# A SONOGRAPHIC EVALUATION ON AGREEMENT AND TIME EFFICIENCY OF FETAL CENTRAL NERVOUS SYSTEM BIOMETRY WITH SEMI-AUTOMATED 5D ULTRASOUND VS. STANDARD 2D ULTRASOUND IN A CLINICAL SETTING – PRELIMINARY REPORT FROM A PHILIPPINE TERTIARY HOSPITAL

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## Objectives:

This research aims to evaluate the agreement of cranial biometric measurements using standard 2D and semi-automated 5D ultrasound, and to determine if there is a significant difference in the time needed to complete the evaluation using the two methods.

## Method:

An analytical cross-sectional study was employed on 93 women who underwent pelvic ultrasound scans from August 2022 to October 2022 in a specialty OB-GYN ultrasound referral center of a private tertiary hospital. The study population was stratified into second and third-trimester fetuses. Basic biometric fetal central nervous system (CNS) axial planes and measurements were acquired using 2D ultrasound followed by 3D sonography with the application of 5D CNS ultrasound. The agreement of the fetal CNS measurements was evaluated using Bland-Altman plots. An independent t-test was used to determine the differences in time required to completion of each scanning method.

## Results:

The semi-automated 5D CNS ultrasound successfully measured the basic fetal CNS biometry in 90 out of 93 (96.8%) fetuses. It showed an average of 94.4 percent agreement on all measurements *(refer to Figure 1).* The 5D CNS ultrasound takes a shorter time of 90 seconds (s) to complete a fetal CNS ultrasound evaluation in comparison to an average time of 99 s using the 2D method. However, this 9-second difference was not found to be statistically significant ($p$=0.076). Upon stratification of the study population per trimester, in the second trimester, the cranial biometric measurement took 76 s with 5D CNS vs 89 s when 2D was used. This 13-second difference was found to be statistically significant ($p$=0.044). In the third trimester, completion of the 5D CNS ultrasound took 105 s vs 108 s when 2D was used. The 3-second difference was not statistically significant ($p$=0.614).

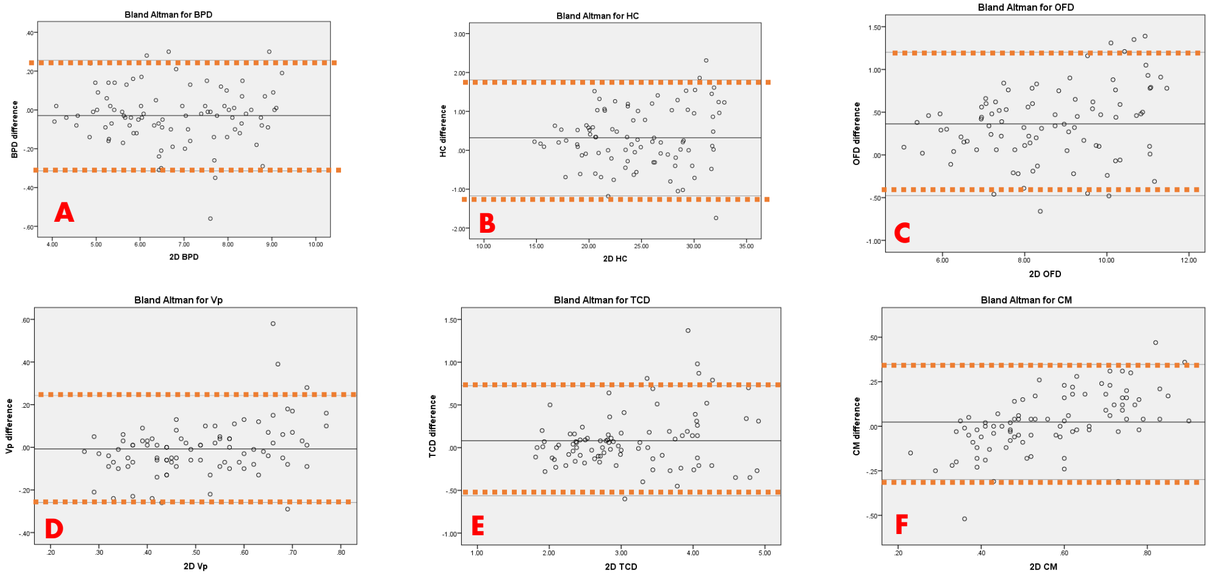


**Figure 1. Bland-Altman plots for the mean difference and the 95% limits of agreement** *(indicated as red dashed lines)* **between 2D and 5D CNS measurements for both second and third-trimester fetuses**. The percentage of the study population that was able to show agreement per cranial measurement are as follows: **A.** 86 out of 90 (95.5%) for BPD, **B.** 86 out of 90 (95.5%) HC, **C.** 84 out of 90 (93.3%) for OFD, **D.** 85 out of 90 (94.4%) for Vp, **E.** 84 out of 90 (93.3%) for TCD, **F.** 85 out of 90 (94.4%) for CM, an average of **94.4 percent** agreement on all measurements.

## Conclusion:

Our study found the clinical utility of 5D CNS ultrasound in fetal cranial biometry in a specialty OBGYN ultrasound referral center in terms of the agreement in the biometric measurements compared to 2D ultrasound. In terms of time for completion of the 5D CNS sonographic evaluation, there are fetal-dependent factors and operator-dependent factors affecting the duration of the ultrasound study. The application of this new technology in the local clinical setting has the potential to improve workflow efficiency after the necessary training on 3D sonography and the use of the 5D CNS ultrasound software.