

Clinical Note

Insidious onset of grade IV intraventricular hemorrhage in a premature infant. A case of clinical deception

Cranial ultrasound (US) is a reliable tool used for screening intraventricular hemorrhage (IVH) in premature infants with high sensitivity and specificity.¹ As more than 90% of IVH occurs in the first 3-4 days of life, early scanning is recommended.^{2,3} In spite of the established utility of the cranial US as a screening procedure for detecting IVH, some pediatricians have contention and reservation regarding its role, especially in neonates with gestational age greater than 29 weeks.⁴ We would like to present a case of a premature infant who remained asymptomatic despite the rapid progression of IVH from no IVH on the first US to grade IV IVH on the repeat US, carried out 12 days apart. The aim of the report is to highlight the use of serial cranial US in premature infants, as signs and symptoms, including head circumference, may not be reliable in detecting the progression of IVH.

The infant was a 31 week premature boy who was delivered via cesarean section, secondary to fetal distress. He had poor Apgar scores (one, 3 and 5 at one, 5 and 10 minutes). Initially he required intubation and mechanical ventilation with inotropic support for his hypotension and one dose of sodium bicarbonate to correct the metabolic acidosis. However, he showed rapid improvement in his condition and was extubated on the 2nd day of life. On the same day, the screening cranial US (1st Monday as per unit protocol) was carried out, which was reported as normal (**Figure 1**). Thereafter, he remained stable. On the 14th day of life on routine examination, he was noted to be hypoactive and lethargic, so a septic work up was completed

including a spinal tap to rule out sepsis and meningitis. The spinal fluid was noted to be bloody and was not clearing. With the suspicion of intracranial bleed, an urgent cranial US was obtained which revealed grade IV IVH (**Figure 2**). Other laboratory investigations, obtained at that time, were all within normal limits. In due course, the infant developed post-hemorrhagic hydrocephalus, a known complication of grade IV IVH, which was initially managed conservatively with medication and serial spinal and ventricular tap as described in the literature.⁵⁻⁷ However at 35 days of life, he was referred to the neurosurgeon, where he had the placement of ventriculoperitoneal shunt. At the time of this report he had shunt in situ and was thriving well.

Up to 90% of IVH in premature infants occurs within first 48 hours of life.² The remaining 10% could occur later but the asymptomatic, rapid progression to grade IV IVH, as noted in the case described, was unusual. There was a difference of 12 days between the initial and 2nd US and most likely the bleeding had occurred during that period. Risk factors for IVH were present at birth, namely poor Apgar score, metabolic acidosis, use of bicarbonate and hypotension, but the delayed onset of grade IV IVH was unexplainable. Secondly, during the 12 day period the infant remained asymptomatic with no deterioration in the condition. In fact, the infant showed signs of improvement with extubation within 48 hours. Also the increment in the head circumference was normal (carried out weekly, approximately 0.15 cm/day). Looking for any acute changes or risk factors⁸ during the 12 day period, except for blood transfusion, no other associated risk factors could be implicated for this acute rapid progressive bleed. The investigations including the coagulation profile and platelet counts were all within normal limits. In a recent article, Harding et al

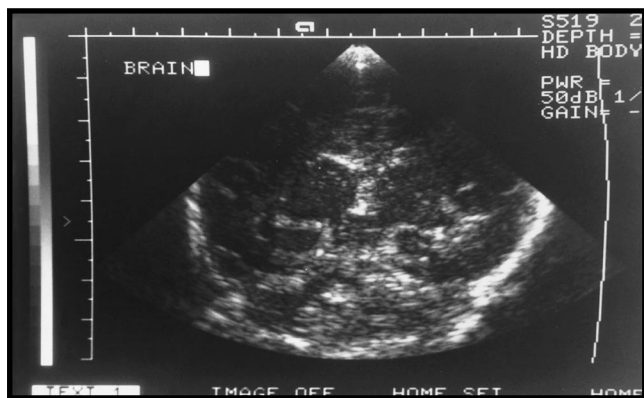


Figure 1 - Cranial ultrasound taken at 2 days of life.

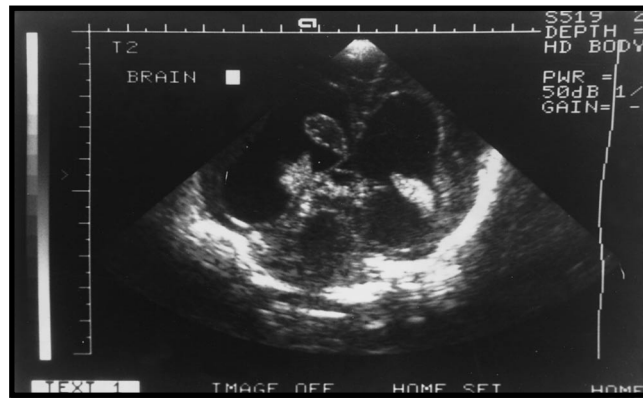


Figure 2 - Cranial ultrasound taken at 14 days of life.

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questioned the cost effectiveness of the cranial US in preterm infants as a screening procedure.⁴ They have negated the use of cranial US as a screening procedure in infants with gestational age of greater than 29 weeks. However, it was an evident from the case described above (gestational age 31 weeks) that rapid progressive intraventricular hemorrhage can follow without symptoms, a clinical deception, in preterm infants even with higher gestational age. Another important aspect that needs attention here is the predictive value of initial cranial US. In view of the case described the validity of initial cranial US as a predictor of neuro-development outcome, as suggested by others,^{9,10} becomes arguable. A critical look should be given to such predictions.

In conclusion, an initial normal cranial US does not necessarily rule out IVH and as premature babies are at high-risk of IVH with minimal to no symptomatic clues, a policy of obtaining serial cranial sonography during the first 2 weeks of life of premature infants should be practiced.

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References

1. Chess PR, Chess MA, Manuli MA, Guillet R. Screening head ultrasound to detect intraventricular hemorrhage in preterm infants. *Pediatr Radiol* 1997; 27: 305-308.
2. Hill A, Volpe JJ. Intracranial hemorrhage. In: Robertson NRC editor. Textbook of Neonatology 2nd ed. Edinburgh: Churchill Livingstone; 1992. p. 1077-1089.
3. Tudehope DI, Lamont AC. Neonatal cranial ultrasound scanning for intraventricular hemorrhage. *J Paediatr Child Health* 1998; 34: 112-113.
4. Harding D, Kuschel C, Evan N. Should preterm infants born after 29 weeks gestation be screened for intraventricular hemorrhage? *J Paediatr Child Health* 1998; 34: 57-59.
5. Libenson MH, Kaye EM, Rosman NP, Gilmore HE. Acetazolamide and frusemide for posthemorrhagic hydrocephalus of the newborn. *Pediatr Neurol* 1999; 20: 185-191.
6. Dykes FD, Dunbar B, Lazarra A, Ahmann PA. Posthemorrhagic hydrocephalus in high-risk preterm infants: natural history, management, and long-term outcome. *J Paediatr* 1989; 114: 611-618.
7. Ventriculomegaly Trial Group. Randomized trial of early tapping in neonatal posthaemorrhagic ventricular dilation. *Arch Dis Child* 1990; 65: 3-10.
8. Bassiouny MR, Remo C, Remo R, Lapitan R. Intraventricular hemorrhage in premature infants: A study from Oman. *J Trop Pediatr* 1997; 43: 174-177.
9. Vohr B, Allan NC, Scott DT, Katz KH, Schneider KS, Makuch RW, et al. Early-onset intraventricular hemorrhage in preterm neonates: incidence of neurodevelopmental handicap. *Semin Perinatol* 1999; 23: 212-217.
10. Fowlie PW, Tarnow-Mordi WO, Gould CR, Strang D. Predicting outcome in very low birth weight infants using an objective measures of illness severity and cranial ultrasound scanning. *Arch Dis Child Fetal Neonatal Ed* 1998; 78: F175-F178.