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

AUTHORS (FIRST NAME, LAST NAME): Olga Patey^{1, 2}, Julene S. Carvalho^{2, 3}, Basky Thilaganathan^{1, 3}

INSTITUTIONS (ALL):

1. St George's Hospital Medical School, University of London, London, United Kingdom.
2. Brompton Centre for Fetal Cardiology, Royal Brompton Hospital, London, United Kingdom.
3. Fetal Medicine Unit, St George's Hospital, London, United Kingdom.

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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