

## Allergy and Airway

**SESSION TITLE:** Allergy and Airway Abstracts Posters (B)

**SESSION TYPE:** Original Investigation Posters

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### IMPACT OF ARTERIAL CARBON DIOXIDE LEVELS ON IN-HOSPITAL MORTALITY IN ICU-ADMITTED PATIENTS WITH ASTHMA

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**PURPOSE:** Patients with asthma are more prone to experiencing respiratory complications due to the nature of their condition. Respiratory failure in these individuals is often accompanied by tachypnea and resulting hypocapnia. However, it remains unclear whether these phenomena significantly affect outcomes in ICU patients with asthma as a comorbidity. This study seeks to explore the relationship between hypocapnia at admission and ICU outcomes in patients with asthma.

**METHODS:** This observational study utilized data from the MIMIC-IV database and focused on patients admitted to various intensive care units at Beth Israel Deaconess Medical Center between 2008 and 2019. Patients diagnosed with asthma, identified through ICD-9 code 493.92 and ICD-10 code J45.901, were included. They were stratified into two groups based on their CO<sub>2</sub> levels at admission: hypocapnia (CO<sub>2</sub> < 35 mmHg) and non-hypocapnia (CO<sub>2</sub> ≥ 35 mmHg). The primary outcome assessed was in-hospital mortality, with secondary outcomes including the risk of intubation and ICU length of stay.

**RESULTS:** The study cohort comprised 1364 patients with asthma as a comorbidity admitted to the ICU, with 120 (9.5%) exhibiting hypocapnia and 1232 (90.5%) with non-hypocapnia. The median CO<sub>2</sub> level for hypocapnia patients was 32 (IQR 28.7 – 34) compared to 47 (IQR 43 – 54) for non-hypocapnia patients. Patients with hypocapnia showed similar age (median age of 63 years [IQR 54 – 75] vs. 65 years [IQR 54 – 74]; p=0.7), female gender (51.8% vs. 48.8%; p=0.42), Charlson Comorbidity Index (CCI) (6 [IQR 3 – 8] vs. 5 [IQR 3 – 7]; p = 0.34), and SOFA score (5 [IQR 2 – 9] vs. 5 [IQR 3 – 8]; p=0.56) compared to non-hypocapnia patients. In-hospital mortality rates were significantly higher in hypocapnia patients (27.7% vs 11.5%; OR 1.227; 95% CI 1.171 - 1.287, p=0.001). Hypocapnia patients showed a higher intubation rate (41.0% vs. 21.8%; OR 1.114; 95% CI 1.106 - 1.185, p = 0.001). The ICU length of stay did not show a statistically significant difference between the two groups (4.97 days [IQR 1.62 – 6.26] for the hypocapnia group vs. 4.47 days [IQR 1.33 – 5.13] for the non-hypocapnia group; p=0.63). These differences persisted in the multivariate analysis, factoring in the CCI, ventilation requirement, and SOFA score.

**CONCLUSIONS:** Our study suggests that critically ill patients with asthma as a comorbidity that present with hypocapnia experience a significantly higher mortality rates and intubation requirements compared to their counterparts, even after adjusting for clinical factors. This highlights the elevated risk of adverse outcomes in asthma patients with hypocapnia.

**CLINICAL IMPLICATIONS:** Hypocapnia in ICU asthma patients signals higher mortality and intubation risks, prompting targeted interventions for improved outcomes.

#### DISCLOSURES:

No relevant relationships by Fernando Hernandez

No relevant relationships by Sebastian Ocrosopoma Heraud

No relevant relationships by Min Ji Son

No relevant relationships by Sergio Vallejo

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