# Can We Predict Severe Alcohol Withdrawal Syndrome?

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## TAKE-HOME MESSAGE

The Prediction of Alcohol Withdrawal Severity Scale performed best for predicting severe alcohol withdrawal syndrome.

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## METHODS

### DATA SOURCES

The authors searched for English-language articles in MEDLINE and EMBASE from 1946 to January 2018.[1] Additional studies were identified from reference lists of original and review articles.

### STUDY SELECTION

Included studies compared symptoms, signs, and risk-assessment tools between patients who developed severe alcohol withdrawal syndrome and those who did not. Prospective and retrospective cohort trials and case-control trials were included for analysis. Trial quality was assessed by 2 reviewers using the levels of evidence from the *Rational Clinical Examination: The Evidence-Based Clinical Diagnosis* handbook[2]; levels 1 to 3 were considered high quality. Sources of bias were also assessed with the Quality Assessment of Diagnostic Accuracy Studies tool.

### DATA EXTRACTION AND SYNTHESIS

Contingency tables (2×2) were constructed for each sign and symptom. Data were entered into spreadsheets predesigned to calculate sensitivity, specificity, likelihood ratios, and 95% confidence intervals.

**EBEM Commentators**
Lauren Evans, MD
Zachary B. Lewis, MD
Rawle A. Seupaul, MD
*Department of Emergency Medicine*
*University of Arkansas for Medical Sciences*
*Little Rock, AR*

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*Jestin N. Carlson, MD, MS, Alan Jones, MD, and Michael Gottlieb, MD, serve as editors of the SRS series.*

## Results

Categorical Findings that Predict Severe Alcohol Withdrawal Syndrome

| Clinical Findings | No. of Studies (No. of Patients) | Sensitivity (95% CI) | Specificity (95% CI) | Positive LR (95% CI) | Negative LR (95% CI) |
|---|---|---|---|---|---|
| PAWSS score ≥4 | 1 (403) | 0.93 (0.77–0.99) | 0.99 (0.98–0.99) | 174 (43–696) | 0.07 (0.02–0.26) |
| Independent clinical correlates ≥5* | 1 (284) | 0.13 (0.07–0.23) | 1.0 (0.98–1.0) | 27 (3.5–209) | 0.88 (0.80–0.96) |
| LARS-10 score ≥9 | 1 (100) | 0.95 (0.77–0.99) | 0.93 (0.88–0.94) | 12 (5.8–27) | 0.05 (0.0–0.37) |
| History of delirium tremens | 3 (554) | 0.33 (0.23–0.46) | 0.88 (0.77–0.94) | 2.9 (1.7–5.2) | 0.78 (0.67–0.91) |
| Systolic blood pressure ≥140 mm Hg | 3 (519) | 0.42 (0.33–0.51) | 0.73 (0.59–0.84) | 1.7 (1.3–2.3) | 0.78 (0.69–0.89) |

*LR*, Likelihood ratio; *PAWSS*, Prediction of Alcohol Withdrawal Severity Scale; *LARS-10*, Luebeck Alcohol Withdrawal Risk Scale.
*Independent clinical correlates are use of a morning eye-opener, initial Clinical Institute Withdrawal Assessment of Alcohol Scale, Revised score greater than or equal to 10, aspartate transaminase level greater than or equal to 80 U/L, past benzodiazepine use, history of delirium tremens, and greater than or equal to 2 previous alcohol treatments.

Fourteen trials enrolling 71,295 patients with 1,355 cases of severe alcohol withdrawal syndrome were included for analysis. The authors examined 21 factors, including demographics, psychiatric history, alcohol withdrawal history, signs, laboratory findings, and composite

measures. Of these, Prediction of Alcohol Withdrawal Severity Scale score was the most accurate, with a positive likelihood ratio of 174 and a specificity of 0.99.

## Commentary

It is critical that emergency providers recognize and treat severe alcohol withdrawal syndrome efficiently to minimize morbidity and mortality. This Rational Clinical Examination systematic review provides meaningful guidance. Although the history and physical examination are helpful, the pooled likelihood ratios suggest they offer low to moderate diagnostic assistance. Commonly used scoring systems, however, provide substantial diagnostic value and can be used to rule in or rule out severe alcohol withdrawal syndrome with reasonable certainty. The Prediction of Alcohol Withdrawal Severity Scale may be the most useful.[3] This scoring system can be applied to patients who have consumed alcohol within the last 30 days or had a positive blood alcohol level on admission. Historical information receives one point for each of the following elements: recent intoxication, previous episodes of alcohol withdrawal, previous withdrawal seizures, previous delirium tremens, previous alcohol rehabilitation treatment, previous blackouts, previous combined alcohol use with sedative

medications within the last 90 days, and previous combination of alcohol use with any other substance of abuse within the last 90 days. Clinical evidence of blood alcohol levels greater than 200 mg/dL on presentation and evidence of increased autonomic activity receive one point each. Scores greater than 4 identify patients at a high risk for complications associated with alcohol withdrawal, such as seizures or delirium tremens.

This review had several limitations, including the quality of available studies, widespread prophylactic treatment to prevent severe alcohol withdrawal, and various clinical definitions of severe alcohol withdrawal syndrome. Additionally, 7 of 14 included trials used benzodiazepine therapy as directed by the Clinical Institute Withdrawal Assessment for Alcohol screen. This could have introduced spectrum bias by excluding many patients who may have progressed to severe alcohol withdrawal. Also, the assessment tools reviewed (including the Prediction of Alcohol Withdrawal Severity Scale) were not fully validated, limiting their generalizability, which could alter the accuracy and validity of the stated results. Previous studies have found that clinicians have difficulty identifying alcohol use disorder in the hospital setting.[4] This may in

part be due to variability in defining alcohol withdrawal in the medical literature. The definition of severe alcohol withdrawal syndrome was heterogeneous across articles included in this systematic review, which may limit the accuracy of the results. Trials used various criteria for the diagnosis of severe alcohol withdrawal syndrome, including an alcohol withdrawal score greater than 10, Clinical Institute Withdrawal Assessment score greater than 20, and alcohol withdrawal syndrome complicated by seizure or delirium tremens, along with many that do not specifically define severe alcohol withdrawal syndrome.[5]

1. Wood E, Albarqouni L, Tkachuk S, et al. Will this hospitalized patient develop severe alcohol withdrawal syndrome? the Rational Clinical Examination systematic review. *JAMA*. 2018;320:825-833.
2. Simel DL, Keitz S. Update: primer on precision and accuracy. In: Simel DL, Rennie D, eds. *Rational Clinical Examination: The Evidence-Based Clinical Diagnosis*. New York, NY: McGraw-Hill; 2008:9-16.
3. Maldonado JR, Sher Y, Das S, et al. Prospective validation study of the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) in medically ill inpatients: a new scale for the prediction of complicated alcohol withdrawal syndrome. *Alcohol Alcohol*. 2015;50:509-518.
4. Mitchell AJ, Meader N, Bird V, et al. Clinical recognition and recording of alcohol disorders by clinicians in primary and secondary care: meta-analysis. *Br J Psychiatry*. 2012;201:93-100.
5. Wetterling T, Kanitz RD, Besters B. A new rating scale for the assessment of the alcohol-withdrawal syndrome (AWS scale). *Alcohol Alcohol*. 1997;32:753-760.