OP15: TWINS II

OP15.01
Absolute uterine artery blood flow volume is increased in twin human pregnancies compared to singletons

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Objectives: To compare (1) absolute and (2) weight-specific blood flow volume of uterine arteries (UtA) in normal twin pregnancies to normal singleton pregnancies.
Methods: Twelve twin pregnancies (10 dichorionic, two monochorionic) with normal UtA PI and normal weight at birth were included. UtA diameter and time-averaged maximum velocity were obtained to calculate flow (mL/min) and UtA flow/EFW (mL/min/kg) in each UtA. UtA flow was estimated by the formula $Q = hV \cdot \pi D^2/4$; a patient-specific coefficient, h, was obtained by an ad hoc mathematical model. Total UtA flow was calculated as a sum of right and left vessel flow volume. Twins' UtA flow was expressed per unit EFW considering the sum of the two EFWs. Twins were compared to 48 normal age-matched singletons.
Results: Gestational age at exam was similar in twins and in singletons (25.9 ± 6.4 vs. 25.2 ± 6.2 weeks, NS). UtA flow (mL/min) was significantly increased in twins (509.3 ± 240.7 mL/min) compared to singletons (337.2 ± 257.0 mL/min) ($P = 0.04$). UtA flow (mL/min) exponentially increased along gestation in twins and in singletons. The twins' trend was above the third interquartile range of singletons' reference values. UtA diameter was significantly increased in twins (0.33 ± 0.07 cm) than in singletons (0.28 ± 0.05 cm), while no differences in UtA mean velocity were observed (77.5 ± 29.9 vs. 76.7 ± 29.1 cm/sec, respectively, NS). UtA flow per EFW did not differ between twins and singletons (384.4 ± 198.6 vs. 460.9 ± 302.9 mL/min/kg, respectively, NS).
Conclusions: (1) UtA flow volume (mL/min) in twin pregnancies was significantly increased. This was determined by larger vessel diameter, compared to singletons. (2) Each twin proved to share an amount of UtA flow per unit estimated fetal weight not significantly different from singletons.

OP15.02
Intertwin disparity in crown–rump length, gestational sac and yolk sac size and fetal heart rate at 7 weeks' gestation

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Objectives: To record intertwin disparity in biometric parameters and fetal heart rate at 7 weeks' gestation in mono- and dichorionic twin pregnancies.
Methods: Twin gestations arising from ART programs were prospectively recruited at 7 weeks' gestation. Mean crown–rump length, gestational sac size, yolk sac size and fetal heart rate were recorded for each fetus and chorionicity was assigned. Ultrasonographic assessments were all carried out by two researchers using a GE Logic Expert 5 with a transvaginal ultrasound probe at a frequency of 8-MHz. Using a standardized protocol, three measurements were taken for each biometric parameter and the results averaged. Intertwin disparity in crown–rump length, gestational sac size and yolk sac size was expressed as a percentage of the larger co- twin's corresponding parameter. In the case of fetal heart rate, intertwin disparity was expressed as a percentage of the faster heart beat.
Results: This study population comprised 40 viable twin gestations prospectively recruited over a 10-month period. Chorionicity was determined as dichorionic in 37/40 (93%) of cases. Median intertwin disparity in crown–rump length was 16% (range 0–49%). Median disparity in gestational sac size was 10% (range 0–39%), in yolk sac size it was 8% (range 1–100%) and in fetal heart it rate was 5% (range 0–25%).
Conclusions: Intertwin sonographic differences at 7 weeks' gestation are most notably reflected in a disparity in the crown–rump length of each fetus rather than gestational sac size, yolk sac size or fetal heart rates.

OP15.03
Clinical significance of first trimester crown–rump length discrepancy in twin gestations

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Objectives: The prevalence and significance of intertwin growth discrepancy in the first trimester of pregnancy are controversial. The purpose of this study was to determine the clinical significance of first-trimester crown–rump disparity in twin gestations.
Methods: This is a retrospective study of twin pregnancies initially evaluated at 11–14 weeks' gestation, between September 2003 and February 2007. Differences in crown–lump length (CRL) and estimated gestational age were calculated for each twin pair and their distribution was analyzed according to chorionicity and mode of conception (spontaneous or following assisted reproductive technologies). The distribution of discrepancy was analyzed according to fetal structural or chromosomal anomalies, intrauterine growth retardation and twin weight discordance at birth. χ^2 Pearson or Fisher's exact test (depending on the requirements of each test) were used for statistical analysis. When we found a significant probability value we presented the OR with its 95% confidence interval.
Results: A total of 262 twin pregnancies were included. In this group we found 12 fetal structural anomalies, five chromosomal anomalies, 72 intrauterine growth retarded fetuses and 47 twin weight discordance at birth. The mean ± SD discrepancy in CRL was 2.66 ± 2.64. The 95th percentile was 9 mm and the 90th percentile was 6 mm. There was no influence of chorionicity and mode of conception. CRL discordance > 10%, which is the 90th percentile, was associated with a higher incidence of structural malformations (16.1% versus 2.6%, $P < 0.05$) fetal anomalies (structural malformations and chromosomal anomalies) (19.4% versus 4.8%, $P < 0.05$) and twin weight discordance at birth (32.3% versus 15.6%, $P > 0.05$).
Conclusions: First-trimester crown–lump length disparity in twin gestations is associated with an increased risk of fetal structural and chromosomal anomalies and twin weight discordance at birth.

OP15.04
Pseudo-amniotic band syndrome: a rare complication of monochorionic twins with feto-fetal transfusion syndrome treated by laser coagulation

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Objectives: The aim of the study was to assess the incidence and risk factors of limb constriction defects related to pseudoamniotic band syndrome (PABS) as a rare complication following selective fetoscopic laser surgery (FLS) in feto-fetal transfusion syndrome (FFTS).
Methods: All consecutive cases of FFTS treated by selective FLS between 1999 and 2006 were prospectively examined for PABS at the time of delivery. The incidence and characteristics of PABS were reported. Univariate analysis was conducted to look for potential risk factors of developing PABS.

Results: 438 consecutive FFTS cases were treated at 15 to 26 weeks. PABS developed in eight cases (1.8%). The affected twin was always the former recipient. The diagnosis was made prenatally in two of eight cases (25%). All cases survived the perinatal period. PABS affected fetal leg, arm or foot. In five (62.5%) and seven (87.5%) cases, PABS occurred following premature rupture of membranes and intrauterine demise of the donor, respectively. No maternal, fetal or peri-operative risk factor could be identified.
Conclusions: This complication is related to invasive procedure and is probably different in the physiopathology from the intrinsic malformative theory, suggesting that the anomalies and the fibrous bands have a common origin, caused by an anomaly of the developing germinal disc of the early embryo. The sequence of events in our series involved rupture of the amnion (5/8), fetal demise of the donor after laser fetoscopy (7/8) and prematurity (7/8). The latter is consistent with a particular role of membranes in this condition. Awareness and targeted serial ultrasound evaluation in this high-risk group may improve prenatal diagnosis, counseling and management of PABS following FLS.

OP15.05
Spontaneous intertwin dividing membranes rupture and membranes detachment in twin–twin transfusion syndrome

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Although rupture of the intertwin dividing membranes (DM) and membrane detachment from the uterine wall are well-recognized complications of invasive procedures performed in monochorionic–diamniotic (MoDi) twins, these findings have rarely been reported to develop spontaneously. Diagnosis and management of twin–twin transfusion syndrome (TTTS) in spontaneous 'functional-monoamniotic' twins pose a challenge, as illustrated in this case. Ultrasound of a 27-year-old pregnant woman at 18 6/7 weeks showed MoDi twins with 38% weight discordance. The smaller twin had persistent absent end-diastolic flow in the umbilical artery (AEDF-UA) and a small bladder. The maximum vertical pocket (MVP) of amniotic fluid was 10.5 cm and 7.2 cm on either side of the DM. A follow-up ultrasound showed detachment of the membranes from the uterine wall, and the sub-membranes MVP of amniotic fluid measured 14.2 cm. Both fetuses were located on the same side of the DM. The donor twin had a collapsed bladder and persistent AEDF-UA. The patient had not undergone a prior invasive procedure. Amnioreduction of 1600 mL of sub-membranes amniotic fluid followed by an amniopatch was performed. Follow-up ultrasound revealed partial sealing of fetal membranes. The recipient twin developed reversed flow in the ductus venosus and pulsatile flow in the umbilical vein. Selective laser photocoagulation of communicating vessels was performed at 21 6/7 weeks using the spontaneously created rupture in the DM as an access point to allow visualization of the vascular communications. Cord entanglement was documented fetoscopically. The patient was hospitalized for fetal surveillance due to cord entanglement, and was delivered at 27 2/7 weeks for non-reassuring fetal heart rate patterns. Both twins are alive and well. To the best of our knowledge, this is the first reported case of MoDi twins with TTTS complicated by spontaneous antepartum rupture of the intertwin DM and membranes detachment.

OP15.06
The use of 3D ultrasound for diagnosis of unicornuate and didelphys uteri with twins gestation during first trimester of pregnancy

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Objectives: Multifetal gestations are unusual in unicornuate or didelphic uteri and are associated with poor pregnancy outcome, such as increased incidence of abortions and preterm delivery. Early diagnosis of these combined conditions is therefore crucial if early preventive measures are considered. The objective of this study was to establish a practical and valid method for the diagnosis of twins gestation, *in uteri* with müllerian anomalies, during the first trimester of pregnancy.
Methods: Ten women with twins gestation were included in the study, eight with normal uteri, one with unicornuate and one with didelphic uteri. The women underwent 3D ultrasound scans weekly, from 8 to 12 weeks' gestation, (GE Voluson 730 expert, abdominal and vaginal probes). Measurements of the ratio between the longitudinal and the transverse uterine lumen diameter (L/T ratio) in the sagittal and coronal plans were applied to all patients in the multiplanar method. The mean L/T ratios were compared and analyzed between the müllerian uteri and the normal uteri.
Results: Mean sagittal and coronal L/T ratio of the uteri with müllerian anomalies (2.08 ± 0.26 (range, 1.7–2.36) and 2.1 ± 0.21 (range, 1.7–2.4), respectively) were significantly higher ($P < 0.01$ for both) compared to the normal uteri (1.61 ± 0.43 (range, 1.05–2.6) and 0.92 ± 0.12 (range, 0.72–1.15), respectively). Receiver operating characteristic (ROC) curve of the mean L/T ratio revealed that for a threshold 1.15 and 1.68 in the coronal and sagittal planes, respectively, the sensitivity, specificity and negative likelihood ratio are 100%/100%, 100%/70.8% and 0/0.
Conclusions: To the best of our knowledge, this is the first report demonstrating that 3D ultrasound measurement of the mean sagittal and coronal L/T ratios may detect müllerian anomaly in twin gestation uteri. Moreover, mean L/T ratio in the coronal plane above 1.15 is pathognomonic for twins gestation carried by the aforementioned müllerian anomalous uteri.

OP15.07
The use of MRI, ultrasound and Doppler in the diagnosis and management of a triplet pregnancy complicated by conjoined anomalous pyopagus twins

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Complex fetal anomalies are often difficult to diagnose prenatally. Advances in MRI, ultrasound, and Doppler have provided increased ability to diagnose and manage complicated pregnancies. We are reporting the management of a triplet pregnancy with a set of conjoined pyopagus twins using MRI, ultrasound, and Doppler. The triplet pregnancy including a set of conjoined twins was diagnosed during a first-trimester ultrasound. Multiple anomalies including acardia and omphalocele were diagnosed in one of the conjoined twins while the other conjoined twin appeared normal during a second-trimester ultrasound. MRI and Doppler were used during the third trimester to evaluate the vascular sharing between the conjoined twins and the degree to which they were conjoined. At 31 weeks' gestation Doppler evaluation revealed worsening cardiac function and brain sparing in the pump conjoined twin. A multidisciplinary conference was held to discuss what interventions would be required based on prenatal imaging.
After evidence of worsening maternal and fetal condition, delivery occurred by classical Cesarean section at 31 weeks' gestation. The