

Beaumont Health

## Beaumont Health Scholarly Works and Archives

---

Conference Presentation Abstracts

Pediatric Services

---

4-2021

### Cerebral perfusion using the Resistive Index on Doppler Ultrasound In Extremely Premature Newborns with Ventriculomegaly

Rawad Obeid

Marni Jacobs

Taeun Chang

An N. Massaro

Dorothy Bulas

*See next page for additional authors*

Follow this and additional works at: [https://scholarlyworks.beaumont.org/pediatric\\_confabstract](https://scholarlyworks.beaumont.org/pediatric_confabstract)



Part of the Pediatrics Commons

---

---

**Authors**

Rawad Obeid, Marni Jacobs, Taeun Chang, An N. Massaro, Dorothy Bulas, and Anna Penn

---

## 1961 - Cerebral perfusion using the Resistive Index on Doppler Ultrasound In Extremely Premature Newborns with Ventriculomegaly



**Poster Board #:** 1961

**Publication #:** EP-213.1961

### Presenter(s)



**Rawad Obeid, MD**

Assistant Professor  
Beaumont Children's Hospital  
Beaumont Children's Hospital  
Royal Oak, Michigan, United States

**Background:** In extremely premature newborns, the effect of ventriculomegaly, as seen on cranial ultrasound (CUS), on cerebral perfusion is not well studied. The resistive index (RI) (Figure-1) is a marker of change of the flow velocity on Doppler ultrasound that could be used to understand this effect.

**Objective:** To identify the following: 1- The normal RI values in premature infants without intraventricular hemorrhage (IVH), 2- The relation between the RI in the major intracerebral arteries and the ventricular size on CUS using the fronto-temporal horn ratio (FTHR) in newborns with and without IVH, and 3-The association with white matter injury on brain magnetic resonance imaging (MRI).

**Design/Methods:** A retrospective study at a tertiary care neonatal ICU. Inclusion criteria: 1) < 29 weeks gestational age (GA), 2) < 1500 grams birth weight (BW), 3) admitted in the first week of life with at least two cranial ultrasounds (CUS) performed, 4) brain MRI at term age equivalent. CUS images were reviewed to identify the IVH grade, FTHR, and RI values in the major intracerebral arteries [anterior cerebral (ACA), right and left middle cerebral (RMCA/LMCA)]. White matter injury on brain MRI was estimated using the Kidokoro score (2013).

**Results:** 100 newborns met the inclusion criteria between 2011- 2014: 37 had no IVH, 36 had grade 1-2 IVH, and 27 had grade 3-4 IVH. Median gestational age was 26 wks (range 23-28) and birth weight was 811g (range 410-1280). In newborns with no IVH, the RI values in the first week after birth were: ACA=0.75±0.1, RMCA=0.74±0.1, LMCA=0.74±0.1 and remained relatively stable throughout post

menstrual age (PMA). FTHR for the whole sample positively correlated with RI ACA ( $p = 0.001$ ), RI RMCA ( $p=0.08$ ), RI LMCA ( $p=0.01$ ) even after controlling for PMA and IVH group. Both FTHR and RI were significantly associated with moderate to severe cerebral injury (Kidokoro $>8$ ) on brain MRI. FTHR was a better predictor (AUROC: FTHR: 0.91, RI ACA: 0.64, RI RMCA: 0.63, RI LMCA: 0.61).

**Conclusion(s):** There are signs of change in cerebral blood flow velocity on Doppler ultrasound in the extremely premature newborns with ventriculomegaly. This will require further investigation to find the contribution to cerebral injury.

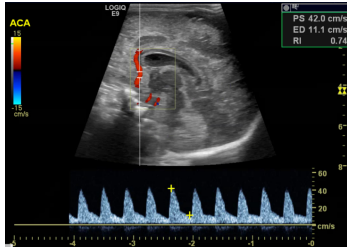


Figure 1: The calculation of the resistive index on Doppler ultrasound in the anterior cerebral artery= Peak systolic-End diastolic velocity/ Peak systolic velocity

---

**Authors/Institutions:** Rawad Obeid, Beaumont Children Hospital, Royal Oak, Michigan, United States; Marni Jacobs, Children's National Hospital, Washington, District of Columbia, United States; Taeun Chang, Children's National Medical Center, Washington, District of Columbia, United States; An N. Massaro, Children's National Health Systems, Washington, DC, District of Columbia, United States; Dorothy Bulas, Children's National Medical Center, Washington, District of Columbia, United States; Anna Penn, Columbia University, New York, New York, United States