

## **Does Alcohol Use at the Time of a Traumatic Injury Increase the Incidence of Ventilator Associated Pneumonia?**

Laura E. LeBlanc, MS<sup>1</sup>; Genevieve E. Messa, BS<sup>1</sup>; John P. Hunt, MD, MPH, FACS<sup>2</sup>; Alan Marr, MD, FACS<sup>2</sup>; Patrick Greiffenstein, MD, FACS<sup>2</sup>; Lance Stuke, MD, MPH, FACS<sup>2</sup>; Alison A. Smith, MD, PhD, FACS<sup>2</sup>

<sup>1</sup> School of Medicine, Louisiana State University Health Sciences Center, New Orleans, LA

<sup>2</sup> Division of Trauma/Critical Care Surgery, Dept. of Surgery, Louisiana State University Health Sciences Center, New Orleans, LA

### **Background**

In the United States, alcohol consumption is a major contributor to traumatic injuries and can impair physiological recovery. Alcohol-induced immune dysfunction and mucosal barrier disruption increase susceptibility to infection. The relationship between blood alcohol content (BAC) and ventilator-associated pneumonia (VAP) in trauma patients remains unclear. This study investigated whether increased BAC levels in patients presenting with a traumatic injury correlates with higher VAP incidence.

### **Methods**

A retrospective chart review was conducted for adult trauma patients testing positive for ethanol on admission at an academic Level 1 Trauma Center from 2018 through 2023. Patients who died or were discharged within 48 hours were excluded. Patient demographics, previous medical history, and complications were recorded. The primary outcome was the development of VAP as defined by the American College of Surgeons Trauma Quality Improvement Program. Secondary outcomes included complication rates and clinical outcomes.

### **Results**

Among 314 patients, 45 (14.3%) developed VAP. No significant association was found between BAC and VAP incidence (mean BAC: 0.14 g/dL in VAP+ vs. 0.16 g/dL in VAP-,  $p=0.21$ ). Patients with VAP had higher Injury Severity Scores (ISS) (26.1 vs. 20.4,  $p=0.002$ ), more ventilator days (21.0 vs. 7.1,  $p<0.0001$ ), longer hospital stays (41.7 vs. 21.2 days,  $p<0.0001$ ), and longer ICU stays (27.8 vs. 11.5 days,  $p<0.0001$ ). Comorbidities did not significantly differ between groups. Additionally, patients with a history of chronic alcohol use did not have significantly different outcomes (24.4% (VAP+) vs. 22.3% (VAP-),  $p = 0.71$ ).

### **Conclusion**

Higher BAC levels were not linked to increased VAP risk. VAP incidence correlated with injury severity and prolonged mechanical ventilation. Future research should explore targeted interventions to reduce VAP risk in severely injured patients requiring prolonged mechanical ventilation.