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TITLE: Discordance in fetal and neonatal spectral tissue Doppler and speckle tracking imaging measurements on different ultrasound platforms

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ABSTRACT BODY:

Objectives: To evaluate reliability and agreement of fetal and neonatal spectral tissue Doppler (TDI) and 2D speckle tracking imaging (STI) measurements on three different ultrasound platforms.

Methods: Prospective study of uncomplicated pregnancies (n=142) delivering at term. Three ultrasound systems - Toshiba AplioMX (n=108), GE Vivid E9 (n=59) and Philips EPIQ (n=34) - with their vendor-specific software were used to obtain spectral TDI and 2D STI echoes days before the onset of labor and within hours of birth. Intra- and inter-observer repeatability of all indices in randomly selected echoes was performed within all ultrasound platforms. In 59 patients, reproducibility study on different ultrasound platforms - Toshiba vs. GE (n=25) and GE vs. Philips (n=34) - was conducted by systematic scanning with head to head acquisition. Intra-class correlation coefficient and limits of agreement by Bland-Altman plots were evaluated.

Results: Intra- and inter-observer repeatability findings demonstrated a good to excellent correlation of all fetal and neonatal TDI and STI measurements (ICC=0.6-0.9) with good agreement within all ultrasound platforms. Inter-vendor reproducibility study of TDI indices on Toshiba vs. GE showed a moderate to good correlation (ICC = 0.4-0.8) with good agreement in both fetus and neonate, whereas correlation of TDI measurements on GE vs. Philips was poor to moderate for fetuses (ICC=0.1-0.6) and moderate to good for neonates (ICC=0.5-0.7). Comparison of fetal and neonatal STI parameters between the different ultrasound vendors revealed uniformly very poor correlation (ICC =0.1-0.3).

Conclusions: Fetal and neonatal spectral TDI and STI measurements are reliable and repeatable on the same ultrasound platform. In contrast, different ultrasound machines with vendor-specific software give significantly divergent estimates of fetal TDI indices and both fetal and neonatal STI parameters. This platform-dependent discordance should be considered when performing and interpreting fetal and neonatal echo assessments.

Additional details

KEYWORDS: Fetal cardiac function, Echocardiography, Reproducibility, Fetal heart.

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