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SCIENTIFIC LETTER

MicroRNAs in Blood as Diagnostic Biomarkers for Neonatal Hypoxic–Ischemic Encephalopathy

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To the Editor: Currently, the diagnostic accuracy of some of the blood markers used clinically for neonatal hypoxic–ischemic encephalopathy (HIE) is less than satisfactory [1]. MicroRNAs (MiRNAs) have received much attention for their diagnostic value in varieties of brain injuries [2, 3]. To this end, our study sought to summarize the evidence for the diagnostic potential of miRNAs in blood for neonatal HIE.

We searched all articles reporting miRNAs for the diagnosis of neonatal HIE from 10 literature databases updated as of August 01, 2022. A meta-analysis of all the data was conducted using a random-effects model. Ultimately, a total of 9 articles (including 1373 children with HIE and 794 healthy controls) were included. The pooled results showed that the sensitivity, specificity, and diagnostic advantage ratios of 14 miRNAs (6 upregulated and 8 downregulated) in the diagnosis of neonatal HIE were 0.84, 0.82, and 38.81, respectively; moreover, the positive likelihood ratio, negative likelihood ratio, area under the curve, and Q* index were 6.44, 0.13, 0.92, and 0.85, respectively. Although the grouping of miRNAs showed better diagnostic performance in Chinese/non-Chinese, venous blood samples after birth/cord blood samples, and up-/downregulation of expression, the former within each subgroup was more advantageous than the latter. In particular, four miRNAs (miR-210, miR-374a, miR-410, and miR-384) were found to differentiate the severity of HIE. Furthermore, the sample source and miRNA expression levels were sources of heterogeneity.

Systematically, our study demonstrates that these miRNAs in blood show excellent potential in diagnosis and in differentiating the severity of neonatal HIE, which will help guide clinical decisions. MiRNAs can reflect the complex pathogenic mechanisms of HIE [4]. Considering the challenges in detecting and quantifying miRNA, more prospective studies are expected to validate and promote our findings with the ultimate goal of being applied to the assessment, monitoring, prediction, and diagnosis of neonatal HIE and its adverse outcomes.

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Data Availability On reasonable request.

Declarations

Conflict of Interest None.

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