OP03.06
Learning Curve and Factors Influencing the Feasibility of Performing Fetal Echocardiography at the Time of the First Trimester Scan

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Objective

To assess the learning curve and factors influencing the feasibility of carrying out a complete fetal cardiac evaluation at the time of the first trimester scan (FTS).

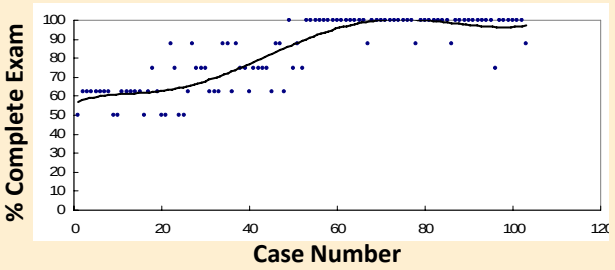
Methods

Prospective study on 104 gravidas presenting for FTS at 11w6d-13w6d. Maternal body mass index (BMI), fetal crown-rump length (CRL), and 8 cardiac parameters were evaluated: 4 chamber view (4CV), tricuspid regurgitation (TR), outflow tracts cross over (CO), bifurcating pulmonary artery (BPA), 3 vessel view (3VV), aortic arch (AoA), superior and inferior venae cavae in sagittal views (VC) and Dopplers of the ductus venosus (DV). All exams were carried out transabdominally by a single sonologist certified by the Fetal Medicine Foundation. The average time from the first to the last cardiac image obtained was calculated.

	1st period [Case 1-21]	2nd period [Case 22-52]	3rd period [Case 53-103]	p-value
#Views out of 8	4.76 (59.5%)	6.0 (75%)	7.89 (98.6%)	0.0001
Average Time (sec)	262.4 (4.37 m)	429.3 (7.13m)	560.1 (9.3m)	0.032
BMI	24.08	24.0	23.5	0.752
CRL	72.2	72.7	72.1	0.899

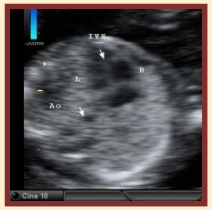
Results

103 fetuses were evaluated. Median CRL was 72.1 mm (range 53.9-85.8 mm). Median BMI was 23 (range 17.7-32.3). The 4CV and TR were obtained on 100%, CO on 90%, BPA on 81%, 3VV on 55%, AoA on 76%, VC on 65% and DV on 99%. A complete exam was feasible in 55% of cases: in 15% of the first 52 and 94% of the last 51 cases. Of the 8 parameters, 59.5% were seen in case 1-21 , 75% in case 22-52 and 98.6% in the last 51 cases (P=0.0001). Average time spent on the cardiac exam increased among the 3 groups: 4.37, 7.13 and 9.3 minutes respectively (p=0.032). There was no statistically significant influence of CRL (p=0.899) or BMI (p=0.752). The gained sonographer experience and duration of the exam were the most significant factors.



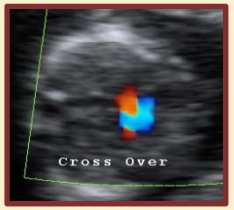
Conclusion

Fetal cardiac evaluation is feasible in the first trimester. At least 52 exams are needed for a significant improvement in the ability to carry out a complete exam. The 3VV and VC are the most challenging views to obtain. Gained sonographer experience and allocation of time seem to be the most influential factors affecting the completeness of the exam.

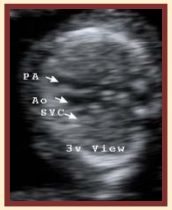

4CV


Doppler of 4CV

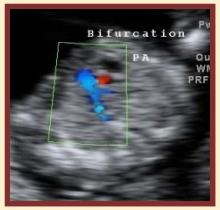

PV



CO



3VV



BPA

LVOT

3VV

RV Inflow

OP15.09
Feasibility of Intracerebral Translucency Measurement at the Time of the First Trimester Scan

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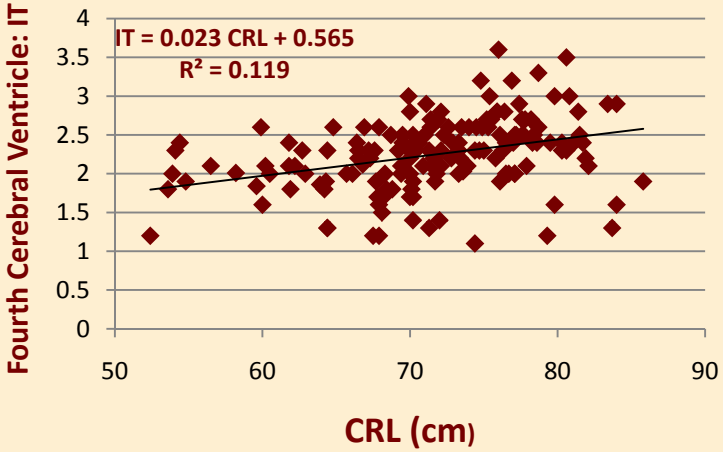
Objective

To assess the feasibility of measuring the intracerebral translucency (IT) at the time of the first trimester scan (FTS) and to compare our reference range of IT to crown-rump length (CRL) to the established range of Chaoui et al.

Methods

Prospective study on 157 gravidas presenting for FTS between 11w6d and 13w6d. One fetus excluded because of ectopia cordis. CRL and IT were measured in the same midsagittal plane in which nuchal translucency (NT) and facial angle were measured. All exams were carried out by a single sonologist certified by the Fetal Medicine Foundation. Regression analysis was used to study the reference range of the AP diameter of the IT according to CRL.



Results

IT was measured on 156/156 (100%). The median CRL was 71.7 mm (range 52.4-85.8 mm), the median IT was 2.3 mm (range 1.1-3.6 mm). Regression analysis yielded: IT=0.023CRL+0.565 with an R2 of 0.119.

Conclusions

IT assessment is highly feasible at the time of the FTS. Statistically, we were unable to reproduce the established IT to CRL relationship of Chaoui et al. In case the actual size of the IT, and not simply its presence or absence, proves to be the determining factor in the early detection of spina bifida, then this would imply the need for sonographer certification and ongoing quality control as has been implemented with the NT.

P04.04
Characterizing the Iliac Lucency in the First Trimester

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Objective

To characterize a bilateral echolucent area termed "iliac lucency" (IL) in the first trimester fetal pelvis. The IL may be mistaken for the fetal bladder (B) if visualized in a parasagittal plane (Figure 1).

Methods

Prospective study on 106 fetuses between 10w0d and 17w0d. A 3D volume of the fetal pelvis was obtained on each fetus at the level of the IL (Figure 2). Off line analysis was subsequently carried out. The 3D volume was standardized with the IL in the 'a' plane, and the reference dot placed halfway between them. Tomograpgic ultrasound imaging (TUI), with 2mm slice thickness, was then used (Figure 3). The AP diameter of the bladder was measured as well as the AP diameter of the IL bilaterally (Figure 4). The average AP diameter of the 2 IL for each fetus was calculated. Regression analysis was used to establish the reference range and significance of the relationship of the IL to the crown-rump length.

Results

The IL was visible in 103/106 fetuses (not visible in two at 10 weeks and one at 14w1d). The fetal bladder was seen in 104/106 (not visible in one at 10w4d and another 10w5d). IL ranged from 0.9 to 4.85 mm with a median of 2.3 mm. The AP diameter of the fetal bladder ranged between 0.7 to 9.4mm with a median of 2.2mm. Oftentimes the IL and the bladder were visualized in the same TUI plane or in 2 consecutive planes 2mm apart.

Figure 1: Parasagittally IL can be mistaken for B

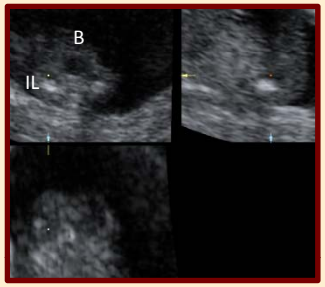

Figure 2: 3D volume of the pelvis & reference dot in the IL

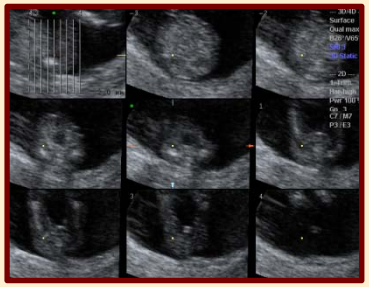

Figure 3: TUI at 2mm slices showing IL and B in same plane

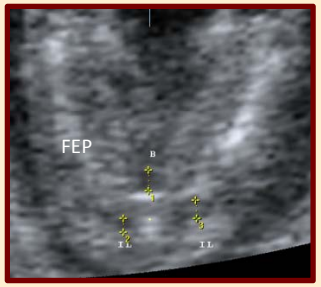

Figure 4: Coronal view of IL, B and femoral epiphysis (FEP)

Figure 5: Parasagittal image of the IL which can be easily mistaken for the bladder

Conclusions

The IL is visible in all fetuses at the time of the first trimester scan, 11w6d-13w6d, with a median AP diameter of 2.3mm. The median AP diameter of the fetal bladder in this study was 2.2mm. Given its closeness in distance to the bladder, as well as in appearance and size at this point in gestation, the IL may be mistaken for the fetal bladder when viewed in a parasagittal plane. Care must be taken when attempting to complete a first trimester anomaly scan. The fetal bladder should be visualized in an axial, coronal or a true midsagittal plane, the same plane in which the nuchal translucency is measured. A parasagittal plane may lead to an erroneous identification of the fetal bladder. The identity of the IL remains unclear and may represent the psoas muscle or a true iliac lucency. It may thus be worthwhile to evaluate the evolution of the IL in the early first and second trimester to further characterize its identity.