Introduction: Fetal tricuspid annular plane systolic excursion (f-TAPSE) is a modified method to measure the vertical movement of the tricuspid valve annulus by M-mode ultrasound, to assess the fetal right heart. We established reference ranges for this measure in the second half of pregnancy. We now applied this measure to early second trimester fetuses.

Methods: Gravidae presenting from 12-18 weeks for targeted organ scans, fetal echocardiography or other evaluation, with structurally normal singleton fetuses and verified gestational age (GA) were enrolled. M-mode was applied to the tricuspid annulus, and the amplitude of the resulting wave was measured. Women with fetuses with anatomical or functional pathologies that presented during the study period were also evaluated with f-TAPSE as part of fetal echocardiography.

Results: We examined 320 fetuses at GA 12-18 weeks. Conventional M-mode f-TAPSE values ranged from a mean of 1.2 (±0.22) mm at 12 weeks to a mean of 3.4 (±0.63) mm at 18 weeks. Scatterplots of f-TAPSE measures obtained with conventional M-mode were created vs GA and estimated fetal weight (EFW). f-TAPSE values in some pathological cases varied significantly from the mean for GA and EFW.

Conclusion: f-TAPSE is a feasible measure in the first half of gestation. f-TAPSE increases linearly ($R^2=0.86$) with gestational age; pathological cases demonstrate measurable variation from reference values. We suggest the addition of f-TAPSE measurement to fetal cardiac function evaluation in the first half of gestation.