

**[17-173]****Fetal growth in pregnancies undergoing serial amniocentesis for early onset anhydramnios – A secondary analysis of the RAFT Trial****Yair Blumenfeld**

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Background: Outcomes after serial amniocentesis for bilateral renal agenesis (BRA) or fetal renal failure (FRF) depend on gestational age at delivery and birthweight; however, early-onset anhydramnios may increase the risk of fetal growth restriction (FGR) and reduce sonographic estimated fetal weight (EFW) accuracy. We aimed to characterize fetal growth and ultrasound accuracy in pregnancies undergoing amniocentesis. Methods: A secondary analysis of the RAFT Trial was conducted. FGR was defined as EFW <10th percentile and SGA as BW <10th percentile. Sonographic EFWs were plotted to create growth curves compared against established nomograms. Ultrasound accuracy for predicting SGA was calculated. Results: In 49 participants (18 BRA / 31 FRF), sonographic FGR was found in 39%. At last ultrasound 22% of BRA and 32% of FRF cases had FGR; however SGA was only found in 12% of BRA and 23% of FRF neonates. The sensitivity, specificity, PPV and NPV of SGA prediction was 1.00, 0.82, 0.33, and 1.00 in the BRA group, and 1.00, 0.82, 0.57 and 1.00 in the FRF group. Conclusions: Sonographic FGR is common in BRA and FRF pregnancies undergoing amniocentesis. Though SGA is seen in more than 10% neonates, anhydramnios significantly affects prenatal prediction of SGA.

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**An In Vitro Model of Fetal Growth Restriction: Nutrient Restriction in Trophoblast Stem Cells Stimulate the Release of Anti-Angiogenic miRNA-141-3p via Extracellular Vesicles****Caitlin Eason**

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Fetal growth restriction (FGR) affects approximately 5-10% of pregnancies and is commonly driven by placental insufficiency, marked by impaired angiogenesis. Maternal malnutrition is a major risk factor globally, however the early molecular mechanisms linking nutrient stress to disrupted placental vascular development remain poorly defined. Emerging evidence suggests interferences in cell signaling through extracellular vesicles (EVs) and their microRNA (miRNA) cargo, which post-transcriptionally alter gene expression, may contribute to this pathology. To investigate mechanisms underlying aberrant placental angiogenesis in FGR, we modeled metabolic stress by culturing human trophoblast stem cells (hTSCs) in nutrient-restricted media and examined EV-mediated signaling to endothelial cells. MiRNA sequencing revealed enrichment of anti-angiogenic miR-141-3p in nutrient-restricted hTSC-EVs. Endothelial cell transfection with miR-141-3p reduced mRNA and protein expression of Yes-associated protein 1 (YAP1), a Hippo pathway transcriptional coactivator essential for angiogenic signaling. Functionally, miR-141-3p overexpression impaired endothelial tube formation. These findings delineate an EV-mediated miR-141-3p-YAP1 signaling axis that connects trophoblast nutrient stress to impaired endothelial angiogenesis, offering mechanistic insight into early events underlying placental insufficiency in FGR.

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**Co-stimulation of allo responsive NK cells with an NK cell-specific ligand enhances allo-specific rejection and memory in prenatal chimeras****Hee Kap Kang, Lucas E Turner, Amanda Dicks, Cassandra Huerta, Amir A Alhajjat, Aimen F Shaaban**

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Prenatal foreign antigen exposure leads to lifelong stable tolerance but also can result in non-tolerance to the donor antigen and cause graft rejection. Additionally, almost all lives are living under the risk of acute and chronic viral infection that can affect immune responses. In prenatal allotransplantation model (Balb/c to C57BL/6), allo-specific (Ly49D) NK cells play a key role in engraftment or rejection. We previously reported that prenatally alloantigen-exposed NK cells can enhance allo-specific T cell responses in non-tolerogenic setting (rejector). Probing deeper into prenatal NK-T cell regulation, we hypothesized that activation by NK cell-specific m157 molecule acts as a co-stimulatory signal to enhance allograft rejection. Therefore, we prenatally introduced the m157 antigen into allogeneic chimeras and analyzed engraftment, NK cell receptor expression, and T cell cytotoxicity. Prenatal exposure to m157 enhanced allograft rejection and resulted in higher frequency of hostile allo-specific NK cells. Additionally, rejecter chimeras exhibited stronger T cell responses after prenatal m157 exposure. Collectively, these results suggest that the m157 viral ligand acts as a prenatal costimulatory signal for NK cells to direct allo-specific T cell responses without direct T cell recognition, revealing the mechanism for breaking T cell tolerance via NK cell activation in prenatal allotransplantation.

**[17-177]****Prenatal tolerogenic donor antigen exposure can maintain tolerance despite the presence of m157 viral glycoprotein****Hee Kap Kang, Lucas E Turner, Amanda Dicks, Cassandra Huerta,  
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Prenatal foreign antigen exposure leads to lifelong stable tolerance. However, acute and chronic viral infection can break immune tolerance. We previously reported that prenatally antigen-exposed NK cells in tolerogenic setting (engrafter) have suppressor function in T cell responses in prenatal allotransplantation model (Balb/c to C57BL/6). To further confirm regulatory roles of NK cells, we hypothesized that additional activation of Ly49H expressing allo-specific (Ly49D) NK cells by m157 viral glycoprotein do not cause the rejection of allograft in engrafters. To test this hypothesis, we prenatally introduced m157 molecules into allogeneic chimeras and analyzed engraftment, frequencies of NK cell receptors, cytokine profiles of NK cells, and T cell responses by flow cytometry and ELISPOT assay. We found that the presence of m157 on allogeneic donor cells required higher chimerism threshold for the stable engraftment, and further down-regulation of activating receptors, Ly49H and Ly49D, and increased potential of TGF- $\beta$ 1 production in NK cells that can expand Foxp3+CD4+Tregs. Lastly, engrafter chimeras did not exhibit allo-specific T cell responses after prenatal m157 exposure. These findings reveal the mechanism of prenatal tolerance in the presence of viral antigen on donor cells, providing the implications in current understanding in prenatal tolerance to inherited or acquired antigens.

[17-178]

## Automated Clinical Deployment of Fetal MRI Slice-to-Volume Reconstruction Using a Vendor-Neutral MONAI-Based Pipeline

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**Objective:** To evaluate the feasibility of an automated clinical pipeline for fetal MRI slice-to-volume reconstruction (SVR) using standard clinical single-shot fast spin echo acquisitions.

**Methods:** Consecutive singleton fetal MRI examinations performed at a tertiary fetal care center were processed using a vendor-neutral MONAI Deploy Express pipeline integrated into the clinical imaging workflow. The pipeline automatically identified eligible fetal MRI series, performed landmark-guided pose estimation and motion-corrected SVR using SVRTK, and returned reconstructed fetal brain and body volumes to PACS for radiologist review. Three fetal imagers independently rated reconstruction quality using a 5-point Likert scale. Technical failures, inter-reader reliability, and reconstruction availability after image acquisition were assessed.

**Results:** Sixty-five fetal MRI examinations were successfully evaluated, with mean gestational age 28.9 weeks. Most studies involved fetuses with structural anomalies. Expert ratings demonstrated high inter-reader reliability for both brain and body reconstructions, with ICCs of 0.933 and 0.922, respectively. Median time to reconstruction availability after clinical integration was 10:28 minutes for brain SVR and 11:50 minutes for body SVR.

**Conclusion:** Automated, vendor-neutral fetal MRI SVR deployment is feasible in a real-world clinical workflow and may support broader integration of 3D fetal MRI into routine practice.

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## Federated Learning (decentralized Machine Learning) for Small-for-Gestational-Age Prediction: A Multi-country Evaluation on Real-World Antenatal Data

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Accurate prediction of small-for-gestational-age (SGA) fetuses remains challenging due to data heterogeneity and privacy constraints across institutions. Federated Learning (FL) addresses this challenge by enabling institutions to jointly train models while keeping patient data local, exchanging only model updates with a coordinating server. FL has shown increasing promise in medical imaging and clinical prediction, particularly under governance constraints and institutional heterogeneity.

We applied FL for multi-center SGA prediction using routinely-collected antenatal ultrasound and maternal clinical data from healthcare systems in Malaysia, India, and Singapore. SGA prediction is formulated as binary classification based on INTERGROWTH-21st 10th percentile (SGA-P10) standard, and both local and federated multilayer perceptron (MLP) models are evaluated under clinically-motivated operating point. Four federated optimization strategies, FedAvg, FedAdam, FedProx, and FedBN, are compared using a masked-MLP architecture that explicitly models structured missingness.

Fetal biometry and Doppler indices achieves the strongest AUROC in our larger cohorts, whereas adding maternal features slightly reduces discrimination while maintaining comparable threshold-dependent performance. Smaller cohorts showed more variability, consistent with limited sample size and higher uncertainty. Inclusion of maternal features did not consistently improve sensitivity.

Under a clinically constrained screening regime, FL demonstrates improved operating-point stability and cross-site generalization on heterogeneous real-world antenatal data.

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**IgG-positive/IgM-negative maternal serology in severe congenital parvovirus B19 infection****Gayathri Vadlamudi<sup>1,2</sup>, Felicia Lemoine<sup>2</sup>, Sami Backley<sup>2</sup>, Todd Lovgren<sup>3</sup>, Jimmy Espinoza<sup>2</sup>, Anthony Johnson<sup>2</sup>, Ramesha Papanna<sup>2</sup>**<sup>1</sup> UT Southwestern Medical Center Department of Obstetrics & Gynecology<sup>2</sup> UTHealth Houston Fetal Institute Department of Obstetrics, Gynecology and Reproductive Sciences, McGovern Medical School at UTHealth Houston<sup>3</sup> Nebraska Methodist Health System Department of Obstetrics and Gynecology**Objective:**

To evaluate IgG-positive/IgM-negative maternal serology in congenital parvovirus B19 infection and delineate the role of molecular testing in cases of fetal hydrops and suspected anemia.

**Methods:**

This was a retrospective cohort study at a quaternary academic center (2016-2026) of patients with PCR-confirmed fetal parvovirus infection. Maternal IgG/IgM titers, sonographic findings, and rates of intrauterine transfusion were evaluated.

**Results:**

Among 22 pregnancies with PCR-confirmed parvovirus infection, 13 (59.1%) underwent intrauterine red blood cell transfusion and 8 (36.4%) received platelet transfusion. Two patients (9.1%) had positive IgG with negative IgM serology. One presented at 21 weeks with fetal hydrops, elevated middle cerebral artery (MCA) peak systolic velocity, and mirror syndrome. Following serial intrauterine transfusions, hydrops resolved and she delivered a liveborn neonate at 37 weeks. The second patient presented at 24 weeks with dichorionic triamniotic triplet gestation and hydrops with elevated MCA Dopplers in the monochorionic pair. Despite transfusion, both affected fetuses experienced intrauterine demise.

**Conclusion:**

Negative maternal IgM does not exclude acute congenital parvovirus infection. In this cohort, nearly 10% of PCR-confirmed cases had negative IgM despite confirmed infection. In the presence of fetal hydrops or suspected anemia, PCR testing is essential for accurate diagnosis and timely intervention.

[17-182]

## Meeting Patients Where They Are: Evaluating Fetal Surgery Information on Social Media

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Increasingly, patients turn to social media for medical information. TikTok, a rapidly growing video-sharing platform, has become a common source of obstetric and fetal health content. We evaluated the top 100 videos tagged “#fetalsurgery,” “#fetalintervention,” and “#fetaltherapy” to characterize the quality and source of information available to patients.

Of 300 videos identified, 197 were excluded (14 duplicates, 50 non-English, and 133 unrelated), leaving 103 videos for analysis. Of these, 65 were tagged as fetal surgery, 27 as fetal intervention, and 11 as fetal therapy. Videos were posted between 2020 and 2026, with 64% created within the last two years. Total views ranged from 26 to 5.8 million.

Preliminary analysis of the first 25 videos demonstrated that only 36% were created by healthcare professionals. Additionally, 56% portrayed predominantly positive experiences, while negatively toned videos focused on prognosis and travel burden. Using a modified 5-point DISCERN scale, videos scored an average of 2/5, indicating low information quality. Mean actionability scores using the Patient Education Materials Assessment Tool were 1.

As patients increasingly seek medical information online, healthcare professionals have an opportunity and responsibility to provide accurate, evidence-based, and accessible educational content on social media platforms.