

**4D Fetal Echocardiography: STIC vs eSTIC**

*Germanakis I. , Pepes S., Parthenakis F. , Makrigianakis A.  
Faculty of Medicine, University of Crete, Heraklion, Greece*

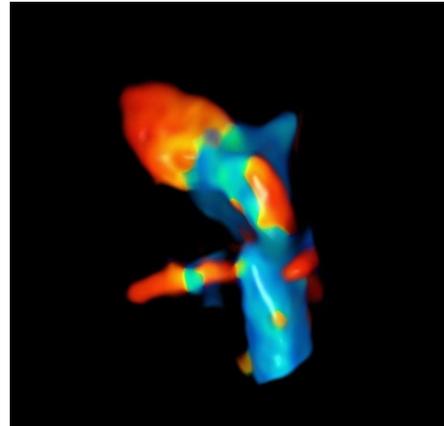
4D fetal echocardiography: STIC vs eSTIC

**Introduction:**

Spatial-Temporal-Image-Correlation (STIC) is a 4D Fetal Echocardiography (FE) technique, based on off-line 4D reconstruction of stored 2D images. As modern electronic probes (eSTIC) could improve 4D FE imaging, we aimed to compare STIC vs eSTIC performance.

**Methods:**

Prospective study, of 33 consecutive routine obstetric scans, median GA:23wk (13-31), (16 early, 40 mid-, 10 late-gestation), performed by an expert sonographer. One pair of each 2D and Color Doppler volumes were acquired, by both STIC and eSTIC, consecutively. Anonymized stored volumes were off-line reconstructed by an expert fetal cardiologist. The success in reconstructing recommended FE views, image quality and diagnostic conclusions by each acquisition were compared.



**Results:**

eSTIC files were larger (63 vs 37 MB) and of higher temporal resolution (37 vs 24 fps),  $p < 0.001$ . The original (A) plane heart axis angle (189 vs 190 degrees) and the mean reconstruction time (4,96 vs 4,94 min) didn't differ. Motion during acquisition was less in eSTIC vs STIC acquisition (12 vs 20 cases, O.R 7.0, 95% CI 1.7-27.2,  $p = 0.002$ ). eSTIC image quality (4 level scale: 1-best to 4-nondiagnostic) was significantly superior on acquisition plane A (1.45 vs 1.67,  $p = 0.022$ ), but also to reconstructed planes (plane B: 2.44 vs 2.79,  $p = 0.008$ , plane C: 3.56 vs 3.77,  $p = 0.015$ ). Similarly the average image quality (planes A,B,C) was significantly better for eSTIC (1.9 vs 2.2,  $p = 0.006$ ). Comparing efficiency to obtain all recommended FE views eSTIC was classified as superior in 22 (33%) / 39 (59%) / 21 (38%) cases regarding plane A / B / C, respectively, with the remaining cases being classified as of similar performance (out of < 10% in each plane in favour of STIC).

The diagnostic performance (Table) of the two approaches showed relative good agreement ( $\kappa = 0,657$ ,  $p < 0.001$ )

	eSTIC normal	abnormal
STIC normal	24	4
abnormal	4	16

**Conclusions:**

Although both STIC and eSTIC require similar off-line analysis time, eSTIC being associated with a higher temporal resolution, reduced motion artefacts and a resulting superior image quality in all planes, might offer diagnostic advantages for both off-line FE diagnostic purposes. Further study is needed to define potential eSTIC diagnostic advantages.