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Life-Threatening Neonatal Epidural Hematoma Caused by Precipitous Vaginal Delivery

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Male, 0
Final Diagnosis: Epidural hematoma
Symptoms: Apnea
Medication: —
Clinical Procedure: Craniotomy
Specialty: Pediatrics and Neonatology

Objective: Unusual clinical course

Background: Neonatal in-hospital falls occur relatively frequently, although they are likely underreported. Significant intracranial head trauma from a fall or birth injury is not common in the immediate newborn period. Furthermore, intracranial bleeding requiring surgical intervention is exceedingly rare. We present an unusual case of an in-hospital fall in the delivery room requiring neurosurgical intervention.

Case Report: A term infant, appropriate for gestational age, delivered precipitously from a maternal standing position. The vertex neonate struck the linoleum floor after an approximate 80-cm fall, landing headfirst. The physical and neurological exams were initially normal, and skull films did not demonstrate an obvious fracture. The baby was closely observed, undergoing continuous cardiorespiratory monitoring. After the patient had an episode of apnea, a scalp hematoma was noted. A computed tomography (CT) scan revealed a left parietal fracture with an acute epidural hematoma, which required emergent craniotomy. The infant had an unremarkable post-operative course and had a normal neurodevelopmental assessment at 15 months of age.

Conclusions: Close, continuous observation is recommended for infants following an in-hospital fall or after significant birth trauma. A high degree of suspicion for intracranial hemorrhage must be maintained. Fall prevention strategies should focus on careful baby handling by the convalescing mother.

MeSH Keywords: Accidental Falls • Birth Injuries • Hematoma, Epidural, Cranial

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/892506

Background

Intracranial hemorrhage in the newborn period occurs infrequently. Spontaneous subdural or cerebral hemorrhage occurs in 2.9 per 10,000 vaginal deliveries, rising to 21.3 per 10,000 when vacuum and forceps instrumentation are used [1]. Intraventricular and subarachnoid hemorrhages are known complications, but occur less often [1]. Epidural hematomas in the immediate newborn period have rarely been reported, with birth injury being the most common etiology [2-4], although isolated cases without obvious trauma have also been described [4–7].

Significant head trauma from a neonatal fall at the time of delivery has only been reported in 2 cases [8,9]. We report an unusual case of birth injury from a fall at delivery. The birth was a spontaneous vaginal delivery from a standing position. The resulting neonatal trauma caused an epidural hematoma requiring emergent surgical evacuation.

Case Report

This 2977 g male infant was born at 40 5/7 weeks gestation to a 26 year-old gravida 5, para 5 woman, who received prenatal care. The pregnancy was unremarkable and she had a normal ultrasound at 26 weeks gestation. Her previous 4 deliveries resulted in term, healthy newborns who all delivered vaginally after a short labor. On the day of delivery, labor began spontaneously and she was admitted to a combined labor and delivery room. The patient refused external monitoring and did not remain consistently in bed due to discomfort. Rupture of membranes occurred while the patient was standing at the bedside, which was immediately followed by the precipitous, vertex delivery of her infant. The neonate fell approximately 80 cm to the linoleum floor below, striking his head.

After delivery the infant cried immediately and received routine newborn care. The child had a normal neurological exam with no signs of local trauma to the skull on initial evaluation by a pediatrician. Apgar scores were 8 and 9 at 1 and 5 minutes, respectively. Skull radiographs did not show an obvious fracture when reviewed by the pediatrician. The infant was admitted to the neonatal intensive care unit (NICU) for close observation and was permitted to feed ad lib. At approximately 5 hours of life, the infant had an apneic episode associated with cyanosis and bradycardia resolving with stimulation. The neurological exam results continued to be normal; however, an area of left parietal scalp edema was newly appreciated. A baseline complete blood count revealed normal hemoglobin and hematocrit at 18.3 g/dL and 50.9%, respectively. The laboratory platelet evaluation clumped, but the quantity under microscopic examination appeared grossly normal. Coagulation studies were not obtained.

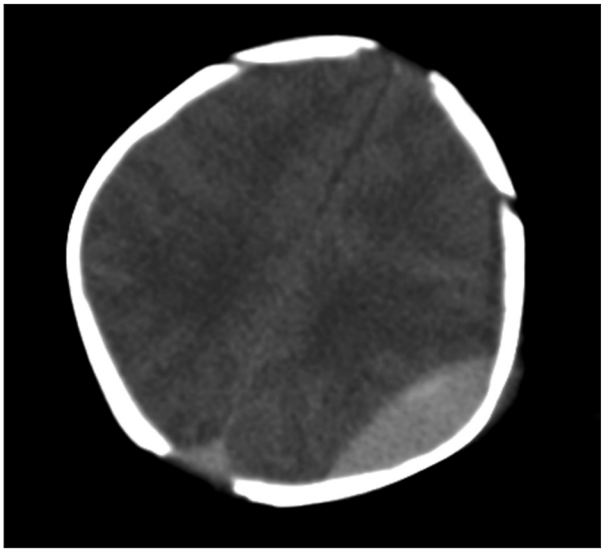

Figure 1. Pre-operative axial non-contrast brain CT that shows a lenticularly-shaped hyperdensity, consistent with an epidural hematoma, exerting a mass effect on the adjacent left parietal lobe.

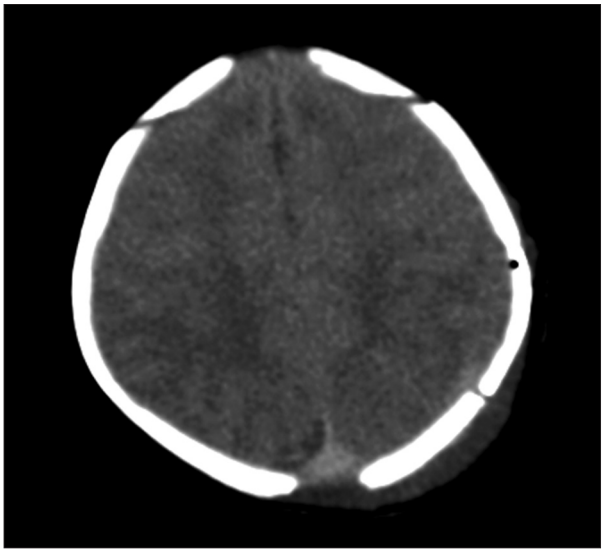

Figure 2. Immediate post-operative axial non-contrast brain CT shows resolution of the mass effect after evacuation of epidural hematoma. There is minimal post-operative pneumocephalus.

A computed tomography (CT) scan of the head revealed a mildly displaced left parietal bone fracture with an underlying acute epidural hematoma measuring 1.3 cm at its maximal thickness, and adjacent traumatic subarachnoid hemorrhage. The epidural hemorrhage exerted a mass effect on the underlying parietal lobe and left lateral ventricle without midline shift (Figure 1). Neurosurgery was consulted and the patient underwent an emergent craniotomy with evacuation of the epidural hematoma. No dural defect was noted and there

were no operative complications. On the first post-operative day the patient was extubated, and a repeat CT scan showed adequate evacuation of the hematoma with minimal residual extra-axial blood and resolution of the mass effect (Figure 2). Repeat laboratory hemoglobin was 20.7 g/dL and the platelet count remained normal. The patient never had a seizure, and was discharged home 3 days after the procedure.

At 3 months of age, a CT scan showed well-healed bone around the craniotomy site without any residual intracranial hemorrhage. A Bayley Scales of Infant Development assessment at 15 months was normal for age.

Discussion

Accidental falls in the hospital are a common occurrence and are likely underreported. Only 3 prior studies have examined the incidence of in-hospital falls in newborn infants. Two studies in large U.S hospital systems found a neonatal in-hospital fall incidence of 1.6–4.14 falls per 10,000 births, with only 4 falls noted in the delivery room [8,10]. A third study, by Ruddick et al., reported 11 in-hospital neonatal falls in a single delivery center in the United Kingdom over a 4-year period [9]. In these studies, only 2 injuries from a fall at the time of birth were reported: a skull fracture with no intracranial pathology [8], and a skull fracture with an associated cerebral contusion and resulting encephalopathy [9].

Assuming the incidence of neonatal falls from these studies is generalizable, an estimated 600–1,600 newborn falls occur yearly in the United States [11]. Of the reported in-hospital falls, most (58%) occur when a parent has fallen asleep while holding the infant, subsequently dropping the baby. This appears to happen more commonly overnight or in the early morning hours [8–10]. Systems-based approaches for preventing neonatal in-hospital falls have been proposed, including frequent assessments of maternal sleepiness overnight (when the baby is being held) [8], and forbidding co-sleeping in a "safety contract" between the mother and hospital staff, detailing risk factors for newborn falls [10]. More rigorous, individual evaluation of the risk of neonatal fall can be completed right after delivery, using parameters such as maternal epidural anesthesia, maternal medications, and other obstacles in safely transferring the baby from a convalescing mother to the bassinet [12]. Serious falls at the time of delivery are rare and in our case would have been difficult to avoid, although detailing the risk of falling could have perhaps prevented this incident.

An epidural hematoma from an in-hospital neonatal fall has not been previously reported, and in total, fewer than 100 cases of epidural hematoma have been described in the newborn period [4]. The rare incidence, along with the ambiguity of neurological signs, makes a timely diagnosis difficult. Published data regarding neonatal birth trauma or falls are primarily case reports or retrospective case series studies, so treatment guidelines have not been established. An approach to neonatal falls proposed by Helsley et al. recommends a prompt evaluation by a provider, followed by a 12-hour period of close observation, including frequent neurological assessments. Head imaging is indicated if symptoms are noted [10]. In our case, close intensive monitoring allowed for prompt detection of changes in neurological status, resulting in a timely intervention.

Conclusions

We suggest that pediatricians should have a high index of suspicion of intracranial injury after an in-hospital fall or significant birth trauma. Close, continuous monitoring for 12–24 hours is strongly recommended. Additionally, fall prevention strategies should focus on maternal sleepiness while holding the infant, particularly at nighttime.

Disclosures or conflicts of interest

The authors have no conflicts of interest to disclose.

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