How small can a normal corpus callosum be? Reporting confirmed hypoplastic corpus callosum measures to normal reference ranges

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Objective
Report measurements of confirmed hypoplastic corpus callosum (CC) to our established biometric reference range for normal fetal CC.

Methods
In a retrospective cross sectional study, we reviewed all exams with CC measurement performed by a single experimented operator in one single centre. We included exams performed between 20 and 34 weeks for pregnancies with a gestational age (GA) determined by CRL on first trimester ultrasound (US). Multiple pregnancies, IUGR, abnormal karyotype and fetal malformations were excluded. Measurements were performed using high-resolution transabdominal or transvaginal transducers in a mid-sagittal plane defined by a sagittal section passing through the CC, the 3rd and the 4th ventricles. The length of the CC was measured from the most anterior aspect of the genu to the most posterior aspect of the splenium by using a straight rostrocaudal line. Correlations between CC length, GA, biparietal diameter (BPD), fronto-occipital diameter (FOD) and head circumference (HC) were investigated and a curve determining centiles is established. We furthermore identified all the cases of CC hypoplasia diagnosed in routine 2nd and 3rd trimester US and confirmed by both fetal MRI and pathology.

Results
We reviewed 5635 ultrasound exams, of which 3038 and 2367 were 2nd and 3rd trimester US with a mean gestational age of 22. 43 and 32. 43 weeks respectively. The length of the CC was best described by a third degree polynomial equation: -92, 91+8, 68*GA -0, 18*GA2 +0, 00123*GA3 (p<0. 01). Based on this approach, the mean and 1st centile were 23. 8 and 20, 40. 3 and 34. 5 mm at 22 and 32 weeks respectively. We identified 17 cases of CC hypoplasia. 8 cases were discovered on routine 2nd trimester US with a mean GA of 23. 3 weeks (+/-2. 9) (with a 17. 0mm mean length of the CC) and 9 cases on routine 3d Trimester US with a mean GA of 31. 8 weeks (+/-2. 9)(with a 24. 6mm mean length of the CC) and. They were all below the 1st centile of the reference range.

Conclusion
The present study confirms the utility of our established reference range for CC measurements. The lowest centiles (~20 and ~34mm for CC in 2nd and 3rd trimester) are the most relevant for prenatal management and counselling concerning CC development abnormalities. A fetal MRI is recommended once those cut off values are reached.