted to the ICU for asthma
    - 1,809 (12.7%) received NIPPV
      - More likely to be older (13-17 years), female, and have Medicare/Medicaid
      - More likely to be admitted in a teaching hospital with > 500 beds
- **Trends in NIPPV Use, Intubations, and Mortality**
  - Adults
    - NIPPV use increased from 1.2% to 7.4% in 2018
    - Intubation (3.7% vs. 4%) and in-hospital mortality (0.3% vs. 0.4%) remained stable
  - Pediatrics
    - NIPPV use increased from 0.7% to 7.1% in 2018
    - Intubation (1% vs. 0.8%) and in-hospital mortality (0.1% vs. 0.1%) remained stable
- **NIPPV Use and Intubation (Propensity-Matched Analyses)**
  - Adults
    - NIPPV use associated with lower risk of intubation compared with those who did not receive NIPPV (15.1% vs. 29.2%)
  - Pediatrics
    - NIPPV use associated with lower risk of intubation compared with those who did not receive NIPPV (2.4% vs. 4.7%)
- **NIPPV Use and In-Hospital Mortality (Propensity-Matched Analyses)**
  - Adults
    - NIPPV use was associated with lower risk of in-hospital mortality compared with those who did not receive NIPPV (1.2% vs. 3.1%)
  - Pediatrics
    - No difference in in-hospital mortality in those who received NIPPV compared to those who did not receive NIPPV.

### **Limitations Identified by Authors**

- Observational study using an administrative database
  - Used ICD codes
  - Randomly selected 1 ICU encounter, rather than all ICU encounters for a patient
- Did not distinguish between modes of NIPPV (CPAP, BiPAP)
- Propensity-score matching may not address effects of unmeasured confounders on outcomes
- Authors not able to ascertain clinical details on physiologic/lab parameters, therapeutic interventions, or ED treatment allocations
- Did not attempt to identify patients with contraindications to NIPPV

### **Take Home Points**

- In a large, observational cohort study using an administrative database, the authors found an increase in the utilization of NIPPV in both adult and pediatric patients admitted to the ICU with severe asthma. However, the rates of intubation and in-hospital mortality remained stable and low.
- In propensity-matched scoring, the use of NIPPV in adults with severe asthma was associated with a decreased risk of intubation and in-hospital mortality.
- In propensity-matched scoring, the use of NIPPV in pediatrics with severe asthma was associated with a decreased risk of intubation but no difference in-hospital mortality.