Newborn Critical Care Center (NCCC) Clinical Guidelines

Cranial Ultrasounds in the Preterm Infant

BACKGROUND

The following is a guide for obtaining cranial ultrasounds (US) to screen the premature infant for the presence of intraventricular hemorrhage (IVH), periventricular leukomalacia (PVL), or ventriculomegaly in the absence of IVH. There are two purposes for screening cranial ultrasounds in the preterm infant. Screening cranial ultrasounds may 1) diagnose brain injury in the newborn at risk so that appropriate medical management can be provided or 2) detect brain lesions associated with long-term neurodevelopmental disability. Close to 25% of infants with gestational age (GA) of <30 weeks have significant cranial US abnormalities that trigger important changes in acute and long-term care. Therefore, routine screening cranial US should be performed on all infants with GA of < 30 weeks (Level B evidence).

OBTAIN CRANIAL ULTRASOUND IN ALL INFANTS < 30 WEEKS GESTATION

Initial cranial ultrasound at 7 - 10 days of life. This may be obtained earlier if there is clinical concern or circumstances warrant obtaining this information for decision-making purposes.

Note: *EPIC order defaults to 7 days of life – the order date should be adjusted if a routine screening HUS would fall on a weekend day*

FOLLOW-UP

Normal

- Repeat at 36 - 40 weeks corrected gestational age or prior to discharge/transfer (if it has been at least 2 weeks from previous study). The order is part of the ELBW admission order-set in EPIC but may need to be retimed.

Abnormal

Determined by results of the study and infant's clinical course:

- All infants with IVH should be followed for progression of hemorrhage and hydrocephalus by clinical exam and serial head circumferences.
- If grade 2, 3 or 4 IVH is present on the screening cranial ultrasound, the cranial ultrasound should be repeated every 1 - 2 weeks until stable.
- All follow-up plans should be individualized.

CLASSIFICATION OF FINDINGS

Intraventricular Hemorrhage

Grade 1: Germinal matrix hemorrhage

Grade 2: Intraventricular hemorrhage **without** ventricular dilatation

Grade 3: Intraventricular hemorrhage **with** ventricular dilatation

Grade 4: Parenchymal involvement

Periventricular Leukomalacia

Periventricular echodensities or cysts seen on ultrasound that result from either ischemic injury in the arterial watershed area, venous infarcts or cytokine mediated inflammatory damage.

Ventriculomegaly (measured at the midbody of the lateral ventricle on sagittal scan):

- *Mild:* 0.5 - 1.0 cm
- *Moderate:* 1.0 - 1.5 cm
- *Severe:* > 1.5 cm

Note: Routine screening cranial ultrasounds are performed Monday - Friday at 0400. However, if an ultrasound is needed urgently at another time, this can be arranged by ordering the exam STAT.

STATISTICS (from Volpe textbook)

Incidence**:**

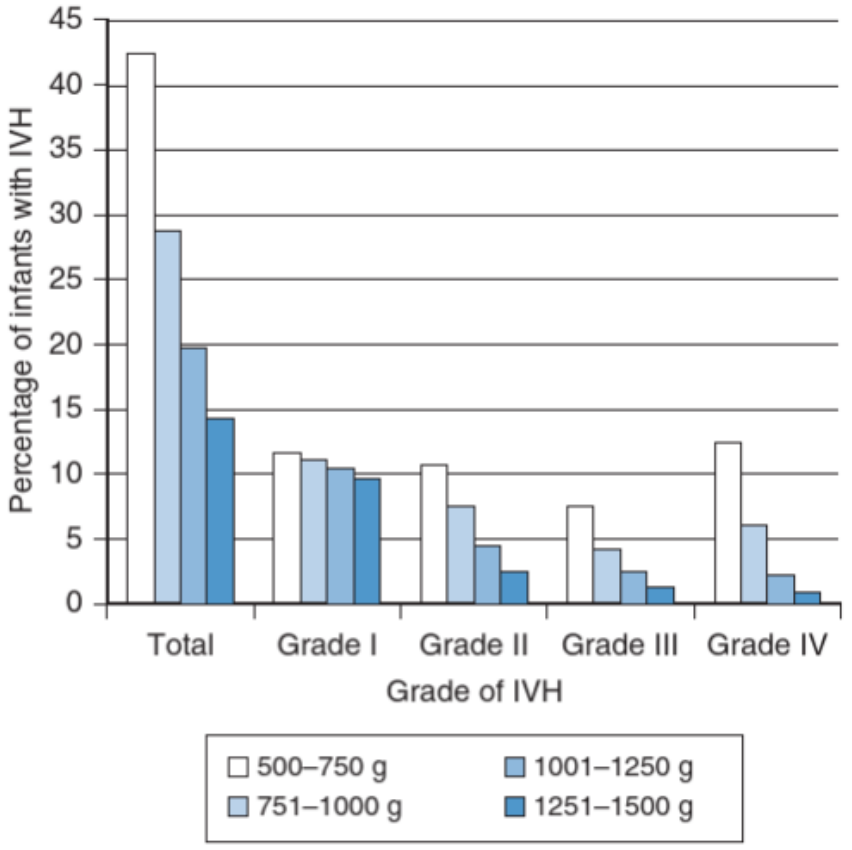

Figure 24.3 The percentage of very preterm infants with birthweight less than 1500 g with intraventricular hemorrhage (IVH) by birthweight groupings for 2013. Data were collected from the Vermont-Oxford Network, assessing approximately 55,000 very low birthweight infants every year.

LONG-TERM OUTCOMES *Incidence of "definite neurologic sequalae"* *(includes CP, mental retardation or both)*	
Grade 1	15%
Grade 2	25%
Grade 3	50%
Grade 4	75%

References:

1. Ment LR. Bada HS. Barnes P. et al. Practice parameter: Neuroimaging of the neonate. Report of the quality standards subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology. June 2002; 58:1726-38.
2. Volpe's neurology of the newborn. Editors, Joseph J. Volpe, et al. Philadelphia, Pennsylvania : Elsevier, 2018. Sixth edition. Available online at HSL.

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