Kangaroo Care NICU Head Ultrasound Scans Guidelines

(Detection of Germinal Matrix-Intraventricular Haemorrhage and Periventricular Leukomalacia)

Intracranial haemorrhage (ICH) can affect newborns of all gestational ages and often is clinically 'silent'. Germinal matrix haemorrhage and intraventricular haemorrhage (GM-IVH) is most common in the premature population.

Estimates of frequency have changed over the last 20 years. Currently, large series report a 15-25 % prevalence in infants <32 weeks or < 1500 gms.

Australia National women's data for the period 2001-2003 indicates an incidence of 10.0% for GM-

IVH in infants<32 weeks. Those most at risk were infants <28 weeks gestation. Grade 3 and 4 GM-IVH was seen in 2.9% of infants<32 weeks, with a higher incidence (15.5%) in infants <26 weeks gestation.

The incidence of periventricular leukomalacia (PVLM) in infants <32 weeks is 1%.

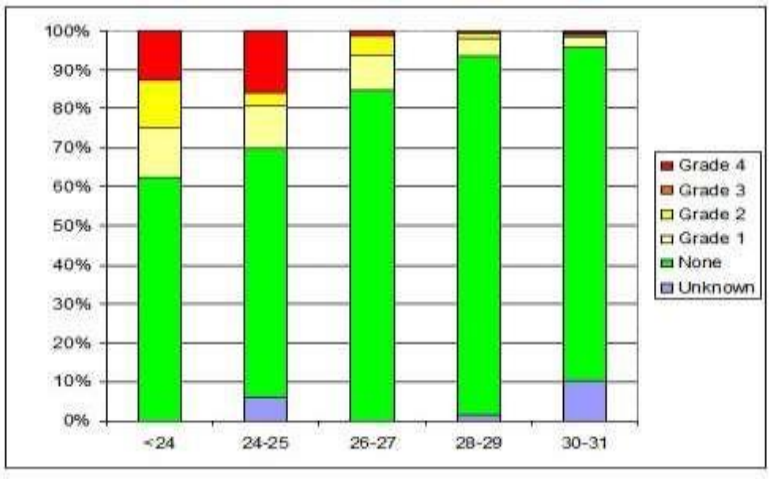
Associated Risk Factors

1.SGA status of newborn

2.Maternal pre-eclampsia

3.Asphyxia

4.Male gender



Timing of IVH

1. Most haemorrhage occurs within the first three days of life.

2."Late" haemorrhage (i.e., after three days of age) may be associated with pneumothorax and its restriction of venous return to the heart.

Imaging protocol

1. Indications of CRUSS

a. Gestational age less than 32 weeks, or

b. Birth weight less than 1500 grams

2. Timing of CRUSS

a. Less than 28 weeks gestation:

   1. On D1 of life
   2. On D3 of life
   3. On D 7 of life
   4. On D28 of life or at corrected 36 weeks gestation/or discharge

b. From 28 to 32 weeks gestation:

   1. On D 3 of life
   2. On D7 of life
   3. On D 28 of life or at corrected 36 weeks gestation/or discharge

c. Above 32 weeks gestation

   Only if clinically indicated as below

   1. Neonatal encephalopathy/therapeutic hypothermia treatment
   2. Seizures

3. Neonatal meningitis

4. Necrotizing enterocolitis

Diagnosis

1. GM-IVH is reliably diagnosed with ultrasonography.
2. Parenchymal injury (ischemia, petechial haemorrhage, haemorrhagic infarct) can be diagnosed with ultrasonography, but with less sensitivity.
3. MRI is more sensitive but currently impractical as a routine investigation in preterm infants.
4. CT scanning is more sensitive than ultrasonography in cases where extra axial (subdural, subarachnoid) or posterior fossa haemorrhage is suspected.

Be aware that ultrasound is not a sensitive method of detecting cortical or brainstem injury as seen with neonatal encephalopathy, or for detecting evidence of cerebrovascular events or collections outside the brain.

In infants suspected of other pathologies, MRI or CT should be considered.

Grading Systems of GMH-IVH

I	Germinal layer (subependymal haemorrhage)
II	Intraventricular haemorrhage - no dilatation (<97th percentile)
III	Intraventricular haemorrhage with dilatation
IV	Intraparenchymal haemorrhage

Periventricular Leukomalacia

without cysts	echogenic periventricular margins (flare)
cystic	multiple small periventricular cysts
porencephaly	large intraparenchymal cysts

References:

1. Routine screening cranial ultrasound examinations for the prediction of long term neurodevelopmental outcomes in preterm infants Paediatric Child Health. 2001 Jan; 6(1):39–43.

2. http://www.clinicalguidelines.scot.nhs.uk/ggc-paediatricguidelines/ggcguidelines/neonatology/cranial-ultrasound-a-guideline-for-the-performanceof-routinecranial-uss-for-preterm-infants/

3. https://www.brighamandwomens.org/assets/BWH/pediatric-newborn-medicine/pdfs/huscpg-09.08.16-final.pdf

4. https://www.networks.nhs.uk/nhs-networks/staffordshire-shropshire-and-blackcountrynewborn/documents/Cranial%20Ultrasound%202009-11.pdf

5. http://www.adhb.govt.nz/newborn/Guidelines/Neurology/CranialUSS.html

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