

Clinical Implementation of first trimester screening for congenital heart defects

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Objective

The aim of this study was to examine the feasibility and performance during the first year after implementing a standardized fetal cardiac scan at the time of the first trimester examination.

Methods

This was a retrospective study of prospectively collected data from a low-risk population in a single center between the 1st of March 2021 and the 1st of March 2022. Fetuses were included based on crown rump length (CRL) of ≥ 45 and ≤ 84 mm. A standardized cardiac scan protocol consisting of the four-chamber view (4CV) and 3-vessel and trachea view (3VTV) with color Doppler was implemented as part of the routine first-trimester screening scan performed by Fetal Medicine Foundation (FMF) certified sonographers. The sonographer was asked to categorize the fetal heart anatomy as normal, abnormal, or not possible to evaluate. Data were stratified into two groups based on the possibility of evaluating the fetal heart anatomy in the first trimester, and the influence of maternal and fetal characteristics, as well as the detection of major congenital heart disease (CHD), were investigated.

Results

A total of 3,828 pregnant women (3,887 fetuses) were included. The fetal heart evaluation was completed in 83.1% of cases (n=3,231). The proportion of incomplete scans decreased throughout the study period from 24% in the first month to 14% in the last month. High maternal BMI and early gestational age at scan significantly decreased the possibility of evaluating the heart. The experience of the sonographer contributed to feasibility, as an increase in experience up to 20 years was correlated with a reduction of incomplete scans. The first-trimester scan identified 4/10 prenatally detected major congenital heart defects.

Conclusion

First-trimester evaluation of the fetal heart by a standardized scan protocol is feasible to implement in daily practice. It can contribute to earlier detection of CHD at a very low false positive rate if performed by certified sonographers. Some maternal and fetal parameters decrease the possibility of completing the scan.