

**[16-162]****Fetal Disseminated Intravascular Coagulation Associated with Klippel–Trenaunay Syndrome: a case report****Federica Bellussi**

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**Background:**

Klippel–Trenaunay syndrome (KTS) is a congenital vascular disorder characterized by segmental tissue overgrowth, capillary malformations, and venous abnormalities. KTS may be complicated by Kasabach–Merritt phenomenon (KMP), leading to severe consumptive coagulopathy and disseminated intravascular coagulation (DIC). We present a case of KTS complicated by in utero KMP and DIC.

**Case:**

32-year-old G2P1 referred at 24 weeks for left lower extremity lymphedema and mild hydrops. Amniocentesis results were uninformative. At 29 weeks, hydrops progressed with elevated MCA-PSV. Cordocentesis confirmed anemia and thrombocytopenia; fetal transfusion was performed. MRI and US demonstrated a persistent lateral marginal vein. Repeat transfusions revealed consumptive coagulopathy. Delivery was prompted at 30 5/7 secondary to non-reassuring fetal testing. Neonatal examination showed segmental overgrowth with overlying port-wine stain. Autopsy confirmed combined capillary venous–lymphatic malformation.

**Conclusion:**

In utero KMP is a rare and life-threatening complication of KTS. Repeated transfusions may provide only transient stabilization and carry procedural risks. Once fetal DIC and hydrops develop, deterioration can be rapid, and prognosis is guarded. Early recognition of extensive vascular malformations is therefore critical for counseling, multidisciplinary planning, and discussion of perinatal outcomes.

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## Fetal Acetylcholine Receptor Antibody-Related Disorder: Recognizing a Rare, Treatable Condition

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Fetal Acetylcholine Receptor Antibody-Related Disorder (FARAD) occurs when maternal antibodies cross the placenta and target the fetal acetylcholine receptor (AChR). This causes neuromuscular disorders ranging from mild weakness to severe contractures, arthrogryposis multiplex congenita (AMC), and fetal death. Because mothers are often asymptomatic for myasthenia gravis, FARAD is frequently underrecognized, yet it recurs in subsequent pregnancies without intervention.

We recently reported the first successful preventive treatment of FARAD using the FcRn inhibitor efgartigimod in the *New England Journal of Medicine*.

### Case Report

A 34-year-old woman with normal genetic testing experienced six consecutive pregnancy terminations due to severe congenital anomalies. Pathological examination of the last fetus revealed an elevated diaphragm and arthrogryposis. Serology showed high AChR antibody titers specific to the fetal subunit, confirming FARAD. The mother had only transient, minimal diplopia.

In her next pregnancy, plasmapheresis and IVIg started at 7 weeks proved insufficient. Off-label efgartigimod (10 mg/kg/week) was initiated at 11 weeks, reducing maternal IgG to 3.8 g/L and AChR titers to 5 nmol/L. The pregnancy proceeded normally. At 37+3 weeks, a healthy boy was born with mild, self-resolving hypotonia and clubfoot, and no infectious complications.

### Discussion and Conclusion

Placental IgG transfer begins around 13 weeks, and the fetal receptor is expressed until weeks 32–34, making early, continuous intervention essential. Blocking the neonatal Fc receptor (FcRn) with efgartigimod prevents severe FARAD by lowering maternal IgG and inhibiting its transfer to the fetus. No adverse maternal or neonatal effects were observed, though monitoring for transient hypogammaglobulinemia is recommended.

Routine AChR antibody testing for unexplained fetal neuromuscular anomalies allows timely diagnosis. International registries are now required to study the disease and optimize treatment for FARAD. The LUMC has established the ATLAS studies, for more information please contact [atlasstudies@lumc.nl](mailto:atlasstudies@lumc.nl).

[16-165]

## **Prolonged Fetal Bradycardia Following Intraoperative Dexmedetomidine Redosing During Intrauterine Transfusion: A Case Report**

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Maternal sedation during intrauterine transfusion (IUT) varies across fetal treatment centers with no established consensus on agent selection. Dexmedetomidine, a selective alpha-2 adrenergic agonist with sympatholytic properties, crosses the placenta and may affect fetal cardiovascular function. One prior case of fetal bradycardia following maternal dexmedetomidine bolus has been reported in a non-procedural obstetric context; its use during IUT has not been described.

A 38-year-old G6P1312 with anti-C/anti-D alloimmunization underwent four IUTs for hemolytic anemia without hydrops. Fentanyl, midazolam, and propofol at IUT 1 and dexmedetomidine at IUT 2 both produced post-procedure FHR of 115 bpm. At the third IUT at 33+4 weeks, intraoperative redosing of dexmedetomidine was performed for maternal anxiolysis. Immediately following the transfusion, FHR declined to 95 bpm with moderate variability and accelerations. After 45 minutes of OR observation the patient was transferred to labor and delivery; FHR normalized to 115 bpm two hours later. The fourth IUT was performed under spinal anesthesia without bradycardia. Cesarean delivery at 36+6 weeks resulted in a healthy neonate. Dexmedetomidine redosing during IUT may precipitate prolonged fetal bradycardia, though other procedural factors must be considered. Preserved variability and accelerations support expectant management and suggest pharmacologic rather than hypoxic etiology.

**[16-166]****Successful EXIT resection of a large fetal intrapericardial teratoma****Jaime Alkon, MD<sup>1</sup>; Eva Hoffmann, MD<sup>2</sup>; Sandeep Sainathan, MD<sup>3</sup>;  
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**Introduction:** Pericardial teratomas are rare benign pericardial tumors. Although these tumors are benign, they can considerably grow during fetal life leading to increased risk of pericardial effusion, compression of the heart and potentially compromising cardiac output and intrauterine death.

**Case Presentation:** An extremely large pericardial teratoma was diagnosed at 20 weeks' gestation. Serial ultrasonographic and echocardiographic follow-up examinations were performed showing absence of hydrops and normal fetal cardiac function throughout the entire gestation, despite the extremely large size of the tumor. At 36 weeks' gestation, an EXIT-to-resection procedure was successfully performed because of sudden development of fetal hydrops with mirror syndrome. On placental-fetal circulation, the pericardial teratoma was completely resected allowing for successful maternal-fetal outcome.

**Conclusion:** Serial fetal echocardiogram is a key prenatal tool to evaluate fetal cardiac function in large pericardial teratomas. EXIT-to-resection procedure of fetal pericardial teratoma is a safe perinatal therapeutic option to improve the outcomes of those babies.

**Keywords:** pericardial teratoma, mediastinal teratoma, fetal ultrasound, fetal echocardiogram, fetal surgery, EXIT procedure

**[16-167]****Geographic Barriers to Tertiary Care for Pregnancies Complicated by a Congenital Anomaly: An Analysis of the California Birth Cohort Dataset****April Angelica Carlson**

Rady CHOC Department of Pediatric Surgery

**Background:** Access to fetal care for pregnancies complicated by congenital anomalies is a geographic challenge. We aimed to evaluate outcomes related to tertiary care access across California.

**Methods:** This retrospective population-based study using the California Birth Cohort (2013-2020) included all births with congenital anomalies. Maternal residence was mapped in relation to California Children's Services-approved tertiary hospitals (CCSTH). Driving distance to the nearest CCSTH was categorized as  $\leq 50$  or  $> 50$  miles. Demographic and clinical characteristics were compared between groups. Geospatial mapping assessed regional access patterns.

**Results:** 20,136 cases were identified; 10,160 (50.5%) were  $> 50$  miles from a CCSTH. Tertiary hospitals were concentrated in urban areas. Markers of neonatal acuity were higher among cases  $\leq 50$  miles, including NICU admission (39.5% vs. 14.1%), assisted ventilation immediately following delivery (13% vs. 4.5%), and surfactant use (1.2% vs. 0.4%) (all  $p < 0.0001$ ). Fetal death (4.6% vs. 1.6%,  $p < 0.0001$ ) was more common among those residing closer to a CCSTH.

**Conclusion:** In California, greater than half of pregnancies affected by a congenital anomaly face a geographic barrier to access to tertiary care. Maternal-fetal outcomes appear worse in cases residing closer, which may reflect case-mix influence. Targeted strategies are needed to improve equitable access to specialized perinatal care.

**[16-168]****Power to the people: the development of a multi-site multidisciplinary fetal medicine team meeting across Ireland's fastest growing region: a quality improvement initiative (QIP).****Claudia Condon<sup>1</sup>, Katie Flynn<sup>2</sup>, Laura B Ryan<sup>1</sup>, Jane Dalrymple<sup>3</sup>, Paula McEnteggart<sup>2</sup>, Brendan McDonnell<sup>1,2,3</sup>**<sup>1</sup> Cavan General Hospital Obstetrics and Gynaecology<sup>2</sup> Our Lady of Lourdes Hospital, Drogheda Obstetrics and Gynaecology<sup>3</sup> Rotunda Hospital, Dublin Fetal Medicine**Background:**

Dublin North East is Ireland's most populous health region, containing one quarter of the population, with one tertiary level fetal medicine hospital and two regional centres. Prior to this QIP, regional patients requiring expert multidisciplinary neonatal or MFM opinion or complex delivery planning required referral to the central tertiary hospital for discussion. This led to disconnect between the regional and tertiary hospitals in patient care and ownership.

**Aim:**

We sought to improve this communication pathway and re-engage local teams with complex care decisions.

**Methods:**

As part of this QIP we engaged stakeholders in obstetrics, neonatology, and midwifery in all three maternity units. We agreed a monthly virtual meeting with referrals taken from MFMs and discussion with local teams. The meeting outcomes determined by the MDT are disseminated to the primary teams.

**Results:**

This new initiative has had excellent engagement and feedback. We have facilitated local management for patients that would otherwise have been referred to the tertiary unit, preventing unnecessary travel and associated costs for patients.

**Conclusion:**

Regional development of a cross-site MDT is a cost neutral method of improving fetal network cohesion and addresses issues with fetal medicine access in a diverse geographic region.

[16-169]

## Three-Dimensional Fractional Volume Measurement of Vasa Previa Vessels: Toward a Potential Novel Framework for Fetoscopic Laser Ablation Candidacy Assessment

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We evaluated the clinical utility of three-dimensional fractional volume measurement of vasa previa vessels in type II and III vasa previa as a novel framework for fetoscopic laser ablation (FLA) candidacy assessment. A preliminary case series of 21 patients with type II or III vasa previa underwent three-dimensional sonographic fractional volume measurement of the aberrant vasculature. We hypothesized that a fractional volume threshold of  $\leq 25\%$  would identify cases where ablation targets a hemodynamically dispensable placental territory, and applied this criterion to stratify FLA candidacy.

Of 21 cases, 12 (57%) met the proposed  $\leq 25\%$  threshold and were offered FLA, achieving a 100% live birth rate with no post-procedural fetal hemodynamic compromise. The remaining 9 cases (43%) exceeded the threshold and were not offered FLA, reflecting concern for ablation of a functionally significant placental fraction.

This preliminary experience suggests that three-dimensional fractional volume measurement is a feasible and potentially valuable tool for FLA candidacy stratification in type II and III vasa previa. A threshold of  $\leq 25\%$  may identify patients who can safely undergo ablation without compromising fetoplacental perfusion. Prospective validation in larger cohorts is warranted to establish standardized thresholds and confirm clinical utility.

[16-170]

## **A Modified Delphi Study to create a checklist for optimal anesthetic management of fetal bradycardia leading to delivery during fetoscopic myelomeningocele repair**

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### **Background**

Fetal bradycardia during myelomeningocele repair requires rapid intervention to ensure optimal care for mother and fetus. Though simulation has been effective in improving skills, consensus is needed to properly train clinicians to manage this critical scenario. The aim of this study is to create a checklist of the best practices for the anesthetic management of fetal bradycardia during myelomeningocele repair.

### **Methods**

Fetal anesthesiology experts were invited by email to participate in a modified Delphi study. An initial 11-step and 16 sub-item checklist was shared via RedCap with instructions to add, keep, remove, or modify items. This step will be repeated until each item exceeds eighty percent consensus.

### **Results**

Thirteen fetal anesthesiologists from ten institutions completed Round 1. The study is ongoing, and Round 4 remains open. At present, the checklist contains 15-steps and 44 sub-items.

### **Discussion**

Core steps of management and communication have been consistent across institutions. The most common points of variation are medication selection and dosages. The expansion of sub-items captures the meaningful variation in institutional practices and reflects the intricacy of these cases. The final expert-guided checklist can be used to inform educational interventions to improve the skills, knowledge, and attitudes of our learners and clinicians.

**[16-171]****Spinal Anesthesia Improves External Version Success and Decreases Case Cancellation Rates in Fetal Interventions: A retrospective analysis of 99 fetal cardiac and fetoscopic endoluminal occlusion balloon insertion procedures****Claire Naus**

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Optimal fetal positioning is critical to the success of certain minimally invasive fetal procedures, such as fetoscopic endoluminal tracheal occlusion (FETO) balloon placement, fetal atrial septal intervention (FASI), and fetal aortic valvuloplasty (FAV). Because neuraxial anesthesia is known to facilitate external version (EV), we hypothesized that spinal anesthesia (SA) would increase EV success for these cases.

This retrospective, single-center, cohort study includes all FETO balloon placement and fetal cardiac procedures (2012-2025). The primary outcome was successful EV without procedure cancellation or rescheduling. Secondary outcomes included time to successful EV, procedure duration, and total operating room times.

Of the 99 procedures (61 FETO, 38 FASI, 14 FAV), 54 (36 FETO, 13 FASI, 5 FAV) required fetal positioning with EV. Of these 54, 29 involved SA to facilitate EV. Demographics did not differ between groups except for age (higher, SA group). Successful EV was significantly higher in patients receiving SA (OR 18.7, 95% CI 2.4-208.7); 40% (10/25) of cases without SA needed to be rescheduled (unsuccessful EV) versus 3.4% (1/29) with SA ( $p = 0.001$ ).

For fetal interventions requiring precise fetal positioning, SA was associated with higher EV success and decreased need for case cancellation or rescheduling, without prolonging operating room time.

[16-172]

## Development of a Non-Invasive Fetal Oxygenation Monitor

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Non-invasive fetal blood oxygen saturation monitoring remains a significant clinical challenge. We are producing an integrated transabdominal fetal oximeter, comprising optical hardware, with controlled in-silico and in-vivo testing (in gravid sheep), with Adaptive Noise Cancellation (ANC) software framework for fetal signal isolation.

We developed a near-infrared optical oximeter using far-red (735 nm) and infrared (850 nm) LEDs with a Silicon Photomultiplier detector. Optimal source-detector distances were established through systematic signal quality index characterisation. Tissue phantoms with dual embedded vasculature replicated maternal-fetal optical properties at physiologically-relevant flowrates. We applied Recursive Least Squares (RLS) and Least Mean Squares (LMS) algorithms to isolate fetal from composite maternal-fetal signals, with SpO<sub>2</sub> estimated via R-ratio root-mean-squared approach.

We successfully detected deep tissue signals with stable light output with the Silicon Photomultiplier optimised for deep tissue signal quality. Tissue phantom produced physiologically consistent maternal/fetal waveforms (pulsatility indices  $0.09 \pm 0.01$  and  $0.04 \pm 0.00$  respectively, within physiological ranges), enabling controlled and reproducible device testing. We successfully isolated ovine fetal signals, with optimal RLS parameters established ( $N=8$ ,  $\lambda=0.99$ ,  $\alpha=0.1$ ). Validation on real-world datasets yielded SpO<sub>2</sub> estimates consistently ~90%. Key limitations are simultaneous red/infrared signal acquisition and improved maternal reference-signal quality. Future work focuses on refining real-time SpO<sub>2</sub> calibration for clinical validation.