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A clinical decision rule to rule out bloodstream infection in the emergency department: Retrospective multicentric observational cohort study

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Abstract

Background We aimed to identify patients at low risk of bloodstream infection (BSI) in the ED. **Methods** We derived and validated a prediction model to rule out BSI in the ED without the need for laboratory testing by determining variables associated with a positive blood culture (BC) and assigned points according to regression coefficients. This retrospective study included adult patients suspected of having BSI (defined by at least one BC collection) from two European ED between 1 January 2017 and 31 December 2019. The primary end point was the BSI rate in the validation cohort for patients with a negative Bacteremia Rule Out Criteria (BAROC) score. The effect of adding laboratory variables to the model was evaluated as a second step in a two-step diagnostic strategy. **Results** We analysed 2580 patients with a mean age of 64 years±21, of whom 46.1% were women. The derived BAROC score comprises 12 categorical clinical variables. In the validation cohort, it safely ruled out BSI without BCs in 9% (58/648) of patients with a sensitivity of 100% (95% CI 95% to 100%), a specificity of 10% (95% CI 8% to 13%) and a negative predictive value of 100% (95% CI 94% to 100%). Adding laboratory variables (creatinine ≥177 µmol/L (2.0 mg/dL), platelet count ≤150 000/mm³ and neutrophil count ≥12 000/mm³) to the model, ruled out BSI in 10.2% (58/570) of remaining patients who had been positive on the BAROC score. The BAROC score with laboratory results had a sensitivity of 100% (95% CI 94% to 100%), specificity of 11% (95% CI 9% to 14%) and negative predictive value of 100% (95% CI 94 to 100%). In the validation cohort, there was no evidence of a difference in discrimination between the area under the receiver operating characteristic for BAROC score with versus without laboratory testing (p=0.6). **Conclusion** The BAROC score safely identified patients at low risk of BSI and may reduce BC collection in the ED without the need for laboratory testing. © Author(s) (or their employer(s)) 2024. No commercial re-use. See rights and permissions. Published by BMJ.

Author Keywords

clinical medicine; diagnostic tests; emergency department; infections

Index Keywords

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