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INVITED COMMENTARY

Utility of predictive scales for emergency department patients with a new diagnosis of aneurysmal subarachnoid hemorrhage

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Aneurysmal subarachnoid hemorrhage (aSAH) is a devastating form of hemorrhagic stroke that primarily affects a relatively young and predominantly female population with few comorbidities. Although advances in early aneurysm treatment have reduced mortality by 17% between 1973 and 2002,[1] case fatality rates remain high globally, with a median of 32.2% in the United States.[2] Survivors of the initial rupture face significant risks, including rebleeding and complications during the early brain injury and delayed cerebral ischemia phases.[3,4]

Major morbidity from the early brain injury phase stems from the initial injury and the cascading events that follow, contributing to increases in intracranial pressure. Early rebleeding also plays a significant role, with poor outcomes in 80% of affected patients.[1] The likelihood of rebleeding is 4% within the first 24 h, increasing by 1.5% daily over the first 2 weeks. Major morbidity following this phase is driven by delayed cerebral ischemia in which vasospasm remains an important contributor. This ischemia accounts for 23% of aSAH-related deaths and leads to persistent deficits in 37% of survivors.[5,6]

Various grading systems use clinical and radiographic features (and their combination) to classify aSAH severity, predict outcomes, and anticipate complications. The Hunt and Hess Scale (HHS) assesses headache severity, neck stiffness, neurological deficits, and consciousness level, with higher scores correlating with increased mortality.[7] However, its subjectivity and lack of clarity have drawn criticism. The World Federation of Neurological Surgeons Scale (WFNS), incorporating the Glasgow Coma Scale (GCS) and assessments for hemiparesis or aphasia, is more objective and has demonstrated stronger predictive capabilities.[8]

Radiological scales, designed to predict subacute complications such as vasospasm, also play a role. The original Fisher Scale was limited by outdated imaging metrics, while the modified Fisher Scale (mFS) improved correlation with vasospasm by incorporating SAH thickness and intraventricular extension. Despite its stronger predictive value, the mFS lacks precise definitions for "thin" versus "thick" hemorrhages, limiting its reliability.[9] While these scales help identify high-risk patients, they are less commonly used by treating physicians for prognostication.

Az and colleagues[10] conducted a retrospective multicenter study evaluating the predictive accuracy of clinical and radiological scoring systems for 28-day mortality in emergency department (ED) patients with nontraumatic SAH. The study assessed the GCS, HHS, WFNS, mFS, VASOGRADE, and Ogilvy–Charter Scale across 451 SAH patients in six Turkish EDs.

Findings identified the WFNS as the most effective prognostic tool, followed by the mFS and HHS. This aligns with previous research, though no universally accepted scale exists. The WFNS and HHS remain widely used and serve as benchmarks for developing new scoring systems.

Notably, this study focused exclusively on aSAH patients. Patients were retrospectively identified using administrative data and while the methodology for confirming aneurysms was not

detailed, it is reasonable to infer that diagnoses were based on CT imaging and angiographic evidence. Importantly, the findings should not be generalized to nonaneurysmal SAH, which typically carries a better prognosis and was not the intended target of these scoring systems.

A potential limitation of this paper is that we do not know how these patients were managed and according to what standards (e.g., practice to guidelines) affecting the generalizability of the results. Delays to diagnosis, transfer to tertiary care center, and securing the culprit aneurysm are all major factors contributing to the 28-day mortality that would confound the interpretation of their findings.

Overall, the study supports the WFNS as the most effective clinical scale for prognosticating aSAH outcomes in the ED, outperforming radiological and combination scales. However, its application should usually be reserved for neurosurgeons or neurologists rather than emergency physicians. Early prognostication based solely on these tools should be approached with caution, as high-grade patients can still achieve meaningful recoveries.[11] Indiscriminate use may reinforce a "self-fulfilling prophecy." Furthermore, these scales do not account for critical patient-specific factors such as comorbidities or frailty, underscoring their limitations.

Despite these challenges, consistent with guideline recommendations and common data elements, a standardized set of grading systems should be applied to ensure a common language in clinical discussions, resource allocation, and research.[12,13] The work by Az et al. supports the WFNS as being the optimal clinical scale. While it may remain the best clinical scale for guiding evidence-based discussions about prognosis with aSAH patients and their families, these scales are far from perfect, especially immediately after diagnosis. Therefore, we should exert extreme caution in making end-of-life decisions based on these tools which have significant limitations; there is an ongoing need for better tools to guide early prognostication decisions—especially those leading to end of life.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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