

Title of Abstract:

Occipital Frontal Circumference and Brain Circumference in Premature Infants

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Abstract Description:

PURPOSE: Preterm infants often have impaired brain growth and injury during the neonatal period which are associated with poor long term neurodevelopment outcome. Poor brain growth can be identified by a small head or small brain. Small head can easily be measured by occipital frontal circumference (OFC). However, small brain can only be reliably detected by MRI when accompanied by normal OFC.

OBJECTIVE: To develop a non-volumetric quantitative clinical tool to evaluate circumferential brain growth in preterm infants.

METHODS: A total of 97 preterm infants (gestational age < 31 weeks) born between 2011 and 2016 who had a brain MRI (BMRI) at discharge were included in the study. Thirty two term infants who had BMRI for clinical indications were used as a term control group. Head circumferences for infants in both groups were obtained within a week of BMRI. Brain circumferences (BC) were analyzed using image J® software. BC to OFC ratio (BC: OFC) were calculated for each individual infant. Student t-test was used to calculate differences between groups.

RESULTS: The mean values of BC and OFC in preterm and term infants are presented below along with the BC:OFC ratio. The mean BC:OFC ratio of preterm infants was significantly smaller than that of term infants (p=0.0001).

Preterm Term

BC, cm (mean +/- SD) 27.7 +/- 0.2 31.2 +/- 0.3

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OFC, cm (mean +/- SD) 32.4 +/- 0.2 35.5 +/- 0.3

BC:OFC Ratio 0.85 0.88

CONCLUSIONS: Compared to term infants preterm infants showed a smaller ratio of BC:OFC, indicating more extra-axial CSF fluid space potentially associated with poor brain growth at discharge. Circumferential brain growth might provide additional quantitative non-volumetric MRI measurement to evaluate brain growth at discharge. Its predictive value for long term neurodevelopment outcomes remain to be studied.

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