# Factors related to alcohol withdrawal syndrome in extremity trauma patients

**Benjamin Lehrman, MD; Saskya Byerly, MD; Emily Lenart, DO; Dina Filiberto, MD; Isaac Howley, MD; Andrew Kerwin, MD**
**Division of Trauma/Surgical Critical Care, Department of Surgery, The University of Tennessee Health Science Center**

## Introduction

In the setting of a hospitalization, patients with alcohol dependence may develop Alcohol Withdrawal Syndrome (AWS), due to the acute reduction in alcohol consumption. There is a paucity of research assessing the factors related to the development of AWS in trauma patients, as well as the role of psychiatric illness as a potential effect modifier of substance abuse. Early identification of patients at risk for AWS needs to be improved.[1] Increased morbidity and organ dysfunction was linked with worse outcomes in AWS patients.[2] One study found that trauma patient with low injury burden had significantly worsened morbidity if AWS occurred.[3] Baseline CIWA score, age, gender and head injury all had a value in predicting the patients' likelihood of going through delirium tremens.[4] Several studies have looked at the role of initial blood alcohol content and the development of AWS, without demonstrating a strong correlation.[5] Our project aims to identify and quantify risk factors associated with AWS and identifying their corresponding effect using a national trauma database, primarily focusing on patients with isolated extremity trauma.

THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

## Methods

This is a retrospective analysis of all patients within the Trauma Quality Improvement Program (TQIP) database with extremity trauma in 2019. Patients with and without AWS were assessed. Regression analysis was conducted to determine predictors for AWS, tracheostomy, and length of stay (LOS). Other primary outcomes included mortality, unplanned intubation, tracheostomy creation, length of stay, ventilator days, development of ventilator associated pneumonia (VAP) and development of acute respiratory distress syndrome (ARDS).

| Study Population | |
|---|---|
| **Male** | 51% |
| **Mortality** | 0.8% |
| **Psych d/c** | 0.36% |
| **Trach** | 0.16% |
| **Unplanned ICU** | 1.2% |
| **Unplanned intubation** | 0.4% |
| **VAP** | 0.03% |
| **ARDS** | 0.05% |
| **Delirium** | 0% |
| **AWS** | 0.34% |
| **ETOH use disorder** | 3% |
| **ADD/ADHD** | 1.2% |
| **Cirrhosis** | 0.8% |
| **Dementia** | 7% |
| **Mental disorder** | 10% |
| **Substance use disorder** | 3% |
| **Age** | 51 (27) |
| **SBP** | 138 (122, 155) |
| **Pulse** | 85 (73, 98) |
| **ISS** | 6 (4, 9) |
| **LOS** | 4 (2, 6) |

## Results

431,406 adult patients with isolated extremity trauma were identified. Numerous factors were significantly associated with AWS, including comorbidities and adverse hospital outcomes. As compared to patients without AWS, patients with AWS were more likely to have unplanned intubations, require a tracheostomy, develop VAP or ARDS, be discharged to a psychiatric facility, have a longer LOS and had a higher mortality. On logistic regression, predictors for AWS included ISS (AOR:1.04), male gender (AOR: 1.75), unplanned intubation (AOR:10.12), and cirrhosis (AOR:2.34). The presence of a psychiatric diagnosis was an effect modifier of alcohol use disorder (AUD). The odds of AWS for patients with AUD are 52 times higher compared to those without an AUD. Alternatively, patients diagnosed with a mental health disorder were 26 times more likely to have AWS if already diagnosed with AUD compared to those without AUD.

| | No AWS | AWS | p-value |
|---|---|---|---|
| **Male** | 51% | 73% | <0.0001 |
| **Mortality** | 0.8% | 1.7% | 0.0001 |
| **Psych disposition** | 0.36% | 1.6% | <0.0001 |
| **Psych history** | 11% | 22% | <0.0001 |
| **Trach** | 0.15% | 1.4% | <0.0001 |
| **Unplanned intubation** | 0.37% | 6% | <0.0001 |
| **VAP** | 0.03% | 0.7% | <0.0001 |
| **ARDS** | 0.05% | 0.5% | <0.0001 |
| **ETOH use disorder** | 3% | 62% | <0.0001 |
| **Cirrhosis** | 0.8% | 9% | <0.0001 |
| **Dementia** | 7% | 2% | <0.0001 |
| **Substance use disorder** | 3% | 14% | <0.0001 |

## Conclusions

AWS is associated with morbidity and mortality in trauma patients with extremity fractures. Patients who developed AWS during their hospitalization were more likely to suffer adverse events. Being male, a cirrhotic, undergoing an unplanned intubation and having a greater injury burden were all shown to be predictors of AWS. Both a history of mental health disorders and AUD were associated with the development of AWS; however, AUD alone was found to have dramatic effects on the risk of developing AWS during hospitalization. Altogether, AWS carries a great weight on the healthcare system and warrants further research as quicker recognition of patients at risk for AWS could dramatically improve patient outcomes.

## References

1. Weinberg JA, et al (2008). Comparison of intravenous ethanol versus diazepam for alcohol withdrawal prophylaxis in the trauma ICU: Results of a randomized trial. *J Trauma*, 64(1), 99-104.
2. Vigouroux A, et al (2021). Alcohol withdrawal syndrome in ICU patients: Clinical features, management, and outcome predictors. *PLoS One*, 16(12), e0261443.
3. Bard M, et al (2006). Alcohol withdrawal syndrome: Turning minor injuries into a major problem. *J Trauma*, 61(6), 1441-1445.
4. Salottolo K, et al (2017). Occurrence, Predictors, and Prognosis of Alcohol Withdrawal Syndrome and Delirium Tremens Following Traumatic Injury. *Crit Care Med*, 45(5), 867-874.
5. Ng C, et al (2021). The impact of alcohol use and withdrawal on trauma outcomes: A case control study. *Am J Surg*, 222(2), 438-445.