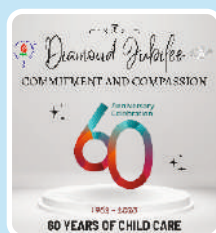


Indian Academy of Pediatrics (IAP)



nRICH

Newer Research and recommendations In Child Health

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UNDER THE AUSPICES OF THE IAP ACTION PLAN 2023

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Dear fellow IAPans,

nRICH

Newer Research and recommendations In Child Health-aims to bring you the abstracts of some of the breakthrough developments in pediatrics, carefully selected from reputed journals published worldwide.

Expert commentaries will evaluate the importance and relevance of the article and discuss its application in Indian settings. nRICH will cover all the different subspecialties of pediatrics from neonatology, gastroenterology, hematology, adolescent medicine, allergy and immunology, to urology, neurology, vaccinology etc. Each issue will begin with a concise abstract and will represent the main points and ideas found in the originals. It will then be followed by the thoughtful and erudite commentary of Indian experts from various subspecialties who will give an insight on way to read and analyze these articles.

I'm sure students, practitioners and all those interested in knowing about the latest research and recommendations in child health will be immensely benefitted by this endeavor which will be published online on every Monday.

Happy reading!

Upendra Kinjawadekar
National President 2023
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BASED ON ARTICLE

How well does neonatal neuroimaging correlate with neurodevelopmental outcomes in infants with hypoxic-ischemic encephalopathy? Wu YW, Monsell SE, Glass HC, Wisnowski JL, Mathur AM et al. *Pediatr Res.* 2023 Mar 1. doi: 10.1038/s41390-023-02510-8

ABSTRACT

Background: In newborns with hypoxic-ischemic encephalopathy (HIE), the association between neonatal neuroimaging and the degree of neurodevelopmental impairment (NDI) is unclear.

Methods: Infants with HIE enrolled in a randomized controlled trial underwent neonatal MRI/MR spectroscopy (MRS) using a harmonized protocol at 4-6 days of age. The severity of brain injury was measured using

- Global Brain injury score evaluated from the extent of injury (score=0=none, 1=<25%, 2=25-50%, score=3=>50%) noted in ADC, T1, T2 images of the eight regions of brain caudate, putament/globus pallidus, thalamus, Posterior limb of internal capsule, cortex, white matter, brainstem and cerebellum
- Severity of Global brain injury score classified as none (score=0), mild(score=1-11), moderate (score=12-32), severe (score=33-138).
- Patterns of injury classified as central grey, peripheral watershed and global
- Timing of lesions as acute, subacute and chronic injury based on ADC, T1 and T2 image patterns
- Lactate/NAA and NAA/creatine ratios were calculated on the MRS from the two focal areas of thalamus and white matter

Using proportional odds regression, adjusted odds ratios (aOR) for the associations between MRI/MRS measures of injury and primary ordinal outcome (i.e., normal, mild NDI, moderate NDI, severe NDI, or death) at age 2 years were calculated.

Results: Of 451 infants with MRI/MRS at a median age of 5 days (IQR 4.5-5.8), outcomes were normal (51%); mild (12%), moderate (14%), severe NDI (13%); or death (9%). MRI injury score (aOR 1.06, 95% CI 1.05, 1.07), severe brain injury (aOR 39.6, 95% CI 16.4, 95.6), and MRS lactate/n-acetylaspartate (NAA) ratio (aOR 1.6, 95% CI 1.4, 1.8) were associated with worse primary outcomes. Infants with mild/moderate MRI brain injury had similar BSID-III cognitive, language, and motor scores as infants with no injury.

Conclusion: In the absence of severe injury, brain MRI/MRS does not accurately discriminate the degree of NDI. Given diagnostic uncertainty, families need to be counselled regarding a range of possible neurodevelopmental outcomes.

COMMENTARY

Hypoxic-ischemic encephalopathy (HIE) is a significant contributor to neonatal morbidity and mortality. Neuroimaging study- brain MRI and MR spectroscopy (MRS) is frequently performed to predict and counsel families regarding neurodevelopmental outcomes. The relationship between neuroimaging and the level of neurodevelopmental impairment (NDI) in infants with HIE is not well-established.

In a multi-centric, prospective cohort study involving 451 participants with HIE requiring therapeutic hypothermia, the researchers examined the correlation between the severity of brain injury, as determined by MRI-MRS performed at a median age of 5 days, and neurodevelopmental impairment at 2 years of age, as assessed by a validated MRI injury score and MRS lactate/n-acetylaspartate (NAA) ratio. ***The study found that severe brain injury, a global pattern of injury, and an abnormal (in the top quartile) MRS Lactate/NAA ratio were strongly associated with death or neurodevelopmental impairment.*** However, in infants with mild to moderate MRI brain injury the cognitive, language, and motor scores were comparable to those infants with no injury, as evaluated by the BSID-III. The differences between MRI and MRS predictive values were small. Absence of injury on MRI does not rule out possibility of range of neurodevelopmental impairments in HIE infants. There remains prognostic uncertainty with infants with normal brain MRI with HIE.

Implications for practice:

1. In infants with HIE, brain MRI performed on day 4-6, presence of severe MRI brain injury, global injury pattern and abnormal lactate/NAA ratio correlate with severe neurodevelopmental impairment or death.
2. In infants with HIE with mild to moderate MRI brain injury, neurodevelopmental impairment were comparable to those infants with no injury.
3. Clinicians must be aware of potential pitfall of predicting good outcomes in infants with HIE with normal MRI brain.