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Reply to ''Usefulness of the PIRO system to predict mortality in patients with severe infection in the emergency department''

Respuesta a ''Utilidad del sistema PIRO para predecir mortalidad en el paciente con infección grave en el servicio de urgencias''

Dear Editor,

We read with great interest the letter to the Editor ''Usefulness of the PIRO system to predict mortality in patients with severe infection in the emergency department'' by Dr. Rubio Diaz and Dr. Julián-Jiménez. We congratulate the authors who performed a replication study of ''Validation of the Predisposition Infection Response Organ (PIRO) dysfunction score for the prognostic stratification of patients with sepsis in the Emergency Department''[1] in a big cohort of septic patients from a Spanish Emergency Department (ED). The authors used the PIRO method (by Howell et al.[2]) at the admittance in their ED to predict 30 days mortality and ICU admittance and observed a 30 days mortality rate in their sample that is similar to the original study[1] and to other PIRO validation studies performed in the ED,[2] in hospital wards[3,4] and in the ICU.[3]

Recently Cardoso et al. that validated the original PIRO score in a large cohort of septic patients at admittance in general ward and in ICU[5] obtaining similar results. In my opinion the prognostic role of PIRO for mortality is confirmed by all these studies and it allow to recommend for its use in ED, High Dependency Units and ICU settings aiming to stratify patients with sepsis by the risk of a poor outcome. This categorization is useful to guide clinical management, performing slightly better than the easier qSOFA; however, this complex and comprehensive prognostic staging system is also useful to categorize patients in trials, creating homogeneous populations to evaluate treatment effectiveness without biases and to compare results of different studies.

Both Caramello et al. and Diaz et al. studies showed a reduced performance of PIRO in predicting ICU admissions, that was outperformed by SOFA in the first and by qSOFA and 5MPB-Toledo score in the second. Considering the complexity of obtaining the PIRO calculation in the ED the authors are against its use in the ED to predict ICU admission. Nevertheless, although valuable for its simplicity, in our study qSOFA showed a poor performance and many authors suggest improving qSOFA effectiveness by associating lactates[6] or inflammation markers[7] levels.

Indeed, the usefulness of PIRO to predict ICU admission is lower than SOFA, but this result could be biased by the fact that the clinical decision to admit in ICU is often based on the severity of organ disfunction, strictly related to the SOFA score and described by the ''O'' component only. On the contrary, PIRO includes a more comprehensive evaluation of prognostic factors, pertaining to the individual patient (Predisposition, assessing complexity and frailty), the pathogen (Infection and infection site) and the immune response (Response). It is possible that PIRO stage III and IV could include many older and frail patients who are not eligible for invasive management. The Predisposition, Infection and Response factors, on the contrary, strongly affect morbidity, mortality, hospital length of stay and functional decline after the acute septic event, thus PIRO could perform better in evaluating those outcomes.

I was really interested in reading about the 5MPB-Toledo score, previously validated to predict bacteriaemia.[8] It includes comorbid conditions (by Charlson comorbidity index), infection markers (procalcitonin) immune response (rise in leucocyte count) and severity (temperature and respiratory rate), like a quick version of PIRO. It could be interesting to evaluate if the variables included in the Toledo score are the strongest predictors of mortality among those included in PIRO. I wonder if this tool could be internationally validated for mortality and ICU admission by further studies, better defining the diagnostic and prognostic importance of this score.

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