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LETTER TO THE EDITOR

Comments on the Risk Stratification for the In-Hospital Mortality in Subarachnoid Hemorrhage: The HAIR Score

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The HAIR score was published in the August 2014 issue of *Neurocritical Care* as a tool to enable risk stratification of in-hospital mortality after subarachnoid hemorrhage (SAH) [1]. The scale features four variables: Hunt and Hess score, age, intraventricular hemorrhage, and re-bleeding that comprise a composite maximum score of 8. Several other factors, previously described as being associated with poor outcome after SAH, were not considered in the HAIR score, for example larger aneurysm size or the presence of global cerebral edema on follow-up CT scan. In their retrospectively reviewed cohort of 400 patients, Lee et al. demonstrated increasing mortality rates with incremental increases in HAIR scores across the entire spectrum of scores between 0 and 7.

We sought to externally validate the HAIR score in our cohort of SAH patients from the Columbia University SAH Outcomes Project (SHOP) registry. Data from 1,629 patients were prospectively collected and adjudicated weekly by the study team. Our findings show that the HAIR score adequately discriminates mortality rates between scores 0 and 5, however, fails to discriminate between scores 6 and 7 (Fig. 1a). The area under the ROC-curve was 0.90 (Fig. 1b).

Additionally, Lee et al's study did not include any patients with a HAIR score of 8, which, in our cohort, corresponded to a 100 % in-hospital mortality rate.

In summary, analysis of our larger, prospectively collected cohort of patients with SAH confirmed the authors'

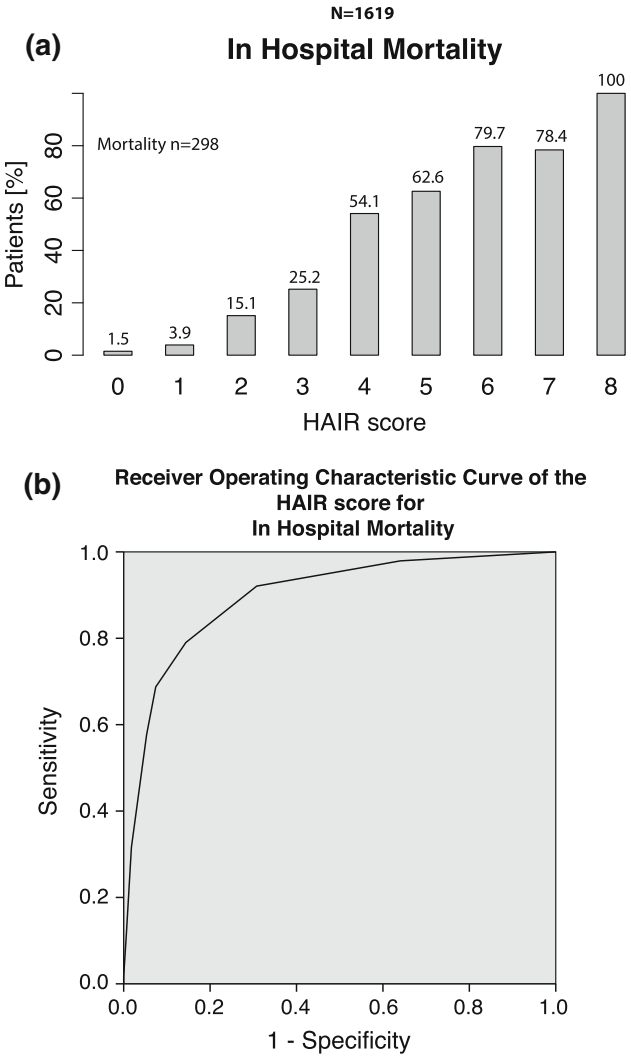

Fig. 1 External validation of the HAIR score. (**a**) Distribution of HAIR scores in an independent patient cohort. Percentages indicate in hospital mortality of patients with respective scores. (**b**) ROC curve of the HAIR score in the same patient cohort

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findings between HAIR scores 0 and 5. However, we found that the relationship with mortality was reversed between scores 6 and 7. Further studies are required to identify variables that would enable discrimination between patients with higher HAIR scores.

Reference

1. Lee VH, Ouyang B, John S, Conners JJ, Garg R, Bleck TP, et al. Risk stratification for the in-hospital mortality in subarachnoid hemorrhage: the HAIR score. Neurocrit Care. 2014;21:14–9.