Objective
The corpus callosum (CC) is the largest white matter tract serving to integrate activities of the two hemispheres. Both agenesis and dysgenesis/hypoplasia of the CC are risk factors for developmental delays and are further more associated with additional malformations mainly of the central nervous system (CNS). While the diagnosis of agenesis is straightforward, the diagnosis of dysgenesis is based on reference charts defining the range of normal sizes for CC: length, width and thickness bases on gestational age and gender. The aim of our study was to investigate the hypothesis that the size of the normal CC is not only a function of the gestational age but also of other fetal biometric parameters.

Methods
A retrospective study of 554 fetal sonographic examinations at 20 to 40 gestational weeks performed in our tertiary academic center between the years 2012 and 2014. Enrollment criteria included a singleton pregnancy, precise dating of gestational age and the existence of a measurable fetal corpus callosum. The cohort included 328 routine fetal anatomical scans and 226 targeted neurosonogram scans due to suspected fetal CNS abnormalities. Fetal gender and presentation, sonographic approach, indication for scan and vast biometrical parameters were recorded. The study was approved by the institutional ethics committee.

Results
The routine scans group included 58.5% male fetuses, 37.8% female fetuses, and 3% of unknown gender. Univariate analysis of CC length was significantly correlated to biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), femur length (FL), occipitofrontal diameter (OFD), trancerebellar diameter (TCD), estimated fetal weight (EFW) and Gestational age (all p<0.01). However, on a multivariate analysis including fetal biometry, gestational age and fetal gender, only HC was significantly correlated to CC length (R²=0.887, p<0.01). The ratio of CC length to OFD was constant throughout all gestational ages and 95% of cases had a ratio between 0.31 to 0.41. CC thickness was significantly correlated to CC length, BPD, HC, AC, OFD, TCD and gestational age (all p<0.01) but on a multivariate analysis none of these factors (including fetal gender) were not significantly correlated to CC width. Of the 228 targeted scans 71 fetuses were diagnosed with ventriculomegaly (ventricle diameter >10 mm). While mean CC length was larger in cases with ventriculomegaly, the rate of CC/OFD was similar to cases with normal ventricles. 29 fetuses had CC abnormality. CC length was significantly shorter than controls. Abnormal CC length was associated with abnormal CC/OFD ratio (0.36±0.026 vs. 0.32±0.042, p<0.01).

Conclusion
The ratio of corpus callosum length to occipitofrontal diameter is constant throughout pregnancy and is consistent even in cases of fetal ventriculomegaly. This ratio may serve as an additional indicator for CC structural normality.