# **ON-LINE APPENDIX**

#### Fetal MR Imaging Acquisition

Fetal MR imaging was performed in the third trimester of gestation, around 33 weeks' PMA (range, 29–35 weeks). All fetuses were scanned on a 3T MR imaging system. Mothers were positioned comfortably in the MR imaging scanner in a left lateral tilt with no sedation given. The following sequences were used for this study: T2-weighted imaging in coronal, axial, and sagittal directions (TE/TR = 180/55,860 ms, FOV =  $360 \times 360$ , slice thickness = 2 mm), axial snap inversion recovery, and axial diffusion-weighted imaging.

## **Neonatal MR Imaging Acquisition**

The same neonatal MR imaging protocol was used for preoperative and postoperative neonatal MR imaging. All neonates were scanned on a 3T MR system. Neonates were fed, swaddled in a vacuum cushion, and, if necessary, sedated with oral chloral hydrate (50-60 mg/kg). Neonates who required mechanical ventilation at the time of MR imaging received continuous sedation. The following sequences were used for this study: coronal T2-weighted imaging (TE/TR = 150/4851 ms, FOV =  $180 \times 180 \times 132$  mm, slice thickness = 1.2 mm), volumetric 3D T1-weighted imaging, axial diffusion-weighted imaging, and axial susceptibility-weighted imaging.

### **Conventional MR Imaging Analysis**

Fetal and neonatal MR images were reviewed by 2 independent researchers for the presence of congenital anomalies, parenchymal hemorrhage, ischemic brain injury, and ventriculomegaly (atrial diameter, >10 mm). Parenchymal hemorrhage included cerebellar hemorrhage and grade 4 intraventricular hemorrhage. Ischemic brain injury included moderate-severe white matter injury (classified as  $\geq$ 4 lesions of  $\leq$ 2 mm or  $\geq$ 2 lesions of >2 mm), focal infarction (single white matter lesion of >2 mm or stroke involving cortical gray matter and/or basal ganglia-thalamus), and hypoxic-ischemic watershed injury.

#### On-line Table: Association between fetal and neonatal MRI<sup>a</sup>

|                       | Association Fetal and<br>Preoperative Neonatal<br>Brain Volumes | Association Fetal and<br>Postoperative Neonatal<br>Brain Volumes | Association Fetal Brain Volumes<br>and Neonatal Ischemic<br>Brain Injury |
|-----------------------|---|--|--|
| TBV <sup>b</sup>      | 0.58 (0.25–0.79)  | 0.50 (0.14–0.74)   | −0.52 (−0.75 to −0.16)   |
| UWM <sup>b</sup>      | 0.57 (0.23–0.78)  | 0.06 (-0.34-0.44)  | −0.46 (−0.72 to −0.09)   |
| CGM <sup>b</sup>      | 0.58 (0.25–0.79)  | 0.42 (0.04–0.70)   | −0.45 (−0.71 to −0.08)   |
| CB <sup>b</sup>       | 0.40 (0.02–0.68)  | 0.29 (-0.12-0.61)  | -0.41 (-0.68 to -0.02)   |
| UWM:TBV <sup>c</sup>  | 0.28 (-0.12-0.60)   | 0.78 (0.56–0.90)   | 0.34 (-0.05-0.64)  |
| CGM:TBV <sup>c</sup>  | 0.31 (-0.09-0.62)   | 0.26 (-0.14-0.59)  | 0.20 (-0.21-0.54)  |
| CB:TBV <sup>c</sup>   | 0.67 (0.39–0.84)  | 0.50 (0.14–0.74)   | 0.40 (0.01–0.68)   |
| TBV:ICV <sup>c</sup>  | 0.68 (0.40–0.84)  | 0.39 (0.01–0.68)   | 0.26 (-0.14-0.59)  |
| VCSF <sup>c</sup>     | 0.64 (0.34–0.82)  | 0.29 (-0.11-0.61)  | 0.23 (-0.17-0.57)  |
| ECSF <sup>c</sup>     | 0.82 (0.64–0.92)  | 0.51 (0.15–0.75)   | 0.40 (0.01–0.68)   |
| VCSF:ICV <sup>c</sup> | 0.40 (0.02–0.68)  | 0.60 (0.28–0.80)   | 0.25 (-0.15-0.58)  |
| ECSF:ICV <sup>c</sup> | 0.71 (0.44–0.86)  | 0.42 (0.04–0.69)   | 0.28 (-0.12-0.60)  |

Note:-CB indicates cerebellum.

<sup>a</sup> Strength of correlation of fetal and neonatal preoperative volumes (first column); fetal and postoperative neonatal volumes (second column); fetal volumes and neonatal ischemic brain injury (third column). Volume is in cubic centimeters.

<sup>b</sup> Result of linear regression analysis with correction for postmenstrual age at scanning.

<sup>c</sup> Result of quadratic regression analysis. Correlation coefficient with 95% confidence interval is presented.



**ON-LINE FIGURE:** Inclusions in the longitudinal brain imaging program.