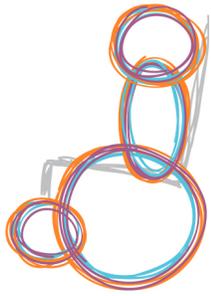


Increased blood flow to the brain following asphyxiation may predict a newborn's risk for brain injury

childhood
disability
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Summary

Hypoxic-ischemic encephalopathy (HIE), the brain injury that follows interrupted oxygen supply to the fetus, is caused by the primary interruption of oxygen and also by the reentry, or reperfusion, of blood into the obstructed area. Asphyxiated newborns with elevated brain reperfusion seem to develop brain injuries more severe than those with normal reperfusion, suggesting that the level of reperfusion following asphyxia could predict a newborn's risk for HIE. This was a prospective cohort study of 18 newborns displaying varying degrees of hypoxic-ischemic encephalopathy (HIE) due to asphyxia. Of the affected newborns, 11 qualified for and received induced hypothermia treatment from 6 hours to 72 hours after birth. Brain magnetic resonance imaging (MRI) and arterial spin labeling perfusion imaging (ASL-PI) were performed on all 18 newborns in addition to 4 term newborns with no HIE. Imaging allowed for measurement of cerebral blood flow (CBF) values and assessment of brain injury extent, which were then compared between newborns.

What families should know

Hypothermia is currently the only effective treatment for minimizing neurological deficits in high risk newborns following asphyxia, or the interruption of oxygen supply. Reperfusion following asphyxia leads to reperfusion injury following a cascade of events that commonly causes tissue death. It is thought that hypothermia therapy prevents reperfusion injury by slowing this cascade of events. Indeed, this study confirms that perfusion rate following asphyxiation does influence the extent of brain injury.

What practitioners should know

Arterial spin labeling perfusion imaging (ASL-PI) of the brain may be a useful tool for identifying asphyxiated newborns with a higher risk for developing hypoxic-ischemic encephalopathy (HIE). ASL-PI shows that all newborns who develop brain injury, whether treated or untreated by hypothermia, display greater perfusion overall in the first week of life

compared to controls. Increased perfusion may therefore be a predictor of risk for brain injury that can identify asphyxiated newborns who should undergo more aggressive hypothermia therapy or additional neuroprotective therapies.

Reference

Wintermark, P., Hansen, A., Gregas, M., Soul, J., Labrecque, M., Robertson, R., et al. (2011). Brain perfusion in asphyxiated newborns treated with therapeutic hypothermia. *American Journal of Neuroradiology*, 32, 2023-2029.

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