

Cardiac axis measurement in the first-trimester screening ultrasound

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Objective

Cardiac axis (CAx) measurement at the end of the first trimester has been reported as feasible and could potentially screen for cardiac pathology. In this pilot study in a Lebanese population we aim to describe the distribution of CAx measurements as noted for the crown rump length measurement (CRL) in the first trimester scan.

Methods

The population studied consisted of 100 consecutive patients referred for the first trimester screening ultrasound. CRL and NT were routinely assessed as defined by the guidelines by a single operator. An abdominal or vaginal approach was used according to the presentation of the fetus. The images of the 4-chamber view were defined when a single full rib was visible on each side of the fetal lateral chest wall and clear visualization of the heart attaining one-third of the display screen. Color Doppler was eventually used to confirm the location of the septum and the fetal spine was situated at the 6 or 12 o'clock position. The angle between the line for the septum and the anteroposterior line was taken. Measurements were taken twice in case the operator felt it wasn't clear enough and the mean of the two measurements was recorded. We excluded patients with abnormal NT, cases with abnormalities found during ultrasound and cases suspected for cardiopathy in follow-up examinations. Statistical analysis was performed with medcalc software. This study was approved by our institution's ethics committee.

Results

Our series included 100 patients with a mean age of 31 years. NT was below the 95th percentile in all of these patients. In all cases the cardiac axis angle could be measured. Two cases were excluded from the study, one because of the diagnosis of trisomy 21 after NIPT screening and the other for a septal defect diagnosed at 21 weeks. Our series included then two additional patients to reach the 100 patients number. The mean for CAx is 48°, ranging from 39 to 60°, with a standard deviation of 5.2. The 2.5 percentile was defined at 40° and the 97.5 percentile at 59°. the distribution of the CAx according to the CRL is reported in Figure 1 along with the confidence interval for each CRL measurement. Figure 2 represents the CAx as a z-score. Higher CRL was associated with a trend of a decrease of the CAx.

Conclusion

Cardiac axis measurement is feasible and was performed in all the cases included in this pilot study. A mean of 48° +/- 5.2 is noted. Larger series including pathological and normal cases could help discriminate values that could lead to diagnosis of cardiopathy.