

Association between size at birth and brain volumes at nine years in children born late-preterm and at term

Samson Nivins¹, Eleanor Kennedy¹, Christopher McKinlay^{1,2}, Benjamin Thompson^{1,3}, Jane Harding¹ for the CHYLD Study Team

¹Liggins Institute, University of Auckland

²Kidz First Neonatal Care, Counties Manukau Health

³School of Optometry and Vision Science, University of Waterloo, Ontario, Canada



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Background

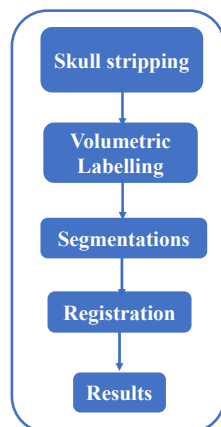
- ❖ Brain growth is altered after preterm birth
- ❖ There are few data on the relationships between birth size and gestational age at birth and brain volumes in mid-childhood

Objective

- ❖ To examine the association between size at birth, gestation length and brain volumes at nine years of age

Methods

- ❖ 101 children born ≥ 36 weeks from the CHYLD (Children with Hypoglycaemia and their Later Development) cohort
- ❖ MRI scan (Siemens 3T Skyra) at nine years of age
- ❖ Brain volumes: total brain, total cortical grey matter and cerebral white matter, total deep grey matter, cerebellum, combined parietal and occipital lobes, cerebellum, occipital lobe, and cerebrospinal fluid were computed using FreeSurfer (Fig 1)
- ❖ Linear regression was used to calculate the association between gestation, birth weight, head circumference and brain volumes



Processing time: 24 to 48 hrs



Fig 1. Workflow of FreeSurfer program for the brain volumetric analysis

Results

- ❖ Shorter gestation at birth, lower birth weight, and smaller head circumference at birth were associated with smaller total brain volumes at nine years of age (Fig 2)
- ❖ This positive association between gestation, birth weight, and head circumference and later brain volumes were seen for total cortical grey matter and cerebral white matter, total deep grey matter and combined parietal and occipital lobes
- ❖ The associations with birth weight and head circumference remained significant after accounting for gestation at birth by using z-scores

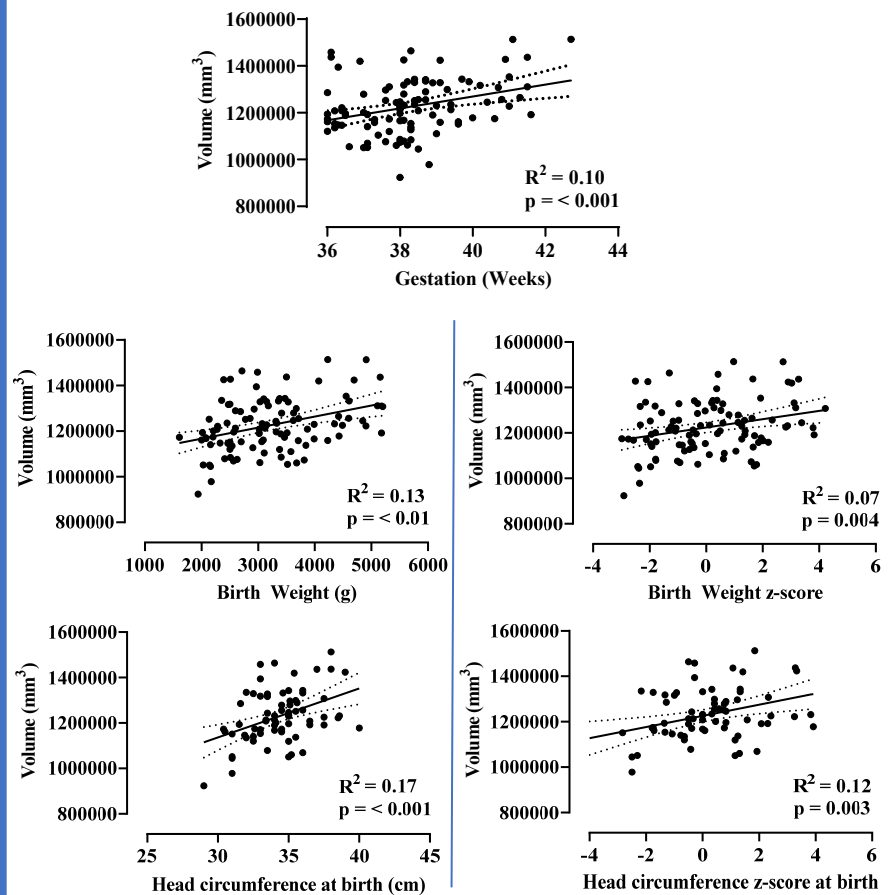


Fig 2. Relationship between perinatal factors and total brain volumes at nine years of age

Conclusion

Size at birth is associated with brain volumes at nine years of age.

