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COMMENTARY

Salivary gland lactate dehydrogenase: A novel diagnostic test for anticipation of neurodevelopmental outcome in perinatal asphyxia in developing countries

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Perinatal asphyxia is the most common cause of morbidity, mortality, and long-term neurological disability. Approximately 4 million newborn deaths occur each year that are attributed to perinatal asphyxia, and most of these deaths occur in developing countries.[1] Annually, 2.3—26.5 per 1,000 live babies in underdeveloped nations suffer hypoxic-ischaemic encephalopathy (HIE).[2] Perinatal asphyxia is the main cause of multiorgan damage, especially to the nervous system, and a leading cause of mortality. The prolonged hypoxic events may affect the blood supply to the brain and other vital organs, leading to brain injury, perfusion mismatch, and pump failure, which manifests as a neurobehavioral disease known as HIE. Therefore, it is crucial to have a reliable, sensitive, and feasible laboratory marker that can accurately predict the development of HIE among high-risk perinatal asphyxiating babies

Meanwhile, extensive research has been conducted on the role of hypothermia as a neuroprotective modality for preventing early deaths and late neurodevelopmental disability. Hypothermia alone cannot protect all babies from developing mental retardation and neurodevelopmental delay in the long term, so neonatologists need to identify and triage these babies who require modalities like magnesium sulphate, allopurinol, free radical scavengers, erythropoietin, calcium channel blockers, and other novel protective strategies.[3]

HIGHLIGHTS

1. Early diagnosis and intervention are crucial for improving outcomes in perinatal asphyxia. Implementing early detection protocols at all centres can prevent neurological disabilities.
2. Salivary lactate dehydrogenase levels in newborns are effective for diagnosing perinatal asphyxia. This cost-effective and accessible test should be adopted.

Lactate dehydrogenase (LDH) testing can be done in low resource countries as it is easily available, cost-effective, requires limited set-up, and can almost be performed in most centres. It can provide exact data and information on the burden of perinatal cases, which goes unnoticed without reliable history.

The double antibody sandwich ELISA technique is used to detect LDH levels. The salivary sample is added to a well that is pre-coated with a monoclonal antibody specific to LDH. After incubation, a secondary antibody conjugated to an enzyme is added, binding to the antigen-antibody complex. A chromogenic substrate is then added, causing a colour change from blue to yellow when the enzyme reacts with it. The intensity of the yellow colour is directly proportional to the amount of LDH in the sample, which is quantitatively measured using a spectrophotometer.

The salivary LDH level has a strong link and association with the severity of birth asphyxia 12-24 hours after birth. Salivary LDH levels can predict the incidence and

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occurrence of birth asphyxia in neonates who were hypoxic in utero.[4] There are no specific, fixed cut-off values to prove or disprove a threshold value. One study by Karlsson M. *et al*.[5] described that serum LDH, with a cut-off level of 1049 IU/L, was the most accurate predictor of HIE, with 100% sensitivity and 97% specificity. Whereas Elmouri H *et al*.[6] suggested an LDH level of 1420 IU/L for a similar sensitivity and specificity. They reported that a full term infant's chances of developing HIE increase by 70% as salivary LDH level rises by 100 IU/L.

This novel investigation is non-invasive, easily accessible and economical. While it shows promising results for the evaluation of perinatal asphyxia and HIE, further research and validation are needed before it can be recommended for universal adoption in newborns. With this, we can identify and triage the babies who have raised levels of LDH in cases where a clear history, signs, and symptoms are lacking. Such patients can then be evaluated for brain injury or insult, allowing us to predict their neurological outcome and begin early intervention.

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