

[EP06.63] Quantitative fetal brain perfusion in normal pregnancies: normative FAIR-Arterial Spin Labeling values



R Corroenne¹, M Midavaine², D Grevent³, L Bussieres¹, LJ Salomon¹

1. EA fetus 7328 and LUMIERE Platform, University of Paris, Paris, France; 2. Department of Pediatric, Necker-Enfants Malades Hospital, APHP, Paris, France

3. Department of Radiology, Necker-Enfants Malades Hospital, APHP, Paris, France

Background

Previous studies have demonstrated the feasibility of measuring fetal cerebral blood flow using FAIR arterial spin labeling (ASL) MRI. However, normative perfusion values in the fetal brain remain unknown.

Objective

The objective of this study was to describe normal fetal cerebral blood flow (CBF) values using an optimized FAIR-ASL protocol.

Methods

Prospective study

Inclusion: singleton pregnancies between 28 and 36 weeks with normal US

Fetal MRI on a 1.5-T scanner

FAIR-ASL sequence

- TR/TE 7000/27.2ms
- FOV 24×24 cm²
- matrix 128×128
- in-plane resolution 2.8×2.8 mm²

- slice thickness 10 mm
- selective inversion thickness 40 mm,
- QUIPSS II thickness 70 mm
- post-labeling delay 1500 ms
- acquisition time 3 min 37 s).

Regions of interest were manually placed in the supratentorial brain. Associations between CBF and GA were evaluated using correlation analysis.

Results

Thirty participants were included at 33.3 weeks [31.6–34.7]. Interpretable FAIR-ASL perfusion maps were obtained in all cases.

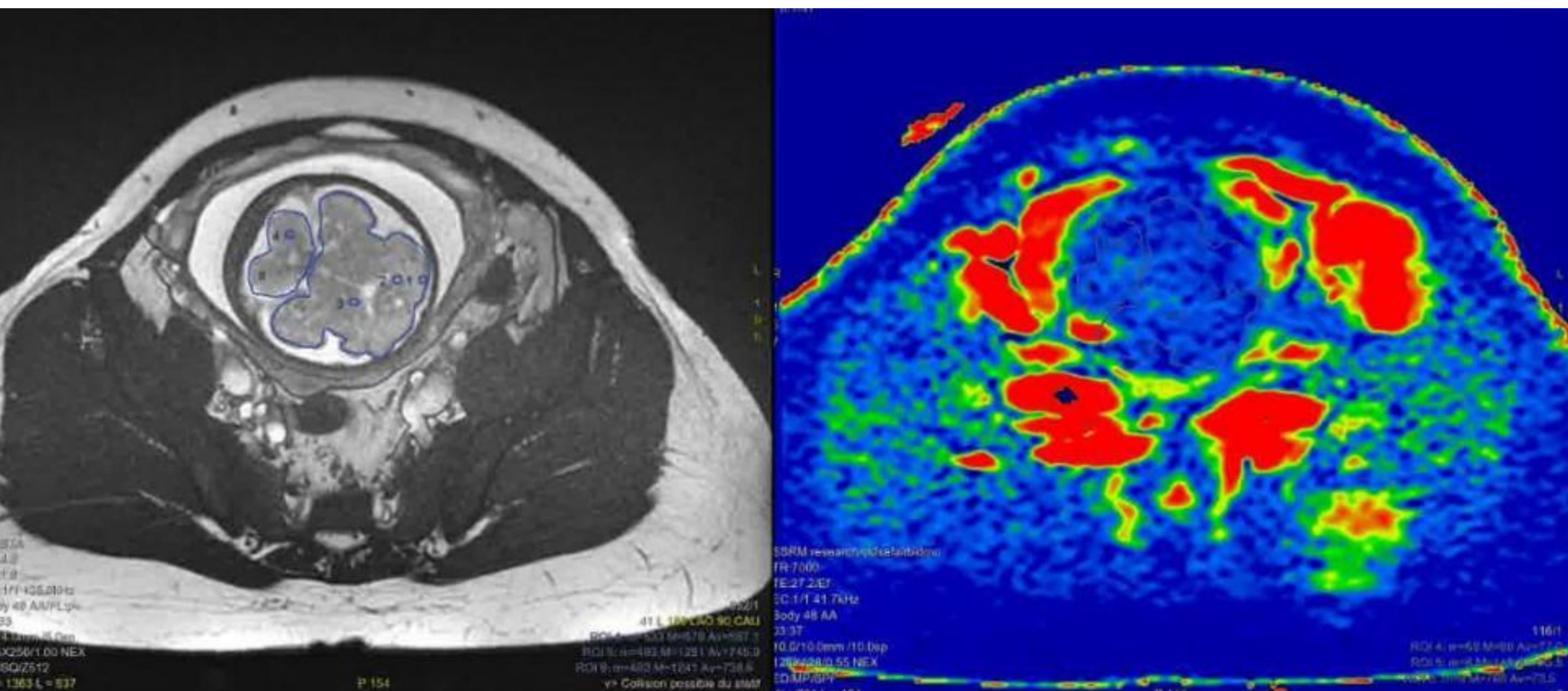
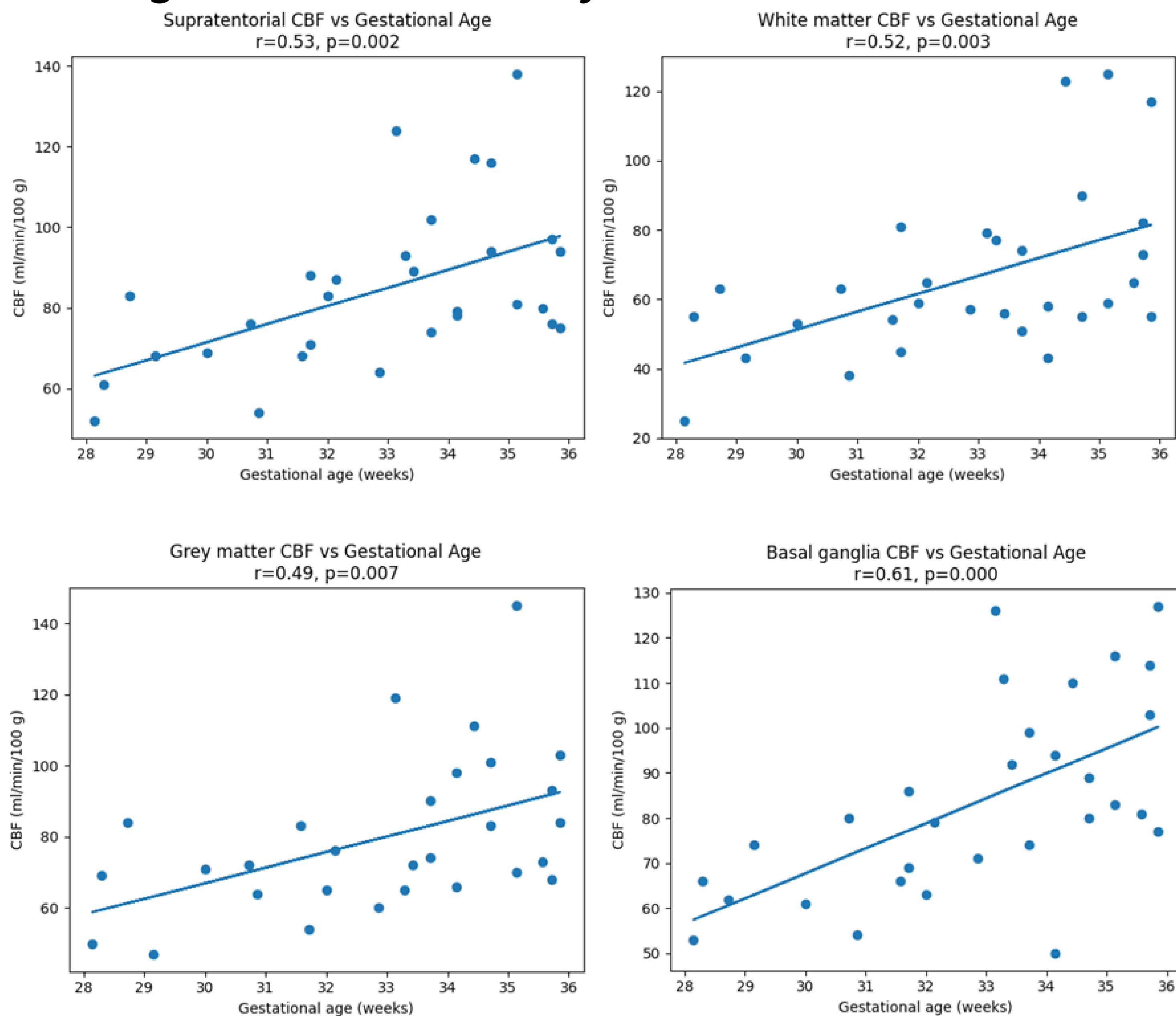


Figure 1 : ROI delimitation in FAIR ASL on the fetal brain

Supratentorial cerebral blood flow increased significantly with gestational age. Similar positive correlations were observed in grey matter, white matter and basal ganglia.

Figure 2. Evolution of CBF values with GA



Conclusion

These results provide normative reference values and demonstrate an increase in cerebral perfusion with advancing gestation.