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Clinical Observations

Risk Factors for Intraventricular Hemorrhage in Term Asphyxiated Newborns Treated With Hypothermia

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ABSTRACT

BACKGROUND: Intraventricular hemorrhage is rare in term newborns. Severe asphyxia is recognized as one of the risk factors of intraventricular hemorrhage in these newborns. Therapeutic hypothermia, which is the only available treatment for the limitation of brain injury in term asphyxiated newborns, may cause fluctuations of cerebral blood flow, possibly placing the newborn more at risk for intraventricular hemorrhage. The literature regarding the incidence of intraventricular hemorrhage in the context of neonatal hypoxic-ischemic encephalopathy and hypothermia is sparse. **METHODS:** We present a clinical observation and review the literature regarding the risk factors for intraventricular hemorrhage in term asphyxiated newborns treated with hypothermia. **RESULTS:** We describe the clinical course of a term newborn with severe hypoxic-ischemic encephalopathy who developed significant intraventricular hemorrhage during the rewarming period after the 72-hour hypothermia. **CONCLUSION:** This newborn presented several risk factors for intraventricular hemorrhage, including severe asphyxia, hemodynamic instability, hemostasis disturbances, instrument delivery, venous sinus thrombosis, and hypoglycemia. Hypothermia and rewarming also may have contributed by causing fluctuations in cerebral blood flow.

Keywords: birth asphyxia, hypothermia, hypoxic-ischemic encephalopathy, intraventricular hemorrhage, magnetic resonance imaging, newborn brain

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Introduction

Intraventricular hemorrhage (IVH) is common in premature newborns, especially in the first 48 hours of life because their cerebral autoregulation is immature, and the blood vessels are not yet fully developed and extremely fragile in the germinal matrix where IVH originates.[1,2] IVH also may develop in term newborns, but it is much more uncommon than in premature newborns.[3,4] It seems to originate from the choroid plexus vessels in the lateral ventricle or in the subependymal layer.[5,6] The incidence of IVH detected by cranial ultrasonography in term healthy asymptomatic infants is around 3.5%.[3,6]

Severe asphyxia is one of the risk factors for IVH in term newborns.[6] In the past few years, therapeutic hypothermia has emerged as the only available safe treatment to prevent the development of hypoxic-ischemic brain injuries and improve the long-term outcome in term asphyxiated newborns.[7,8] However, therapeutic hypothermia may cause fluctuations of cerebral blood flow, possibly placing the newborn more at risk for IVH. The literature regarding the incidence of IVH in the context of neonatal hypoxic-ischemic encephalopathy and hypothermia is sparse.[9]

We present a 37-weeks' gestation newborn who suffered from birth asphyxia, and who presented initially with severe hypoxic-ischemic encephalopathy, was cooled, and

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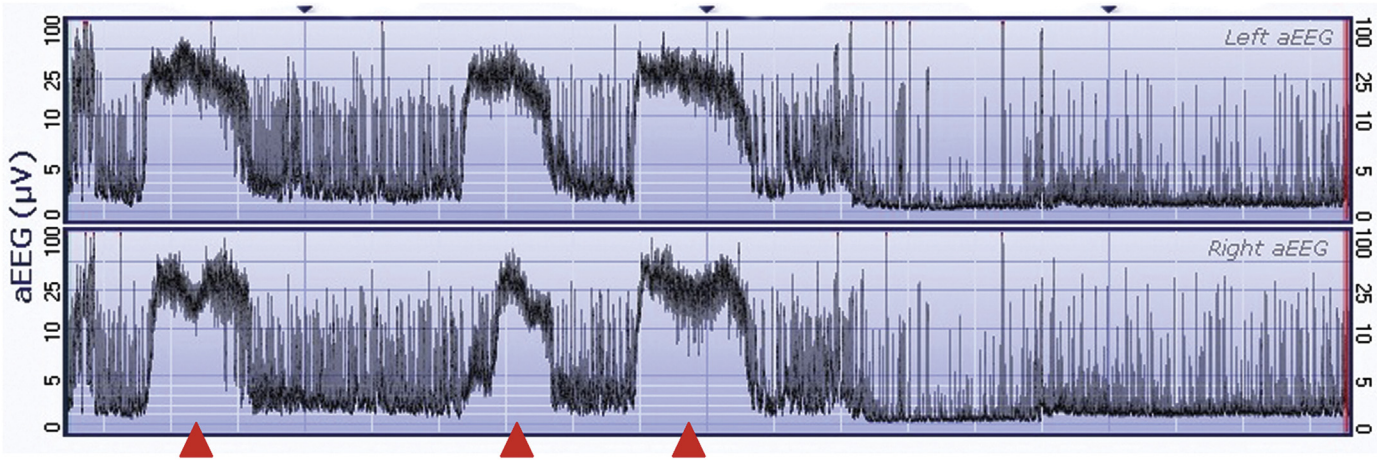

FIGURE 1.
Amplitude-integrated electroencephalography on admission and during the next hours. The background amplitude of the tracing revealed a lower margin <5 mcV and an upper margin <10 mcV, compatible with a severe encephalopathy. Three episodes of prolonged seizures also were observed. Of note, the amplitude of the seizures was relatively similar for both sides. The interval between the two blue triangles on the horizontal axis represents a 1-hour interval. (Color version of figure is available in the online edition.)

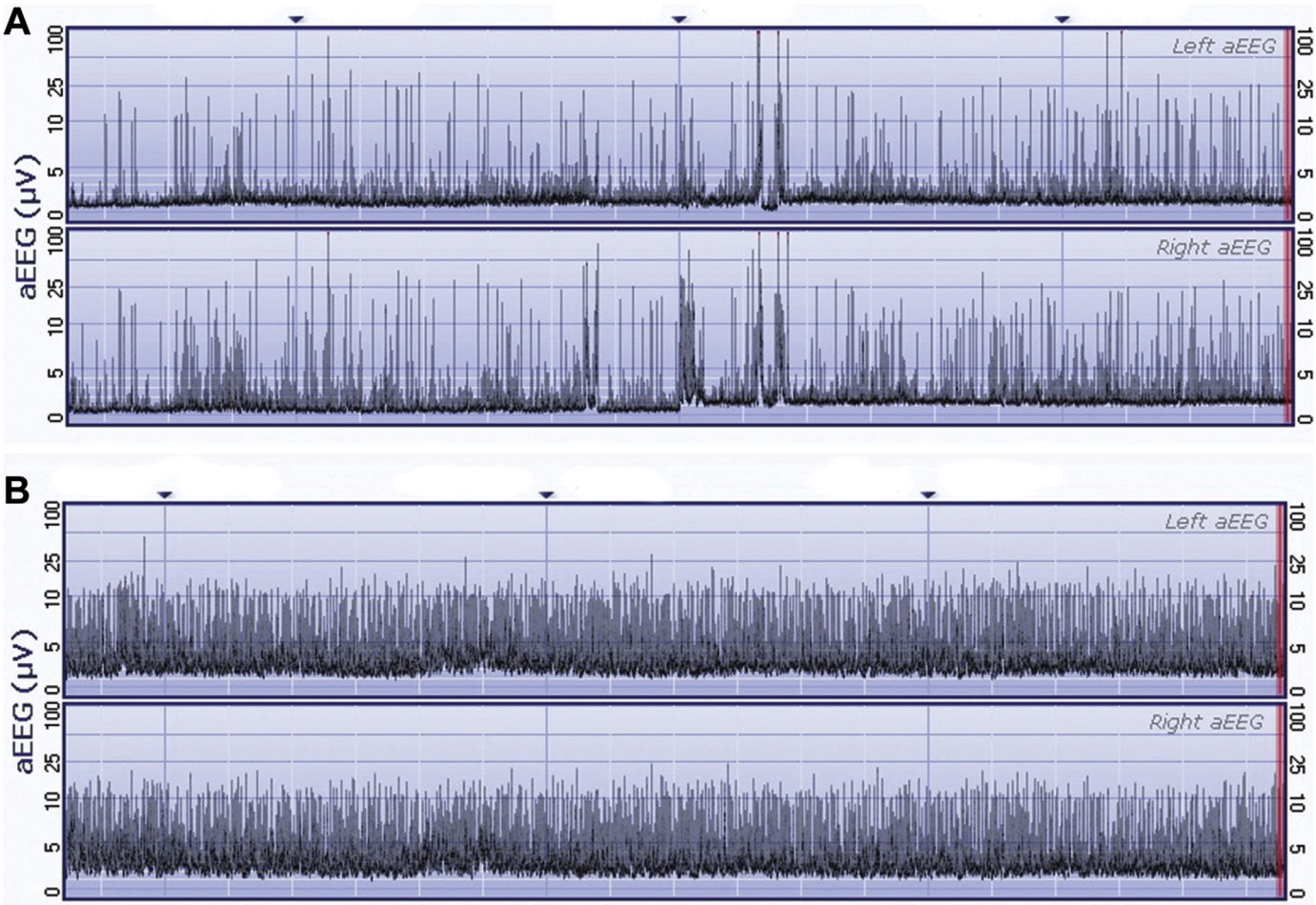

FIGURE 2.
Amplitude-integrated electroencephalography during the hypothermia treatment (A) on day 1 of life and (B) on day 2 of life. The background amplitude of the tracing remained compatible with a severe encephalopathy. Periodic bursts of higher voltage electrical activity (spikes) increased from day 1 of life to day 2 of life. No clear episodes of seizures are visible. The interval between the two blue triangles on the horizontal axis represents a 1-hour interval. (Color version of figure is available in the online edition.)