

Title of Abstract:

Direct Comparison of Head Ultrasound With MRI In Premature Infants: A Prospective Study

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Abstract Description:

INTRODUCTION: Brain MRI (BMRI) is the ideal imaging modality for the evaluation of premature brain development. Cranial ultrasound (HUS), although is less sensitive for identifying white matter injury, provides good quality imaging. HUS, in contrast to MRI, can be done at bedside with low cost.

OBJECTIVE: To compare the non-volumetric measurements from HUS and BMRI performed within 24 hours prior to discharge in preterm infants.

METHODS: Preterm infants born at ≤ 30 weeks gestation between 2011 and 2016 who received HUS and MRI within a 24 hour window, prior to NICU discharge, were included in this study. Discharge HUS using 10 vector, 15 linear transducers and Doppler technique, evaluating both superficial and deep structures with high resolution; and BMRI using 3T magnet were performed.

BMRI measurements: the corpus callosum was measured in two locations on sagittal views; the right and left atria of the lateral ventricles were measured at the level of the thalami; BPD was measured at the same level of the atria measurements; extra axial space was determined by measuring the interhemispheric distance and anterior extra axial space at four locations in two separate MRI slices; and transcerebellar diameter was measured at the widest point in the axial plane. The corresponding HUS measurements using the high frequency probe: the corpus callosum was measured in the sagittal plane in two locations; the right and left lateral ventricles were measured in the coronal plane; BPD was measured in the same coronal image as the ventricular measurement; extra axial space was determined by measuring the interhemispheric

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distance and cortex to inner calvarium at two locations; transcerebellar diameter was measured in the plane which best showed the entire cerebellar extent.

RESULTS: A total of 136 patients were included in the study. There was significant correlation of BMRI measurements with comparative HUS measurements. BPD measurement had the strongest correlation co-efficient. BMRI showed that 9 (7%) babies had white matter lesions, 38 babies had (28%) hemorrhage and 6 (3%) babies had cerebellum hemorrhage.

Conclusions: HUS and MRI BPD measurement has a very strong correlation. The BMRI BPD has been shown a good predictive value for long term neurodevelopmental outcome. The ability of HUS BPD measurement to predict long term neurodevelopmental outcome needs to be evaluated.

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