Effectiveness of fetal heart examination at the 20-24 weeks scan
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Objective
To assess the effectiveness of fetal heart examination at the 20-24 weeks scan.

Methods
Observational, prospective and longitudinal study of pregnant women, who underwent 20-24 weeks obstetrical ultrasonography, including screening for structural heart defects, and delivered in our the institution during the first year of protocol implementation. The study was approved by local ethics committee. On the day of the scan, the patients signed an informed consent form. The examination of the fetal heart was carried out using an obstetric ultrasound device with a convex transducer and its own software. Fetal heart assessment included evaluation of the following views and planes: (1) the cardiac situs; (2) fetal heart rate; (3) complete evaluation of four-chamber view: presence of four chambers, cardiac axis, no pericardial effusion, two atria and two ventricles approximately equal in size, foramen ovale flap in left atrium, drainage of pulmonary veins in left atrium, absence of ventricular wall hypertrophy, moderator band at right ventricular apex, interventricular septum integrity; two ativoventricular valves opening and moving freely and confirming the more apical insertion of the septal tricuspid valve leaflet; biventricular filling (4) left ventricular outflow tract; (5) right ventricular outflow tract; (6) 3 vessel-trachea view (pulmonary trunk, ascending aorta and superior vena cava); (7) anterograde flow in the ductal arch and transverse aorta; (8) aortic arch; (9) ductal arch. In case of failure to obtain any of the screening planes, the patient was referred for fetal echocardiography. We also verified the percentage of obtaining each of the planes listed above.

Results
A total of 420 pregnancies were included in the study. The planes were examined in the following proportions, with respectively 95% confidence interval: (1) situs cardiac: 100%; (2) Fetal heart rate: 100%; (3) complete evaluation of four chamber view: 96.9 % (0.94-0.98); (4) left ventricular outflow tract: 98.2% (0.96-0.99); (5) right ventricular outflow tract: 98.2% (0.96-0.99); (6) 3 vessel-trachea view: 97.9% (0.95-0.99); (7) anterograde flow in the ductal arch and transverse aorta: 86.8% (0.83-0.90); (8) aortic arch: 87.9% (0.84-0.90); (9) ductal arch: 82.5% (0.72 – 0.81). A complete scan including all the aforementioned planes could be performed in 77% of the cases. Only one of the 420 cases presented with a congenital heart defect which was confirmed by fetal and neonatal echocardiography. Echocardiography was performed in 7.1% of these cases. Among these patients, 60% were indicated prior to the screening, and 40% of the indications were post-screening, because of suspected abnormality or failure to complete the examination.

Conclusion
The 77% rate of complete examinations makes the fetal heart assessment likely to be implemented routinely at the 20-24 weeks scan. The proposed fetal heart evaluation protocol is effective and can be incorporated at clinical care.