Outcome Prediction in Severe Burn Injury: Clinical Versus Laboratory Markers.

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Dear Editor,

We’ve read with interest the article of Altrichter et al, in which circulating free-DNA neutrophil extracellular traps (cf-DNA/NETs) were used in the prediction of mortality in a population of 32 patients with severe burn injury [1]. These extracellular DNA structures (produced by neutrophils as defense mechanism trapping and killing pathogens) have previously shown to predict sepsis and mortality in multi-trauma patients [1]. In outcome prediction, mortality is the most objective endpoint, although sepsis and multi-organ failure are also important endpoints [2, 3]. Outcome prediction has several purposes. The ‘severity’ of a population with burn injury can be assessed, e.g. for research, bench marking and resource allocation. Outcome prediction can also be beneficial on patient-level, although this should be performed more cautiously.

We were intrigued to read that these cf-DNA/NETs structures could be more beneficial compared with scoring systems based on simple demographic or clinical parameters, especially early after admission. Previous research repeatedly showed the high predictive value of increasing age and total burned surface area (TBSA) and the presence of an inhalation injury [4]. These factors are used in the Belgian Outcome in Burn Injury (BOBI) prediction model which repeatedly proved to be easy-to-use and reliable [5-7]. In addition, it is definitely less costly since no further (laboratory) analyses are needed as in the study of Altrichter [1]. In the study by Altrichter et al., these cf-DNA/NET markers were compared with the rather outdated ABSI model (1982), after which more than a dozen new severity scoring systems have been developed [5, 8-10]. Since outcome data in burn injury have improved significantly over the last few decades [4, 11], more recent prediction models could be a better match. Based on the data presented in the article by Altrichter et al, we calculated the predictive value of the BOBI model in this cohort. The ROC-curve analysis, which combines sensitivity and specificity of a test, showed a better predictive value, with a larger area under the curve.
and smaller 95% confidence intervals, than obtained with the cf-DNA/NETs marker: 0.93 (0.84-1.00) vs. 0.85 (0.68-1.00); but as seen in the article of Altrichter, even the 30y old ABSI model appeared to be notably better than the DNA marker with especially a higher specificity and positive predictive value (respectively 92% and 75% for the ABSI model vs. 76% and 46% for the cf-DNA/NETs marker). Therefore, we agree with the authors, that a single parameter such as the cf-DNA/NETs marker should never be used as only predictor of mortality [1].

For that reason, we question the clinical benefit of a laboratory marker on ‘outcome’ prediction. Nevertheless, laboratory markers are probably of a higher use in prediction of sepsis and organ failure, since earlier and more accurate treatment of these complications may result in a better outcome [2, 12-15]. A high specificity (few false positive) would then be advisable to avoid unnecessary, potentially harmful treatment. However, especially the positive predictive value of cf-DNA/NETs appears to be poor in this cohort (only 46%).

References


