

Results: The correlation between the measurements obtained by the two- and three-dimensional techniques was high. ICCs for the level of agreement were 0.992 for femur measurement, 0.870 for tibia, and 0.809 for fibula. No significant differences were shown between the pairs of measurements. For the intra- and interobserver reliability, variation was small with all high ICCs (≥ 0.991) and there were no significant difference between the pairs of measurements for each parameter.

Conclusions: The possibility of rotating stored volumes and reviewing it in three orthogonal planes makes three-dimensional ultrasound a useful and easily applicable tool for accurate long bone measurements.

P23.08

The petrous part of the temporal bone as demonstrated by ultrasound between 14 to 40 weeks of gestation

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Objectives: To examine if identification and measurement of the petrous bone - the part of the temporal bone which houses the auditory apparatus, is feasible.

Methods: 248 consecutive pregnant women between 14 to 40 weeks of gestation were included in the study. During a routine fetal anomaly scan using transvaginal or transabdominal ultrasound the fetal head was assessed in transverse sections: first the parotid gland or the external ear were identified then the petrous bone- a ring shaped echogenic structure located medially and superior to the parotid gland or the external ear was identified and measured in its largest antero-posterior diameter. At least the petrous bone of one side was measured, when both sides were visualized easily, both petrous bones were measured.

Results: In 247 fetuses, at least one petrous bone was visualized and measured. The petrous bone had good correlation with gestational age ($R = 0.908$, $P < 0.001$) and with the BPD ($R = 0.983$, $P < 0.001$) and the FL ($R = 0.913$, $P < 0.001$).

Conclusions: The demonstration of the petrous bone is feasible at all gestational ages and have a good correlation with gestational age and the BPD and the FL. The usefulness of the ability to demonstrate this bone in prenatal diagnosis of congenital malformation of the inner ear should be tested in prospective studies.

P23.09

Correlation of fetal thigh and upper-arm volumes by 3D-sonography with 2D-biometric parameters

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Objectives: To correlate of fetal thigh and upper-arm volumes by three-dimensional (3D) ultrasonography with two-dimensional (2D) biometric parameters.

Methods: This cross-sectional study involved 425 normal pregnancies with gestational age between 20 and 40 weeks. An Accuvix XQ equipment (Medison, Seoul, Korea) with a convex volumetric transducer (3–5 MHz) was used. The extended imaging Virtual Organ Computer-aided AnaLysis (XI VOCAL) technique was used for the volumetric calculations, considering 10 sequential sectional plane areas, performed along the axial plan of the fetal thigh and upper arm. The proximal and distal epiphyses were the beginning and final reference. Scatter graphs were created to analyze the correlation between fetal thigh and upper-arm volumes and biparietal diameter (BPD), abdominal circumference (AC) and femur length (FL), the quality adjustments was realized according to the determination coefficient (R^2).

Results: There was a strong correlation between fetal thigh and upper-arm volumes and BPD, AC and FL, with the best model represented by quadratic equation ($R^2 = 0.83, 0.91, 0.91, 0.84, 0.89$ and 0.89 to fetal thigh and upper-arm volumes, respectively).

Conclusions: The fetal thigh and upper-arm volumes by 3D-ultrasonography using XI VOCAL technique showed strong correlation with 2D-biometric parameters between 20 and 40 weeks of gestation.

P23.10

Rule of three: a systematic method of performing a thorough obstetric ultrasound examination

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Objectives: To implement a simple methodology called 'Rule of three' as an aid in performing a systematic obstetric ultrasound examination.

Methods: The 'Rule of three' concept was created in the year 1995 in our unit and involves using the number '3' as a reminder to assess either three planes and/or three structures in a particular plane. This serves to achieve a methodical approach to obstetric scanning. For example, the fetal head is examined in three planes: trans-thalamic, trans-ventricular and transcerebellar; the trans-thalamic plane shows the falx, thalami and the cavum septum pellucidum; the spine needs to be assessed in three planes- sagittal, axial and coronal; the heart needs assessment in three views: 4 chamber view, outflow tracts and three vessel view and so on. This concept is particularly useful for trainees as it serves as a prompter to achieve these views. We present a survey carried out within our unit on the role of this methodology in learning to perform a thorough obstetric ultrasound scan, in day-to-day clinical practice and also in auditing their own performance.

Results: 15 members of staff within the unit participated in the survey. The staff had served in this institution for a median duration of 6 yrs (range 3 months to 20 years). 100% of the staff rated the rule of three very highly (5/5 on a scale of 0–5) for use in learning to perform the obstetric ultrasound and in using it as a tool in teaching others and in auditing their archived images. All of them also felt that they were not aware of any other tool, which would provide a comprehensive, simple and effective methodology for performing an obstetric ultrasound.

Conclusions: 'Rule of three' is a simple concept that can be imbibed by any teaching unit in order to facilitate systematic examination of the fetus by ultrasound. It is also useful as an audit tool.

P23.11

Comparison between bidimensional sonography and three dimensional power Doppler angiography (VOCALTM) for assessment of fetal renal blood flow in normal gestation

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Objectives: The aim of this study was to explore the possible use of three-dimensional power Doppler angiography (3D PDA) for assessment of the fetal renal blood flow in normal gestation.

Methods: This study was undertaken with a prospective design. In total, 77 healthy singletons with gestational ages between 20 and 38 weeks were included. Bidimensional color Doppler ultrasound was used to calculate the pulsatility index (PI), resistance index (RI), peak systolic velocity (PSV) of fetal renal artery and PI and maximum velocity (vmax) of fetal renal vein. 3-D power Doppler angiography analyses was used to assess the fetal vascularization index (VI), flow index (FI) and vascularization-flow index (VFI) in each case.