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Local and personalized operator-tailored fetal weight estimation formulas are better than standard formulas

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Objective

To assess whether using local (LF) and personalized formulas (PF) result in improvement of estimated fetal weight (EFW) accuracy.

Methods

The ultrasound database of both Hadassah hospital campuses (Mount Scopus and Ein-Kerem) was cross referenced with the birth database for all patients who gave birth within 2 days of the ultrasound examination. Duplicate, incomplete and discordant records were excluded from analysis. The records of each operator were divided to two datasets of similar size–a training set and a test set. Operator-specific personalized EFW formulas (PF) as well as local formulas (LF) for each of the two Hadassah centers, were developed using SPSS linear regression, based on the training set. The predicted birthweight (BW) was calculated for the test set based on the results of the linear regressions for the records in the training set. Systematic and random error measures were used to assess the accuracy of the different formulas. The PF and LF were compared to two of the commonly used Hadlock formulas, one utilizing AC and FL (Hadlock AC-FL) and the other using AC and BPD (Hadlock AC-BPD).

Results

The final dataset included 9, 786 complete examinations performed by 9 different examiners between 2013-2017. Systematic error±standard deviation of Hadlock AC-FL, Hadlock AC-BPD, PF and LF were 3. 1±8. 0%, 1. 8±8. 1%, 0. 2±7. 3% and 0. 1±7. 4% respectively. The accuracy of BW prediction as depicted by the percentage of prediction within 5%, 10%, 15% and 20% of actual BW showed statistically significant ($p<0.001$) improvement for both LF and PF in comparison with the Hadlock formulas.

Conclusion

This study showed the utility and advantage of LF and PF for EFW. Adoption of this methodology would result in better accuracy in fetal weight estimation, and hence less erroneous decisions based on inaccurate data.