

Guidelines for Cranial Ultrasounds in Premature Infants

Rationale

Cranial ultrasound is the diagnostic method of choice to detect intraventricular hemorrhage (IVH) and white matter disease (WMD) in the premature infant.

Intraventricular Hemorrhage

The incidence of IVH in infants <1000 grams is 50%-60%, and in infants 1000-1500 grams, the incidence is 10%-20%. Approximately 90% of IVH occurs by the 4th postnatal day with 50% occurring on the first postnatal day. Approximately 20%-40% exhibit progression of hemorrhage over 3-5 days. Infants with IVH are at risk for hydrocephalus and white matter injury.

White Matter Disease

White matter disease includes two primary lesions, periventricular leukomalacia (PVL) and periventricular hemorrhagic infarction (PVHI). PVL occurs in about 3-4% of infants of birth weight <1500g and PVHI occurs in approximately 10-15% of infants of birth weight <1000 grams. PVL occurs in relatively larger premature infants as the most vulnerable time for white matter injury is between the 28th and 32nd weeks of gestation. PVHI occurs at younger gestational ages and birth weights as it is associated with more severe IVH. WMD is associated with prolonged rupture of membranes and chorioamnionitis and may be associated with maternal cocaine use.

WMD is often detectable on early ultrasounds as either an echodensity or echolucency but may not become apparent for 1-3 weeks after the initiating event when cysts begin to form. The echolucencies may then disappear after 1-3 months leaving enlarged ventricles.

Guidelines for obtaining Cranial Ultrasounds

	Day of Life			
	3-5	10-14	28	Prior to discharge
< 1000 grams	*	*	*	*
1000-1250 grams	*		*	*
1250-1500 grams	*			*

Cranial ultrasounds may need to be repeated at more frequent intervals to evaluate for developing hydrocephalus if there is evidence of hemorrhage.

Selected References

1. Perlman, J.M., *White matter injury in the preterm infant: an important determination of abnormal neurodevelopment outcome.* **Early Hum Dev**, 1998. **53**(2): p. 99-120.
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3. Volpe, J.J., *Brain injury in the premature infant--from pathogenesis to prevention.* **Brain Dev**, 1997. **19**(8): p. 519-34.
4. Perlman, J.M., R. Risser, and R.S. Broyles, *Bilateral cystic periventricular leukomalacia in the premature infant: associated risk factors.* **Pediatrics**, 1996. **97**(6 Pt 1): p. 822-7.
5. Perlman JM, Rollins N. *Surveillance protocol for the detection of intracranial abnormalities in premature neonates.* **Arch Pediatr Adolesc Med** 2000;154:822-6.