Objective
4D Spatial-temporal-image correlation (STIC) imaging allows for storing of fetal heart volumes, corresponding to a mechanical (STIC) or electronic (eSTIC) sweep of consecutive 2D cross-sectional planes along fetal heart. The aim was to compare 4D (STIC / eSTIC) with 2D fetal echocardiographic measurements.

Methods
A total of 10 fetal echocardiograms of normal mid-term singleton pregnancies (median gestational age 22.6 wks, range 21.9-23.9 wks) with stored 2D cine loops and STIC / eSTIC fetal heart 4D volumes (transverse acquisition plane) obtained by a single expert sonographer have been retrospectively reviewed by a single observer. Linear dimensions of mitral (MV), tricuspid (TV) in diastole, aortic (AoV) and pulmonary (PV) valve in systole were measured repeatedly (3 times) from a) 2D cine loops obtained by conventional fetal echocardiography (2D) and from 4D volumes obtained during b) STIC and c) eSTIC 4D fetal echocardiography. Intraobserver variability for each set of measurements and each mode has been assessed (ICC: intraclass correlation coefficient), average measurements have been compared for significant differences (related samples Friedman’s test) and the regression of STIC and eSTIC values against each other and 2D values has been assessed.

Results
Intraobserver variability was in ascending order average to good for 2D measurements (ICC 0.69-0.78), good for STIC (ICC: 0.77-0.84) and eSTIC (ICC: 0.86-0.89). There was not any significant difference between median measurements of MV (5.1/5.2/5.3mm), TV (5.6/5.7/5.8mm), AoV (4/3.9/4mm) and PV (4.3/4.3/4.5mm) obtained by STIC / eSTIC / 2D echocardiography, respectively. R square values of linear regression analysis comparing measurement methods ranged from 0.58-0.84.

Conclusion
Intraobserver variability was in ascending order average to good for 2D measurements (ICC 0.69-0.78), good for STIC (ICC: 0.77-0.84) and eSTIC (ICC: 0.86-0.89). There was not any significant difference between median measurements of MV (5.1/5.2/5.3mm), TV (5.6/5.7/5.8mm), AoV (4/3.9/4mm) and PV (4.3/4.3/4.5mm) obtained by STIC / eSTIC / 2D echocardiography, respectively. R square values of linear regression analysis comparing measurement methods ranged from 0.58-0.84.