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Exploring Biomarkers in the Differential Diagnosis of Stroke: Insights from Ongoing Clinical Trials

İnme Ayırıcı Tanısında Kullanılan Belirteçleri Keşfetmek: Devam Eden Klinik Denemelerden İçgörüler

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Dear editor,

We read with great interest the article titled Homocysteine Levels in Patients with Hemorrhagic Stroke, prepared by Yetiş et al., published in the first issue of your journal in 2023.[1] We thank the author and the editorial board for their contributions to the stroke literature. We congratulate them. However, we would like to mention a few points about stroke biomarker studies, their concept, goals and challenges.

Currently ongoing clinical trials aim to identify diagnostic markers that can effectively distinguish between stroke mimics and stroke (e.g., transient ischemic attacks, migraines, metabolic disorders, brain tumors) as well as differentiate between ischemic and hemorrhagic strokes. Most of these marker trials have primarily enrolled adults with ischemic stroke.[2]

While various types of potential markers are being explored, blood components are commonly evaluated. However, the challenge lies in identifying markers with adequate sensitivity and specificity due to the diverse comorbidities and stroke types. Consequently, marker panels incorporating a combination of biomarkers related to apoptosis, blood-brain barrier disruption, necrosis, oxidative stress, and inflammation may offer greater value, even though they haven't yet demonstrated adequate accuracy in clinical settings.[3]

The key distinction between certain hemorrhagic and ischemic strokes is that, in ischemia, the initial 2 to 3 days following the stroke are classically the most critical for the patient. This critical period necessitates the availability of rapid markers, especially if the patient experiences a major stroke, untimely stroke recurrence, or life treating brain edema. Therefore, timely decisions regarding the most crucial therapeutic interventions are often made during this initial phase.[3,4] It is crucial to consider specific subgroups of ischemic stroke patients, particularly those eligible for mechanical thrombectomy and/or, tissue plasminogen activator when evaluating treatment suitability.[5,6]

Cranial hemorrhagic disorders, such as intracranial hemorrhage (ICH) and subarachnoid hemorrhage (SAH), often exhibit a delayed worsening of conditions. Variations in pathophysiology and clinical courses between hemorrhagic and ischemic strokes impact the strategies for intensive treatment and post-stroke phases.[6-8] Consequently, allowing more time for long-term markers in these cases and evaluating their predictive value for secondary injury becomes extremely valuable in guiding treatment decisions and extending the intervention window.

Differences observed between ICH and SAH patients within the hemorrhagic stroke populations suggest that ICH markers should focus on the mechanisms and treatment of cerebral edema.[7-9] Meanwhile, SAH markers may serve to predict delayed vasoconstriction, potentially leading to delayed cerebral ischemia.

Regrettably, most ongoing marker trials exclude children with stroke, possibly due to the varied etiologies and the challenge of predicting outcomes within the first 24 hours.[10] However, future trials specifically designed for neonatal and pediatric populations could significantly impact patient care, considering the varying degrees of learning disabilities and the high prevalence of comorbidities experienced by children throughout their lives.

In conclusion, based on insights from ongoing clinical studies, a significant advancement in the discovery of potential markers for the differential diagnosis of stroke is expected. Considering that the differential diagnosis of stroke can greatly influence clinical practice, the importance of these studies in identifying and validating potential diagnostic markers is high. Developing a marker panel may help distinguish ischemic and hemorrhagic strokes and provide a faster, more accurate diagnosis. However, considering heterogeneous stroke populations and different disease stages, larger samples and standardized assessment methods remain necessary. Future studies may fill knowledge gaps in this field and clarify the role of markers in stroke diagnosis in clinical practice.

REFERENCES

1. Yetiş A, Çelikbilek A, Kaya Tekeşin A, Yağiz O. Homocysteine Levels in Patients with Hemorrhagic Stroke. Ahi Evran Med J. 2023;7(1):101-105.
2. Yew KS, Cheng E. Acute stroke diagnosis. Am Fam Physician. 2009;80(1):33-40.
3. Simpkins AN, Janowski M, Oz HS, et al. Biomarker Application for Precision Medicine in Stroke. Transl Stroke Res. 2020;11(4):615-627.
4. Özdemir S, Cimilli T, Onur ÖE. Relationship between the National Institutes Health Stroke Scale Score and Bispectral Index in Patients with Acute Ischemic Stroke. J Exp Clin Med. 2021;38(4):440-444.
5. Raha O, Hall C, Malik A, et al. Advances in mechanical thrombectomy for acute ischaemic stroke. BMJ Med. 2023;2(1):e000407.
6. Aslan T, Eroğlu SE, İslam MM, et al. Diagnostic value of ABCD2 and ABCD3-I risk scoring systems in determining one-month risk of stroke in patients with transient ischemic attack: An observational study. J. Acute Dis. 2023;12(5):192-197.
7. Toyoda K, Yoshimura S, Nakai M, et al; Japan Stroke Data Bank Investigators. Twenty-Year Change in Severity and Outcome of Ischemic and Hemorrhagic Strokes. JAMA Neurol. 2022;79(1):61-69.
8. Minhas JS, Moullaali TJ, Rinkel GJE, Anderson CS. Blood Pressure Management After Intracerebral and Subarachnoid Hemorrhage: The Knowns and Known Unknowns. Stroke. 2022;53(4):1065-1073.
9. Jin J, Duan J, Du L, Xing W, Peng X, Zhao Q. Inflammation and immune cell abnormalities in intracranial aneurysm subarachnoid hemorrhage (SAH): Relevant signaling pathways and therapeutic strategies. Front Immunol. 2022;13:1027756.
10. Jordan LC, Hillis AE. Challenges in the diagnosis and treatment of pediatric stroke. Nat Rev Neurol. 2011;7(4):199-208.