Original Article

External Validation of the Cham Score for Ordering of Blood Cultures in Emergency Department Patients with Non-Hospital Acquired Pneumonia

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Abstract

Introduction: The aim of this study was to externally validate the Cham score for the prediction of bacteraemia in emergency department (ED) patients with non-hospital acquired pneumonia. Materials and Methods: This is a secondary analysis of a dataset collected to identify independent predictors of bacteraemia in adult ED patients with non-hospital acquired pneumonia. The primary outcome of interest was the predictive performance (sensitivity, specificity, negative predictive value) of the score with respect to bacteraemia. Secondary outcomes included the performance of the score in patients not known to be intravenous (IV) drug users, the predictive performance of pneumonia severity index (PSI) class IV/V and PSI class IV/V or IV drug use as predictors and the clinical impact of score application on test ordering. Data analysis was by clinical performance and receiver operator characteristic curve analysis. Results: A total of 200 patients were studied; 14 true positive blood cultures (7%, 95% CI, 4% to 11%). The Cham score had a sensitivity of 92.9% (95% CI, 64.2% to 99.6%), specificity of 26.3% (95% CI, 20.3% to 33.4%) and negative predictive value (NPV) of 98% (87.0% to 99.9%). Area under the receiver operating characteristic (ROC) curve was 0.71 (95% CI, 0.56 to 0.86). Using PSI class IV/V or known IV drug use as predictors had sensitivity of 92.9% (95% CI, 64.2% to 99.6%), specificity of 51.1% (95% CI, 43.7% to 58.4%) and NPV of 99% (95% CI, 93.5% to 99.9%). Conclusion: In retrospective external validation, the Cham score performed better than in derivation with acceptable sensitivity and NPV. Simplified criteria (PSI class IV/V or known IV drug use), as yet not validated, had similar sensitivity and NPV but would avoid blood cultures in a higher proportion of patients.

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