Intracranial Volumes of Healthy Children in the First 3 Years of Life: An Analysis of 270 MRIs

Michael G. Brandel BA, William Y. Zhu BA, Asra Hashmi MD, Chris M. Reid MD, Samuel Lance MD, Amanda A. Gosman MD
Background
Methods

- Structural MRIs
- NIH Pediatric MRI Data Repository
- Automated segmentation in FreeSurfer (version 6.0.0)
  - Best fit logarithmic curves
  - Patient age ~ ICV
ICV (cm$^3$) vs Age (days) for different stages:
- 3 months
- 6 months
- 9 months
- 1 year
- 2 years
- 3 years
5.9-Month-Old Girl with Bicoronal Craniosynostosis

Posterior cranial vault remodeling with distraction osteogenesis

Actual ICV change:
- 1276 cc (10.5 mo.) – 757 cc (2.4 mo.) = 519 cc (ICV change)

Predicted ICV change for 5.9-month-old female:
- 949 cc (10.5 mo.) – 836 cc (2.4 mo.) = 113 cc (predicted ICV change)

ICV change due to distraction:
- 519 cc – 113 cc = 406 cc

% ICV change due to distraction:
- 406 cc / 519 cc = 78%