Society for Pediatric Interventional Radiology



BEYOND HORIZONS

SPIR2025

14 – 16 October 2025
InterContinental Sydney

www.spir.org/2025-sydney

Meeting Supplement

Society for Pediatric Interventional Radiology

Dear friends and colleagues,

A very warm welcome to **Sydney** and to the **Society for Pediatric Interventional Radiology Annual Meeting 2025**. It's a joy to see our community together again - in person, in conversation, and inspiring each other with the quiet energy that drives our specialty forward!

Our theme this year, **"Beyond Horizons,"** is both a challenge and a celebration. As paediatric interventional radiologists, we live at the edge of what's possible, pushing the boundaries of what's achievable, in our endeavour to make lives of our sick children better!! Every procedure we perform is a reminder that innovation and compassion are not opposites - they are partners in progress.

Today, we are crossing frontiers faster than ever. From AI-assisted diagnosis and hybrid Angio-CTs to nanocatheters, lymphatic mapping, and image-guided gene therapies - we are no longer bound by what our predecessors thought could not be done. Every year, our "what if" quietly becomes "we did."

Beyond procedures, we are educators, innovators, advocates, and collaborators. We are building a future where minimally invasive care is the norm, not the exception - and where the next generation of IRs will dream without limits because we dared to look beyond.

The scientific program this year is a feast of ideas - from cutting-edge image guided therapies, advanced techniques in paediatric imaging, and lymphatic interventions, to spirited debates and engaging discussion that will challenge your thinking and broaden your perspectives. We'll discuss "bread-and-butter" procedures (with a dash of Vegemite), dive deep into vascular anomalies, and showcase the creativity and courage that define our field. Don't miss the "Extreme IR" session, where brilliance meets brevity - and occasionally, chaos.

But this meeting is more than just science. It's about us - a global community connected by purpose, perseverance, and shared laughter over cases that once made our hearts race. It's about the friendships formed in corridors, the ideas sparked over coffee, and the moments of quiet pride when we realise how far our specialty has come.

My heartfelt thanks to my fellow members of the Executive, the Board of Directors and the scientific committee, for their inputs and assistance in shaping this meeting. To the faculty, for their valuable contributions to enrich this meeting. To the industry partners for their generosity. To Susan for her constant support. To Natacha and NC Events crew who have poured their energy into making this event truly special. And to those attending SPIR for the first time - welcome to the family. You are joining a movement that's shaping the future of paediatric care, one tiny catheter at a time.

So, take a deep breath, look out over Sydney's glittering harbour, and get ready to go *beyond horizons*.

Warm regards,
S Murthy Chennapragada
President, Society for Pediatric Interventional Radiology

Society for Pediatric Interventional Radiology
13th International Meeting
October 14 - 16, 2025
Sydney, Australia

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All attempts have been made to ensure information contained in this program is current. There may be substitutions/additions that occurred after this program was sent to print.

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SPIR GOLD MEDAL



The Gold Medal is the highest honor accorded to a member of the SPIR. The recipient must meet at least one of the following:

- Substantial contributions to the specialty of pediatric interventional radiology through clinical excellence, education, mentoring and research.
- Extraordinary contributions to enhance the development and/or stature of pediatric interventional radiology, including service to the Society.
- Outstanding lifetime service to pediatric interventional radiology

Past Gold Medal recipients:

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GOLD MEDAL RECIPIENTS



Anne Marie Cahill MBBCh BAO, FSIR, FCIRSE

Dr. Anne Marie Cahill earned her medical degree from University College Galway, Ireland, in 1990. She completed her Radiology residency at Mater Misericordiae Hospital in Dublin in 1997, followed by a F ellowship in General Pediatric Radiology at British Columbia Children's Hospital in 1998. She pursued further specialization with a Pediatric Interventional Radiology Fellowship at the Children's Hospital of Pittsburgh in 1999. Dr. Cahill received her American Board of Radiology certification in 2005 and earned her Certificate of Added Qualification in Pediatric Radiology in 2007.

In 2000, Dr. Cahill began her career as a Pediatric Interventional Radiologist at the University of Pittsburgh Medical Center, serving as Assistant Professor. In 2003, she joined the Children's Hospital of Philadelphia at the University of Pennsylvania School of Medicine, where she played a pivotal role in advancing Pediatric Interventional Radiology. She currently serves as Division Chief of Interventional Radiology and Director of Image-Based Therapy for Vascular Anomalies. Her clinical focus includes vascular malformation therapy, endovascular treatment of renovascular hypertension, and venous thrombolysis.

Dr. Cahill has built a distinguished academic career. She is a Professor of Radiology at the Perelman School of Medicine, University of Pennsylvania. She has delivered over 100 invited lectures globally and authored 136 peer-reviewed publications and more than 200 abstracts. Her contributions have been recognized with numerous awards. She is a Fellow of the Society of Interventional Radiology (SIR) and a distinguished Fellow of the Cardiovascular and Interventional Radiology Society of Europe (CIRSE).

In addition to her clinical and academic achievements, Dr. Cahill serves as Section Editor for Pediatric Interventional Radiology at several leading journals, including the *Journal of Vascular and Interventional Radiology (JVIR)*, *Cardiovascular and Interventional Radiology (CVIR)*, *CVIR Endovascular*, and *Frontiers in Pediatrics*. She also reviews for multiple journals, including *Pediatric Radiology*, *American Journal of Radiology*, *Pediatric Pulmonology*, *Journal of Pediatric Genetics*, *Phlebology*, *European Journal of Clinical Investigation*, and *Clinical Imaging*.

Above all, Dr. Cahill is a dedicated clinician educator who has mentored numerous students and trained Pediatric Interventional Radiology fellows, many of whom have gone on to distinguished careers worldwide.

Dr. Cahill is a founding member of SPIR and served as President in 2022.



Manrita Sidhu MD

Dr. Manrita Sidhu received her Medical Degree from the Medical College of Pennsylvania in 1988. She then moved to the west coast and did a Research Fellowship in MRI (1991), completed her Diagnostic Radiology Residency at Stanford University Hospital in 1995, and earned her certification from the American Board of Radiology in the same year. Dr. Sidhu then completed subspecializations in Pediatric Radiology at Seattle Children's Hospital in 1996 and Cardiovascular and Interventional Radiology at Stanford University Hospital in 1998. She received her Certificate of Added Qualification in Pediatric Radiology in 2000.

In 1998, Dr Sidhu began her career in Pediatric and Interventional Radiology at the Children's Hospital Oakland, California. In 2000, she returned to Seattle Children's Hospital as an Assistant Professor and later a Clinical Assistant Professor. Since 2016, she focuses in her private practice Seatle Radiologists/ Radia where she is a Partner Radiologist. She is a respected radiologist that continues to share her Pediatric Diagnostic and Interventional Radiology knowledge.

Earlier in her career, Dr. Sidhu was an eager advocate for Pediatric Interventional Radiology, including interactions with NIH, FDA and even Senator Obama's office. She served in committees of several professional organizations including the American College of Radiology, American Roentgen Ray Society, Radiologic Society of North America, The Society for Pediatric Radiology, Society of Interventional Radiology, Western Angiographic and Interventional Society and Society for Pediatric Interventional Radiology, helping to develop Pediatric Interventional Radiology.

Dr Sidhu's academic career highlights include several lectures in Pediatric Interventional Radiology and 32 peer-reviewed publications. Her focus on radiation safety raised awareness of this important topic. She was the Editor of *IR News* in 2007, a guest Editor for *Techniques in Vascular and Interventional Radiology* (2010) and a reviewer for several prestigious journals including the *American Journal of Roentgenology*, *Pediatric Radiology* and *Journal of Vascular and Interventional Radiology*.

Dr. Sidhu is a founding member of SPIR and served as President from 2009-2011.

PIONEERS AWARD

This is awarded for the best scientific paper presented at the annual meeting in honor of pioneering innovators of pediatric interventional radiology. The presentations are judged by 4 SPIR peers and scoring is based on the following criteria: Originality, Objectivity, Reproducibility, Contribution to PIR, and Overall Presentation.

Past Pioneers Award recipients:

2024: **First-in-children experience with a novel pediatric ultrasound guided gastrostomy method using the PUMA-G Pediatric System**
Schoeman S, Barasch N, Tropello S, Srinivasan A, Cahill AM

2023: **Cervical intranodal lymphangiogram in pediatric cardiac patients; Technique, safety and clinical applications**
Shahin M, Shashi K

2022: **Image-guided Interstitial Bleomycin Injections to Treat Challenging Vascular Malformations**
GIll A, Shah J, Hawkins M

2021: **Safety and efficacy of the Cryoablation of pulmonary and pleural metastases in pediatric patients**
Prajapati HJ, Proctor K, Patel PN, Agrawal V, Maller V, Talbot L, Gold R, Zoltan P

2020: **Minimally invasive treatment for unicameral bone cysts with chemical sclerosis and bone graft substitute: A preliminary report.**
Rajeswaran S, Khan A, Samet J, Donaldson J, Attar S, Green J

2019: **Ultrasound-Guided Inguinal Hernia Repair.**
Jarboe M, Hirsche RB, Ladino-Torres M

2018: **Catheter-directed pharmacologic thrombolysis for acute submassive and massive pulmonary emboli in children and adolescents.**
Shah J, Gill A, Ji D, Durrence W, Paden M, Patel K, Hawkins CM

2017: **The contribution of IR to the management of children with button battery ingestion injury.**
Barnacle A, Rose E, Roebuck D, McLaren C.

Society for Pediatric Interventional Radiology



Pioneers Award for Best Scientific Paper

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Analysis of the efficacy of interventional treatment of venous malformations of the foot

Xie S, Liu Z
Presented by Zhenyin Liu

Introduction

Venous malformations (VMs) in the foot often pose a treatment challenge due to their diffuse nature and involvement of nerves, muscles, and joints, often causing pain, swelling, and dysfunction. This study assesses the clinical efficacy, safety, and long-term outcomes of interventional sclerotherapy for the treatment of venous malformations in the foot in children, and to investigate factors influencing treatment efficacy.

Materials and Methods

We retrospectively analysed data from 30 paediatric patients (aged 1-19 years, mean 6.17±4.48 years) treated for foot VMs at our centre from January 2021 to December 2024. Patients underwent ultrasound and/or DSA-guided sclerotherapy, using polydocanol foam, pingyangmycin, tissue adhesive, and spring coils. Lesions were classified according to the Puig's system. Outcomes included number of treatments, technical success, VM volume reduction, and complications, pain improvement (via visual analogue scale, VAS), and functional recovery. Mean follow-up was 18 months.

Results

Sclerotherapy achieved a 90.0% effectiveness rate (27/30). Each patient underwent 3.37 ± 1.79 (range 1-8) sclerotherapy sessions. Post-treatment, 90.0% showed >50% VM volume reduction and significant swelling improvement; VAS score fell from 6.8 to 1.9 ($P<0.001$), with foot function improving by 68.3%. All patients experienced swelling (30/30), with bruising (1/30), and blisters (1/30), but no serious complications. VM distance from the skin surface predicted complications ($p<0.01$). No relapsed occurred, and quality of life improved markedly.

Discussion

Interventional sclerotherapy is an effective and safe treatment for foot venous malformations, offering sustained outcomes and enhanced quality of life.

Angioplasty for Renal Artery Stenosis in Children

Anwar U, Kim K, Alomari A, Amarneh M, Shaikh R, Padua H, Chaudry G
Presented by Gulraiz Chaudry

Introduction

Renal artery stenosis (RAS) is a rare but important cause of hypertension in children patients. Percutaneous renal angioplasty (PTRA) offers a minimally invasive therapeutic option, but data on its efficacy in children remain limited, particularly if associated with mid-aortic stenosis.

Materials and Methods

This retrospective study included children with hypertension secondary to RAS who underwent PTRA at a tertiary care pediatric hospital. Data on patient characteristics, procedural details, and outcomes were collected. Clinical success was defined as improved blood pressure control or reduction in antihypertensive use. Technical success was categorized as complete (<25% residual stenosis) or partial (25–69% residual stenosis) resolution. Descriptive and subgroup analyses were performed.

Results

Fifteen patients (mean age 10.1 ± 4.2 years, 8 males) underwent 20 angioplasties. Five patients (33.3%) had mid-aortic syndrome (MAS). Most stenoses were right-sided (40%), with 26.7% bilateral. Hypertension was incidentally diagnosed in 73.3% of cases. Non-cutting balloons were used in 95% of procedures, and minor complications occurred in two cases (hematoma, intimal dissection). Clinical success was achieved in all procedures (100%), while technical success was complete in 60% and partial in 40%. Subgroup analysis showed no significant difference in outcomes between MAS-associated and isolated RAS.

Discussion

Percutaneous renal angioplasty is a safe and effective treatment for RAS in children, with high clinical success and acceptable technical outcomes.

Comparison of antegrade and retrograde percutaneous gastrostomy techniques in children

Tabor B, Schoeman S, Krishnamurthy G, Vatsky S, Escobar F, Cajigas-Loyola S, Cahill AM, Srinivasan A
Presented by Abhay Srinivasan,

Introduction

We compare procedural outcomes, adverse events, and efficacy of antegrade and retrograde percutaneous gastrostomy techniques in a pediatric cohort.

Materials and Methods

This was a retrospective analysis of 128 gastrostomy procedures—64 antegrade (performed between 10/2020 and 03/2024) and 64 retrograde (between 10/2018 and 01/2024). Patient data and procedure details, including procedure time, fluoroscopy time, radiation dose, technical success, and adverse events (AE) were collected.

Results

The antegrade group was younger (median age 1.9years vs. 12.0y) and smaller (median weight 11.5kg vs. 31.2kg) than the retrograde group ($p<0.001$). Antegrade group had similar mean procedure (67.0minutes±32.8min vs. 69.5min±25.9 minutes, $p=0.64$) and fluoroscopy times (8.0min±6.0min vs. 9.1 ± 7.8 minutes, $p=0.35$) compared to retrograde. Technical success was 100% for antegrade and 96.9% for retrograde (62/64, $p = 0.50$). No major AE occurred in either group. However, minor AE (e.g., small pneumoperitoneum, gastropexy anchor malposition, and rectus hematoma) were more frequent with the retrograde approach (0% vs 15.6%, $p = 0.001$). Radiation exposure (median dose-area-product) was higher in the retrograde group (60.6Gy·cm² vs. 18.5Gy·cm², $p < 0.001$). Both techniques achieved comparable outcomes, with a median weight gain at 3 months of ~1 kg in each group ($p=0.94$).
All antegrade patients required an additional procedure under anesthesia for conversion to a low-profile gastrostomy button within 3 months, whereas buttons were placed primarily for the retrograde group.

Discussion

Both antegrade and retrograde gastrostomy techniques demonstrated high technical success and efficacy. Retrograde placement was performed in larger children and avoided a subsequent procedure for conversion to a gastrostomy button.

Efficacy of Image-Guided Epidural Steroid Injections in Pediatric Patients

Reis J, Eysenbach L, Bogart A, Kim T, Shivaram G
Presented by Lindsay Eysenbach

Introduction

Epidural steroid injection (ESI) is an established treatment for spinal radiculopathy and back pain, however there is limited data on efficacy in children. The purpose of this study is to evaluate pediatric ESI responses, the recurrence rate, and potential factors influencing these outcomes.

Materials and Methods

A 7-year retrospective single-center review of children receiving image-guided ESI was performed. Non-verbal patients were excluded. Pre- and post-procedure symptoms were rated on a 0-10 scale. Responses were recorded from chart reviews as unchanged, partial response, significant response, or resolved. Recurrence was defined as returning/worsening symptoms after 1 month. Trauma history, limitations in daily activities (ADLs), sports participation, MRI findings, corticosteroid selection, and medical therapies were included for multivariate analysis. Ordinal logistic and binary probit regression were to determine the respective effects of confounding factors on outcomes.

Results

45 children remained after exclusions with a mean age of 16.9 +/- 1.9 years. Symptom improvement occurred in 36 patients (80%) with significant improvement or resolution in 24 patients (53%) and a median numerical scale improvement of 60% [IQR 23%, 97%]. Oral steroid use (p=0.03), non-steroidal anti-inflammatory (NSAID) use (p=0.01), limitations in ADLs (p=0.04), and trauma (p=0.047) correlated with post-procedure improvement. Recurrence occurred in 26 cases (58%) increasing with slightly younger age (p=0.045) and NSAID use (0.02), although 87% of patients used NSAIDs.

Discussion

Epidural steroid injections provided relief in most symptomatic children, however recurrence occurred in over half the patients. Oral medication use, limitations in ADLs, and trauma history correlated with improved responses.

Long-Term Outcomes of Transarterial Embolization for Pulmonary Arteriovenous Malformations in Pediatric Hereditary Hemorrhagic Telangiectasia

Páez-Carpio A, Lim A, Gasparetto A, Shaw M, Ratjen F, Amaral JG
Presented by Joao Amaral

Introduction

Pulmonary arteriovenous malformations (PAVMs) are a common manifestation of hereditary hemorrhagic telangiectasia (HHT), and may lead to significant morbidity in children. Transarterial embolization (TAE) is the standard treatment, but pediatric-specific long-term data remain limited. This study aimed to assess long-term clinical and imaging outcomes of TAE in pediatric HHT and to identify predictors of oxygenation response and lesion durability.

Materials and Methods

This retrospective cohort included 33 pediatric HHT patients (mean age: 8.3 years) who underwent TAE for 63 PAVMs between 2004 and 2024. Clinical outcome was assessed by peripheral oxygen saturation (SpO□) at baseline and at 1 month, 1, 3, and 5 years. Lesion-level outcomes included persistence, reperfusion, and recanalization. Regression models were used to identify clinical and anatomical predictors. Technical success, embolic material, number and size of feeding and draining vessels, and adverse events (AEs) were recorded. AEs were classified using the CIRSE system.

Results

TAE had a technical success rate of 96.8%. Median SpO□ improved from 95% at baseline to 98% at 1 month ($p<0.001$), and remained at 98% at 1 ($p<0.001$) and 3 years ($p=0.002$), and 97% at 5 years ($p=0.03$). Diffuse disease and HHT type 1 were associated with lower follow-up SpO□ ($p=0.024$–0.033 and $p=0.023$). Lesion persistence, reperfusion, and recanalization occurred in 16%, 19%, and 6%, respectively. Persistence was associated with larger size ($p=0.007$), diffuse disease ($p=0.008$), and number of draining veins ($p=0.009$). Reperfusion was associated with lesion complexity ($p=0.015$) and number of feeding arteries ($p=0.030$); recanalization with number of feeding arteries ($p=0.046$). AE rate was 12%, mostly minor.

Discussion

TAE proved to be effective and safe for managing PAVMs in pediatric patients with HHT, with sustained oxygenation improvement and low complication rates. Most lesions remained occluded over time, and SpO□ levels improved significantly at early follow-up and remained stable for up to 5 years. Importantly, our study identified diffuse PAVM disease and HHT type 1 as consistent predictors of lower oxygenation at follow-up, even after adjustment for baseline SpO□. This supports prior observations that diffuse involvement may represent a distinct clinical phenotype associated with worse prognosis. Additionally, we found that lesion size, vascular complexity, and number of draining veins were significantly associated with persistence, while reperfusion and recanalization were linked to lesion complexity and feeding artery count. These findings suggest that anatomical charac-

Towards Equitable Access: Evaluating the Paediatric Interventional Radiology (PIR)
Landscape in the Asia-Pacific Region

Fung K, Toh LHW, Bramantya IN, Herath DA, Chennapragada MS
Presented by Kevin Fung

Introduction
To evaluate the current state of PIR workforce, opportunities and challenges in the Asia-Pacific (APAC) region.

Materials and Methods
A three-part electronic survey was distributed to members of the Society of Pediatric Interventional Radiology (SPIR), Asian Oceanian Society for Pediatric Radiology (AOSPR), and Asia-Pacific Society of Cardiovascular and Interventional Radiology (APSCVIR). Part 1 addressed individual provider practices, Part 2 focused on institutional service, and Part 3 assessed perceptions on priorities for developing PIR in APAC, with respondents rating the importance of different factors on a 10-point scale.

Results
A total of 116 individual and 100 institutional responses from 19 APAC countries/regions were analysed. Only 11.2% (13/116) individuals identified as paediatric interventional radiologists, while the majority (66.3%, 77/116) were adult interventional radiologists. Only 6.0% (7/116) reported performing PIR in >50% of their clinical practice. Among the responding institutions, 28.0% (28/100) were children's hospitals. Over half (52/100) have dedicated anaesthesia sessions for PIR. Common procedures included drainage (84%), biopsy (76%), vascular access (70%), and vascular anomaly treatment (70%). While all centres offered day-time PIR services, only 33.0% (33/100) provided on-call coverage. Among those, the majority (25/33) relied on a single PIR provider for on-call coverage. The highest-rated needs for PIR development were a specialist network for case discussion (mean score = 8.9), dedicated anaesthesia resources (8.7), and regional PIR training centres (8.5).

Discussion
PIR in the APAC region faces significant challenges in manpower and resource allocation. Strengthening structured training pathways and securing dedicated anaesthesia support are key to provide equitable PIR access across the region.

Clinical analysis of interventional sclerotherapy combined with oral sirolimus in the treatment of tongue lymphatic malformations

Wu Z, Liu Z
Presented by Zhenyin Liu

Introduction

To assess the clinical efficacy and safety of interventional sclerotherapy combined with oral sirolimus in treating tongue lymphatic malformation in children.

Materials and Methods

This is a retrospective study at a single center that collected the clinical data of 32 children (16 males and 16 females) diagnosed with lymphatic malformation of the tongue between October 2015 and July 2024. The lesions were distributed to the tongue body (n=28), tongue root (n=3), and mixed (n=1). Most cases of this condition happen before a child turns one year old (n=21). The treatment included simple interventional sclerotherapy (n=16) and interventional sclerotherapy combined with oral sirolimus treatment (n=16). Efficacy was evaluated as follows: mass regression ≥95%(cure); mass regression 50% to 95%(significant); mass regression 25% to 50% (moderate); mass regression <25% or deterioration (no response).

Results

In the group receiving the simple interventional sclerotherapy, 2 patients, 11 patients, and 2 patients were evaluated as cured, significant, and no response, respectively. Within the combined oral sirolimus group, 9 patients, 5 patients, and 1 patient were evaluated as cured, significant, and no response, respectively. Postoperative adverse reactions include: swelling (n=19); bleeding (n=1); tongue protrusion (n=1); partial necrosis of the tongue body (n=1). None of the patients experienced serious complications, such as ectopic embolisms, pulmonary hypertension, or severe allergic reactions. The follow-up period was from 6 months to 4 years.

Discussion

This study demonstrates that interventional sclerotherapy is a safe and effective treatment for tongue lymphatic malformations, and its efficacy may be enhanced when combined with sirolimus medication.

Clinical Experience with Combined Minimally Invasive Interventional Therapy and Oral Sirolimus for the Treatment of Klippel-Trenaunay Syndrome

Li H
Presented by Haibo Li

Introduction

To investigate the synergistic efficacy and safety profile of combining minimally invasive interventional procedures with oral sirolimus in patients with Klippel-Trenaunay syndrome (KTS), a rare congenital vascular disorder characterized by complex malformations.

Materials and Methods

In this single-center retrospective study, 16 KTS patients (median age: 3 years; 48% female) received multimodal therapy between 2010 and 2024. Interventional approaches included ultrasound-guided foam sclerotherapy (29%), endovascular laser ablation (52%), and angioembolization (19%), followed by oral sirolimus administration. Primary outcomes were symptom improvement (visual analog scale VAS for pain, limb circumference reduction) and radiologic response (MRI-based volumetric analysis). Secondary outcomes included drug toxicity and procedure-related complications.

Results

At median follow-up of 48months, significant clinical improvement was observed:
Mean VAS pain scores decreased from 8± 2 to 2 ±1,($p<0.01$).
Target limb volume reduced by 58% (± 4SD) in 82% of patients.
MRI-confirmed malformation volume regression ≥50% in 76% cases.
Adverse events included transient hyperlipidemia (12%), mild mucositis (6%), and post-procedural ecchymosis (4%). No grade ≥3 toxicity or thrombotic events occurred.

Discussion

This combined modality therapy demonstrates promising clinical utility for KTS management, with interventional techniques providing immediate symptom relief and sirolimus potentially modulating long-term disease progression. The acceptable safety profile supports further randomized trials to establish optimized protocols.

Effect of regional anesthesia on discharge opioid prescription practices following pediatric interventional radiology sclerotherapy: A follow up study

Gaelen JI, Wu C, Ness JR, Rajeswaran S, Lazar A, Cheon EC, Vargas AA
Presented by Joseph Ness

Introduction

The peri-procedural opioid-sparing effect of regional anesthesia during pediatric interventional radiology (IR) sclerotherapy for bone cysts, venous malformations, and lymphatic malformations has been demonstrated, though its impact on post-discharge opioid prescribing remains unclear.

Materials and Methods

A retrospective study was originally conducted at a single tertiary-care children's hospital examining the analgesic utility of nerve blocks during IR-performed sclerotherapy for these indications between January 2016 and May 2025. Venous and lymphatic malformations were combined for final analysis. Data on discharge opioid prescriptions were obtained through the Illinois Prescription Monitoring Program and re-analyzed for predictive factors.

Results

482 patients were included in final analysis. 189 (39.2%) received opioids at discharge, primarily hydrocodone-acetaminophen (98.9%). Adjusted logistic regression revealed a significantly increased odds of receiving an opioid prescription if in the non-block group (OR 3.01, 95% CI 1.95 to 4.68, $p<0.001$). Additionally, patients who did not receive a block were more likely to receive both higher doses (geometric mean ratio 1.54, 95% CI 1.31 to 1.81, $p<0.001$), and a greater number of doses (geometric mean ratio 1.87, 95% CI 1.50 to 2.33, $p<0.001$) compared to patients who did receive a nerve block.

Discussion

The use of regional anesthesia in pediatric IR for outpatient sclerotherapy for bone cysts, venous malformations, and lymphatic malformations was associated with a significant opioid-sparing effect that continued beyond the acute hospitalization into discharge. Enhanced Recovery After Surgery protocol development in IR would likely benefit from the early implementation of nerve block use.

Evaluating the Impact of a Multidisciplinary Pediatric Hybrid Operating Room on Collaborative IR and Surgical Procedures

Racadio JM, Wallingford A, Hilvert N, Johnson N, Patel M, Cabatingan K, Coley B, Von Allmen D
Presented by John Racadio

Introduction

Hybrid operating rooms (HORs) integrate advanced imaging into the surgical environment, but their use has largely remained siloed within individual subspecialties in adult institutions. We hypothesized that a pediatric HOR specifically designed for multidisciplinary use would facilitate collaborative procedures between interventional radiology (IR) and surgical subspecialties, enabling multiple procedures under a single anesthetic.

Materials and Methods

We conducted an IRB-approved retrospective analysis of all procedures performed in a pediatric HOR between February 2018 and May 2025. Procedures were categorized by subspecialty involvement, number of procedures per anesthetic, and presence of collaborative IR-surgical teams.

Results

Among 2,480 patients (5,142 procedures), 980 patients (40%) underwent multidisciplinary procedures involving IR and at least one surgical subspecialty. These collaborative cases accounted for 2,732 procedures (53%), with an average of 2.79 procedures per patient. The most common collaborations were with general surgery (35%), neurosurgery (33%), interventional pulmonology (9%), and urology (7%).

Discussion

This study reveals that more than half (53%) of all procedures performed in the pediatric hybrid operating room involved multidisciplinary collaboration. Among the patients who underwent collaborative procedures, an average of 2.79 procedures were performed per anesthetic event, demonstrating a high degree of procedural consolidation. These findings suggest that a purpose-built pediatric HOR can effectively promote integrated care across specialties and potentially offer a reproducible model for other pediatric institutions.

Protein-Losing Enteropathy treatment in congenital heart disease patients: Embolization strategies and long-term outcomes

Srinivasan A, Smith CL, Gartenberg AJ, Krishnamurthy G, Escobar FA, Gupta M, Ford B, Dori Y
Presented by Abhay Srinivasan

Introduction

Abnormal hepatic and extra-hepatic lymphatic connections are implicated in protein-losing enteropathy (PLE) in patients with congenital heart disease (CHD) but published reports, focused on intrahepatic lymphatic embolization, show unclear outcomes.

Materials and Methods

We compare the short and long-term outcomes of isolated intrahepatic (IH) versus combined periduodenal (IH+PD) embolization through retrospective study of 71 CHD patients who underwent either IH or IH+PD embolization for PLE. The primary endpoint was duration of remission (serum albumin ≥3.0g/dL). Secondary analyses included association with thoracic duct (TD) occlusion, PLE recurrence, and transplant-free survival.

Results

Of 71 patients (17 IH, 54 IH+PD), sustained remission (albumin ≥3 g/dL for ≥1 year) was achieved in 40% (22/54) of IH+PD patients and 11% (2/17) of IH ($p=0.04$). IH+PD embolization produced higher response within 30 days (86% vs 35%, $p<0.0001$); in the IH+PD group, median serum albumin levels increased from 2.3g/dL to 4.2g/dL ($p<0.0001$). PLE recurrence occurred in fewer IH+PD patients (46% vs. 100%; $p=0.005$) during the follow-up period (median 1.1y, IQR:0.7y–3.5y for IH and 1y, IQR:0.7y–2y for IH+PD). TD occlusion was associated with reduced initial and long-term response, with shorter remission than those without occlusion ($p<0.0001$). Remission resulted in improved transplant-free survival compared to non-responders or those with recurrence <1 year ($p=0.01$). Adverse events included transient pancreatitis (75%) and hyperbilirubinemia (40%), largely self-limiting or responsive to conservative management.

Discussion

Extrahepatic lymphatic supply plays an important role in PLE pathogenesis. Combined IH+PD embolization significantly improved response rates, extended duration of remission, and enhanced transplant-free survival compared to IH embolization alone.

Transradial versus Transfemoral Neuroangiography in a Tertiary Pediatric Hospital – a Propensity Score Matched Study

Fung K, Parra-Farinas C, Rea V, Ho J, Ayoub M, Lee W, Bickford S, Muthusami P
Presented by Kevin Fung

Introduction

To evaluate the feasibility and safety of transradial access (TRA) in comparison to transfemoral access (TFA) for pediatric neurovascular procedures.

Materials and Methods

Retrospective cohort study including 729 pediatric neurovascular procedures performed between January 2020 and December 2024, with 175 TRAs and 540 TFAs. Primary outcomes included technical success and adverse events, while secondary outcomes assessed radiation dose, fluoroscopy time and procedural duration. Propensity score matching (1:1) was applied to adjust for imbalance in baseline covariates. Statistical significance was set at P<.05.

Results

100 matched pairs of TRA and TFA were analyzed (TRA median age 13.9 [IQR 11.7–15.3] years, 52 females; TFA median age 14.5 [IQR 11.6–16.4] years, 51 females). Technical success rates were similar between TRA and TFA (98% vs 99%, P >.99). TRA was associated with a higher rate of vasospasm (7% vs 1%, P=.03) and a lower rate of hematoma formation (2% vs 9%, P=.03). Fluoroscopy time was longer in the TRA group (19.4 vs 8.8 minutes, P <0.001), but the radiation dose and procedural time were comparable between both groups. Asymptomatic radial artery occlusion (RAO) was detected in 5.1% (9/175) of radial accesses. A sheath-to-artery (S/A) ratio ≥1 was independently associated with RAO (OR 6.13; 95% CI:1.32-28.4; P=.021).

Discussion

TRA is a technically feasible and safe alternative to TFA for pediatric neurovascular procedures. Although vasospasm is more frequent, TRA reduces hematoma risk and offers comparable procedural outcomes. Pre-procedural US assessment of radial artery and optimization of S/A ratio are important to reducing the risk of RAO.

Comparative Outcomes of Hybrid Operating Room vs Conventional CT Suite Approaches for Pulmonary Nodule Localization and Thoracoscopic Resection in Children

Vore E, Wallingford A, Brady S, Dasgupta R, Racadio JM
Presented by John Racadio

Introduction

CT-guided localization facilitates minimally invasive thoracoscopic resection of pulmonary nodules but traditionally requires transfer from the radiology suite to the operating room (CT+OR), introducing potential inefficiencies and safety concerns. We hypothesized that performing localization and resection under a single anesthetic within a hybrid operating room (HOR) equipped with cone beam CT improves procedural efficiency and reduces complication rates compared to the conventional CT+OR approach.

Materials and Methods

We conducted a retrospective review of pediatric oncology patients undergoing pulmonary nodule localization and resection between 2012 and 2024. Patients were grouped by localization technique: conventional CT+OR versus HOR. We compared localization times, transport durations, radiation doses, complication rates, and completion of thoracoscopic resections.

Results

A total of 126 procedures were analyzed (35 CT+OR; 91 HOR). Mean localization time was lower in the HOR group (31 vs 45 minutes). CT+OR cases required additional transport time (mean 55 minutes). Radiation dose per localization was similar across groups, adjusted for patient size. Thoracoscopic completion rates were comparable (91.4% vs 93.4%), but the HOR group demonstrated a lower complication rate (7.7% vs 11.4%).

Discussion

Compared to the conventional CT+OR workflow, use of a hybrid operating room for localization and resection of pulmonary nodules is associated with reduced localization time, elimination of interdepartmental transport, and fewer complications. These findings demonstrate that a HOR-based approach enhances procedural efficiency and patient safety in pediatric pulmonary nodule localization and thoracoscopic resection.

Efficacy and Safety of Rivaroxaban in Neonatal Catheter-related Thrombosis: A Single-center Retrospective Study of 122 Cases

Zhang R
Presented by Teng Hui Zhan

Introduction

To systematically evaluate the clinical efficacy of rivaroxaban in treating neonatal catheter-related thrombosis (CRT) and analyze risk factors affecting treatment outcomes.

Materials and Methods

Clinical data of 122 neonatal CRT patients treated with rivaroxaban from March 2022 to October 2024 at our Hospital were retrospectively analyzed. The primary outcome was complete thrombus resolution rate. Multivariate logistic regression was used to analyze risk factors affecting treatment efficacy.

Results

Among 122 patients, the complete thrombus resolution rate was 71.31% (87/122) after 6 weeks of anticoagulation, which significantly increased to 88.52% (108/122) after extending to 3 months ($p<0.01$). Multivariate logistic regression analysis showed that chemotherapy (OR=5.48, 95%CI: 1.04-28.73, $P<0.05$) and difficult catheter placement (OR=12.53, 95%CI: 3.13-50.22, $P<0.05$) were independent risk factors affecting 3-month anticoagulation efficacy. No anticoagulation-related bleeding or other complications were observed during the study period.

Discussion

Retrospective data suggest that rivaroxaban is safe and effective in treating neonatal catheter-related thrombosis, with a higher complete thrombus resolution rate observed at 3 months compared to 6 weeks of anticoagulation therapy. Chemotherapy and difficult catheter placement were identified as independent risk factors affecting treatment efficacy. However, these findings require validation through multi-center, prospective, randomized controlled trials.

Femoral Arterial Access in Pediatric Diagnostic Angiography and Endovascular Interventions: Predictors of Technical Success, Adverse Events and Thrombotic Risk

Fung K, Gasparetto A, Parra-Farinas C, Carroll-Downey A, Ayoub M, Parra D, Amaral JG, Muthusami P
Presented by Kevin Fung

Introduction

To identify predictors of technical success and adverse events (AEs) associated with ultrasound (US)-guided femoral arterial (FA) access in children undergoing diagnostic angiography and interventions.

Materials and Methods

Retrospective study including consecutive FA access attempts aged ≤18 years at a tertiary pediatric hospital between January 2018 and December 2024. Baseline demographics, corrected FA diameter and technical details were analysed using univariable and multivariable Firth logistic regression to identify predictors of technical success and AEs.

Results

661 US-guided FA access were attempted in 311 patients. Median age was 7.9 years (range, 0.09–17.9), and median corrected FA diameter was 4.6 mm (range, 1.2–9.6). 49.8% (329/661) accesses were for interventions. Technical success was 99.2% (656/661). The overall AE rate was 5.4% (36/661), with 1.7% (11/661) SIR moderate and severe grades. Vasospasm, more common in arteries ≤3.9 mm, was associated with both access failure and thrombosis. Prophylactic intra-arterial nitroglycerin significantly reduced vasospasm risk ($P < .001$).

Arterial thrombosis occurred in 0.9% (6/661) of accesses, with median age of 0.3 years, weight of 6.4 kg and corrected FA diameter of 1.7mm. All cases were managed anticoagulation, with no permanent ischemic sequelae. Independent predictors of thrombosis included sheath-to-artery (S/A) ratio ≥1 ($P<.001$) and use of vascular closure device (VCD) ($P=.02$). Hematoma was associated with ≥6 French sheath and body weight ≥75 kg ($P<.001$).

Discussion

US-guided FA access has a high success and low AE rate in children. Pre-procedural US assessment, careful sheath selection and prophylactic intra-arterial nitroglycerin can help improve outcome. VCD should be used with caution in children.

Intraoperative Neuromonitoring for Neuroprotection during Cryoablation of Pediatric Vascular Anomalies and Hypovascular Masses

Cesaire M, Sargent K, Raja J
Presented by Junaid Raja

Introduction

Cryoablation is a minimally invasive therapy for sclerotherapy-resistant venous malformations and hypovascular masses, but nerve proximity risks iatrogenic injury, limiting treatment to lesions >5 mm from nerves1. Intraoperative Neuromonitoring (IONM) during cryoablation may assuage this limitation, particularly for deep or unresectable lesions2. This study evaluates free-run EMG monitoring along with sensory monitoring in preventing nerve injury during pediatric percutaneous cryoablation, assessing procedural safety.

Materials and Methods

A retrospective study at a tertiary care academic medical children's hospital was performed following IRB approval. Cases in which cryoablation was used in conjunction with IONM were reviewed. Demographic and baseline patients' characteristics were extracted in addition to procedural details, including cryoablation and IONM (free run EMG, MEP, SSEP, TOF). Follow-up clinical and imaging data were also reviewed using simple summative statistics.

Results

Six cryoablation sessions were performed in four patients (three male, one female; median age: 16). Lesions included desmoid tumors (n = 2), neurofibroma (n = 1), and vascular malformations (n = 1). Technical success of cryoablation was achieved in 100%, with transient EMG amplitude reductions (>50%) during ice-ball formation in 1 case, prompting real-time probe adjustment. No permanent deficits occurred. Symptom improvement was observed in 100% of cases, accompanied by a qualitative reduction in size on follow-up imaging. Minor adverse events included transient sensory deficit around the area of malformation, which was resolved within a few weeks.

Discussion

IONM offered benefits as a modality of neurosurveillance during cryoablation to maximize the treatment zone while mitigating the risk of neuro-injury. Future refinements of preferred IONM techniques can be considered.

Sodium Tetradecyl Sulfate Embolization for Lymphatic Flow Disorders

Smith CL, Gupta M, Escobar F, Laje P, DaCosta N, Mercado K, Dori Y, Krishnamurthy G
Presented by Abhay Srinivasan

Introduction

Lymphatic flow disorders, including chylothorax and plastic bronchitis (PB), cause significant morbidity. Glue-based embolization is effective but carries risks of systemic embolization. Sodium tetradecyl sulfate (STS), a sclerosing agent, may provide a safer alternative with lower embolic risk and improved penetration into target lymphatic networks. This study describes initial experience with STS embolization for lymphatic flow disorders.

Materials and Methods

A review was conducted of 39 patients who underwent 42 embolization procedures with STS foam for chylothorax, PB, and genital lymphedema from April 2023 through April 2024.

Results

Among 39 patients, the primary indications were chylothorax (22/39, 56%) and PB (7/39, 18%). At a mean follow-up of 272 ± 163 days, 33/36 (92%) achieved symptom resolution, 2/36 (5.6%) improved, and 1/36 (2.8%) remained unchanged ($p < 0.001$). Thoracic duct patency was preserved in 31/31 (100%) cases wherein the duct was accessed for selective embolization. The most common adverse event was post-procedure pain, seen in 18/39 patients (46%). No stroke or non-target embolization occurred.

The most frequently used adjunct strategies included coil embolization of the supplying pedicle in 16/42 cases (38%) and a glue plug in 14 (33%). STS was used alone without adjunctive techniques in 12/42 cases (29%). STS was injected via needle in 22/42 cases (52%).

Discussion

STS was an effective and safe agent for selective embolization of lymphatic flow disorders and may be a favorable agent for patients with high risk of systemic embolization.

Varicocele embolization outcomes of primary or post-surgery recurrent varicoceles in children.

Wong M, Amaral JG, Maher S, Chua M, Lorenzo A
Presented by Marilyn Wong

Introduction

Varicoceles may cause pain, testicular atrophy, and potentially future infertility. Study to determine imaging and clinical outcomes of primary or post-surgery varicocele embolization (VE).

Materials and Methods

Study approved by the Research Ethics Board. Retrospective review of VE patients <=18 years old from January 2000 to December 2024. Demographics and procedure data collected. Imaging (vessel size) and clinical (symptoms and/ or testicular size) success, and reasons for post-surgery recurrence evaluated.

Results

34 patients included (18 post-surgery). Mean age at surgery 13.8 (10.7-17.1) years and at embolization 14.8 (4.7-18.0) years. All varicoceles were left sided but 2 (bilateral). Clinically, 28 were grade III, 1 grade II, 2 contralateral grade 0 and 5 grade unavailable. VE indications were pain/discomfort in 19, testicular asymmetry >20%/contralateral atrophy/solitary testis in14, and patient/parental preference in 4. Bahren venography classification was: 12 - I, 7 - II, 11 - III and 4 - IV. Previous surgery included 4 laparoscopic artery +/- lymphatic sparing Palomo, 12 subinguinal artery +/- lymphatic sparing microsurgical and 2 unavailable. Aside from 4 patients, all tributaries/collaterals treated at venography were proximal to the level of varicocelectomy clips confirming surgical occlusion of the main vein. Procedure technical success was 94% (32/34). SIR minor complications occurred in 34.3% (11/32). Mean follow-up duration was 1 year (0.1-3.1; 2 lost to follow-up). Overall resolution/improvement noted in 97% (31/32), including symptom resolution/improvement in 18/20 and testicular asymmetry reduction in 8/9.

Discussion

VE has a high success rate with minor complications. Post varicocelectomy recurrence is predominantly related to collateral venous anatomy.

Balloon-assisted cryoablation for a large desmoid tumor along the sciatic nerve

Cajigas-Loyola S, Accord M
Presented by Abhay Srinivasan

Clinical History

21 year-old female with large posterior thigh desmoid tumor with pain and limited mobility. The sciatic nerve runs along the entire length of the tumor.

Solution

Tumor was previously ablated with peri-neural hydro-dissection, but ablation was limited by changes in nerve conduction signals during procedure. To address this, 10 mm non-compliant balloon catheters were introduced at multiple stations to displace the nerve and provide insulation during cyroablation, with the thought that air would insulate and displace the nerve better then saline.

Clinical Outcome

No changes in latency or amplitude were encountered and 2 cycles of cyroablation were successfully completed at all stations throughout the tumor. Patient was discharged home the same day.

Biliary Transection after ATV Accident

Baron C, Maughan K
Presented by Kyle Maughan

Clinical History

9-year-old male who presented with biliary injury after ATV accident. He initially underwent biliary drain placement with IR followed by ERCP with biliary stenting. He continued to have leakage of bile and presented to IR for PTC.

Solution

Left sided biliary access into a non-dilated biliary system was obtained. Cholangiogram demonstrated a left-sided biliary leak. Multiple attempts were made to cross the defect, however the wire could not be passed across the injury. A wire was passed through the defect into the biloma. The common hepatic bile duct was then accessed fluoroscopically, using the ERCP stent as a landmark. Cholangiogram demonstrated minimal opacification of the left ducts consistent with complete transection. A wire was passed retrograde through this access into the biloma. Through the left biliary access, a snare was advanced into the biloma and used to capture the wire from the common hepatic duct access. Once snared, the through-and-through access was used to exchange for an internal/external biliary drain, successfully crossing the transected left biliary system.

Clinical Outcome

Repeat cholangiogram one month later demonstrated spontaneous passage of contrast past the injury into the CBD with resolution of the previously seen injury.

Bronchoscopic and Fluoroscopic-Guided Recanalization and Balloon Dilation of Multifocal Bronchial Stenosis in a Child: A Collaborative Interventional Pulmonology–IR Approach

Racadio J, Cabatingan K, Johnson N, Patel M, Wallingford A, Hysinger E
Presented by John Racadio

Clinical History

A child with granulomatosis with polyangiitis presented with progressive respiratory compromise from multifocal bronchial stenosis. Conventional bronchoscopy was unable to access or treat several distal stenoses.

Solution

In a novel collaborative approach, pediatric interventional radiology and interventional pulmonology performed bronchoscopic and fluoroscopic-guided transbronchial balloon dilation in a hybrid OR. Using flexible bronchoscopy for endoluminal visualization and fluoroscopy for wire and balloon navigation, the team successfully recanalized and dilated multiple obstructed bronchial segments. High-pressure angioplasty balloons, intralesional steroid injections, and cryotherapy were employed.

Clinical Outcome

This dual-modality image-guided technique restored airway patency and improved respiratory status. Follow-up bronchoscopy confirmed durable results. This case illustrates how interdisciplinary collaboration and adaptation of vascular IR tools to the airway can achieve successful outcomes in complex pediatric pulmonary disease.

Creation and short-term thrombosis of trans-jugular intra-hepatic portosystemic shunt in 3 year-old child

Srinivasan A, Cahill AM, Cahill AM, Escobar F, Krishnamurthy G
Presented by Abhay Srinivasan

Clinical History

A 3 year-old male with biliary atresia underwent TIPS creation (8 mm stent-graft) for recurrent upper GI bleeding. Five days post-procedure, the TIPS was noted to be thrombosed. Patient returned to IR suite the next day. But attempts to cannulate the TIPS from a trans-jugular approach did not succeed.

Solution

The TIPS was accessed percutaneously and the wire was snared from the jugular vein. With this access, thrombolysis, aspiration thrombectomy, and balloon maceration of thrombus were carried out, followed by extension of the shunt with an additional graft.

Clinical Outcome

The TIPS was successfully recanalized and revised. It has been patent on follow-up and no recurrent bleeding has occurred.

Embolization of large base of thumb varix, caused by arteriovenous malformation, with preservation of adjacent venous anatomy

Willard S, Schaefer C, Desai S, Nissim L, Errea M, Abruzzo T
Presented by Scott Willard

Clinical History

17-year-old right-handed female with painful, pulsatile mass at the base of the right thumb, first noticed 6 years prior and growing. MRI suggested extensive arteriovenous malformation, involving the base of thumb as well as the index and middle fingers and radial side of the hand. Symptoms primarily involved the thumb.

Solution

Angiography delineated the large lobulated varix at the base of the thumb measuring up to 4.9 x 1.3 cm in conglomerate, terminating at the radial vein. To preserve venous outflow, we approached the lesion via three access sites. We obtained arterial access at the groin for digital subtraction angiography. The radial vein was accessed in retrograde fashion for placement of a coil pack followed by a conformable balloon, both to preserve venous outflow from the hand. Third, direct puncture of the varix distally was used for administration of liquid embolic.

Clinical Outcome

Symptoms significantly improved just in time to begin college.

Endoscopic-assisted fluoroscopic removal of a deep bronchial metallic foreign body in a child.

Vedamuthu JS, Lenehan N, Chennapragada SM, Hobson M
Presented by John Samuel Vedamuthu

Clinical History

A 2-year-old boy was referred to a tertiary care centre for further management of a metallic foreign body (FB) in the bronchus. Earlier attempts at bronchoscopic removal were unsuccessful.

Solution

CT scan confirmed distal wedging of the screw into lower lobe segmental bronchus with segmental atelectasis and obstructive dilatation of the distal bronchus. Bronchoscopy was used to direct a catheter and snare towards the pegged screw. Under fluoroscopy image guidance, the FB was manipulated but could not be snared. Raptor forceps were able to grasp one side of the screw which was then removed safely. Bronchoscopic visualisation was used for monitoring bleeding and bronchial wall trauma during the extraction.

Clinical Outcome

The wedged intrabronchial foreign body was successfully retrieved, resulting in significant clinical improvement. The child was discharged after 3 days.

Endovascular therapy for Kaposiform hemangioendothelioma

Zhang R, Zhan TH
Presented by Rong Zhang

Clinical History

A 1-month-old female presented with a hemangioma on the left face and neck, treated initially with oral propranolol. The mass increased in size, leading to discomfort, milk refusal, and shortness of breath three days before admission. CT imaging revealed a 9.0×7.8×5.8cm mass causing nasopharyngeal and oropharyngeal compression. Platelet counts progressively decreased, and airway obstruction worsened. Referred for suspected Kaposi's hemangioendothelioma, she was admitted to our hospital.

Solution

Treatment included tracheal intubation, platelet transfusion, methylprednisolone, and sirolimus to inhibit lesion growth, followed by transcatheter atherosclerotic embolization(TAE) to reduce tumor blood supply. Postoperatively, airway obstruction improved, platelet counts stabilized, methylprednisolone was tapered off, ventilation was discontinued, and sirolimus dosage was adjusted based on blood levels.

Clinical Outcome

After 1 year of follow-up, the patient's facial appearance normalized, and no airway obstruction was noted.

Extreme Portal Recanalization in a Fontan Patient Reveals Underlying Hepatocellular Carcinoma

Acosta LF, Shabila A, Nordeck S, Gabriel G, Raissi D, Galuppo R
Presented by Luis F. Acosta

Clinical History

15-year-old female with Hypoplastic Left Heart Syndrome, s/p Norwood, Glenn, and extracardiac Fontan presented with abdominal pain, weight loss, and diffuse portal vein thrombosis with hepatic hypoenhancement.

Solution

Transjugular portal access was obtained via the middle hepatic vein using intracardiac echocardiography (ICE, AcuNav 10F). A multimodal endovascular strategy—catheter-directed thrombolysis, balloon maceration, and suction thrombectomy (Penumbra Indigo)—was performed over 3 days. Innovative catheter repositioning enabled targeted tPA infusion into recanalized segmental branches.

Clinical Outcome

Despite technical success and restored flow, the patient experienced hemorrhagic shock and expired after bedside laparotomy and resuscitation. Autopsy revealed multifocal hepatocellular carcinoma with extensive intrahepatic vascular invasion and residual tumor thrombus. This case illustrates the extreme challenge of portal intervention in complex congenital heart disease and the feasibility of ICE-guided transjugular thrombolysis in pediatric patients with severely altered anatomy and unexpected malignant pathology.

Finding the Way through the Maze - “Rendez-vous” Sharp Recanalisation of a Complete Esophageal Stricture via Retrograde Jejunal Access

Fung K, Amaral JG
Presented by Kevin Fung

Clinical History

A 8-year-old boy with a history of esophageal atresia who underwent multiple surgical repairs, including a gastric transposition with jejunostomy creation at age 7, presented with significant drooling and recurrent aspiration pneumonia. Esophagogram showed a complete mid-esophageal stricture. Multiple antegrade attempts to recanalize the stricture were not successful.

Solution

Using a retrograde approach from the jejunostomy, we were successful to reach the transposed stomach using a 5 French angled catheter and Bentson guidewire. Given the tortuous retrograde course, a 7 French guiding sheath was exchanged for better support. After approximating the esoaphgeal gap with a combined antegrade and retrograde approach, sharp recanalization of the stricture was performed using the backend of a 0.035” hydrophilic guidewire, followed by balloon dilation up to 8mm. Serial monthly balloon dilatation was then performed with progressive upsizing to 14mm.

Clinical Outcome

Nine months post-dilatation, the patient experienced significant symptomatic improvement with no further episodes of aspiration pneumonia.

Innovative Image-Guided Dual-Site Epidural Drainage in a Neonate with Extensive Spinal Abscess and Sepsis

Gunasekaran K, Kumar SH, Venkat T
Presented by Kannan Gunasekaran

Clinical History

A term male neonate presented on day 22 of life with fever, seizures, and evolving paraparesis. Imaging revealed multiple deep-seated abscesses, including a large pre-sacral and extensive epidural collection with psoas extension and right hip septic arthritis.
Open surgical drainage was considered but deferred due to high surgical risk

Solution

Image-guided percutaneous drainage was performed for peripheral collections. For the spinal abscess, an innovative dual-site minimally invasive technique was adopted: a drainage catheter for aspiration at lumbar level and an upper cervical epidural catheter for saline irrigation. This combined approach enabled effective pus clearance and neurological recovery while avoiding major spinal surgery

Clinical Outcome

MRSA was isolated, and targeted antibiotics led to full clinical resolution over six weeks. The paraparesis of the child is improved.

Left to left modified TIPS creation in a 20kg child with portal venous thrombosis and surgically disconnected splenic vein for high risk gastroesophageal varices

Raja J, Pozo M, Gutierrez H
Presented by Junaid Raja

Clinical History

5 year old female with history of portal venous thrombosis precipitated from neonatal umbilical venous catheter usage complicated by gastroesophageal varices resulting in hematemesis and with a thromboses rex recessus status post distal splenorenal shunt creation and coronary vein ligation complicated by recalcitrant thrombosis and high risk gastroesophageal varices on endoscopy.

Solution

Left hepatic to left portal transjugular and transhepatic intrahepatic portosystemic shunt creation using gunsight technique aided by intravascular ultrasound with deployment of a modified partially covered 6mm stent construct.

Clinical Outcome

Eventual successful TIPS creation with decrease of portosystemic pressure gradient from 22mmHg to 9mmHg and angiographic decompression of gastroesophageal varices. Intraprocedural complication from hepatic capusular injury was managed with embolization and ICU care. Post procedurally recovered exceptionally well without encephalopathy or heart failure and durable patency of the TIPS on follow up crossectional imaging.

Necrotizing pancreatitis complicated by colonic bleed with subsequent colonic perforation and percutaneous debridement

Suryadevara S, Duncan J
Presented by Jim Duncan

Clinical History

On Day 0, 13-year-old previously healthy male collapsed enroute to a local hospital. After immediate transfer to Children's Hospital, CT demonstrated severe necrotizing pancreatitis which was managed conservatively. On Day 18, hypotension and rectal bleeding led to a CT angiogram which showed evidence of bleeding. Emergent angiography demonstrated multiple bleeding foci in the descending colon which were treated by coil embolization. On Day 28, the patient's course was complicated by colonic perforation evidenced by large pockets of air within the complex series of abdominal collections.

Solution

Three percutaneous drains on Day 30 followed by multiple tube changes together with three sessions of percutaneous debridement over the next 113 days. A large defect in the descending colon's medial wall was managed conservatively. A surgical ileostomy was performed on Day 128 and taken down after a contrast enema on Day 244 confirmed complete healing of the colon.

Clinical Outcome

Complete recovery

Percutaneous Portocaval Shunt Creation as a Bridge to Transplant in a Non-Anatomic Patient

Rajeswaran S, Ness J, Baker J, Variyam D
Presented by Darshan Variyam

Clinical History

13 y/o with a history of hepatoblastoma s/p right lobe resection with chemotherapy complicated by a bile leak and a biliary-bronchial fistula requiring a roux-en-y hepaticojejunostomy presents with cirrhosis, portal HTN, and significant hematochezia. Patient is a potential transplant candidate; however, due to the large varices, prior adhesions from surgery and diminutive portal vein of 5mm was considered a high-risk candidate.

Solution

Due to the patient's altered anatomy, a traditional TIPS and varix embolization was not technically feasible. Utilizing a gunsight technique via a transplenic and transcaval approach, percutaneous access was utilized to obtain through and through access. A 7mmx 39mm VBX was deployed and the varix was embolized with coils/onyx. Intraprocedural clot developed in the mesenteric system which was cleared with suction thrombectomy.

Clinical Outcome

Patient's hematochezia resolved and due to preferential portal flow, the vein hypertrophied over 6 weeks from 5mm to 15mm and the patient has been listed as a transplant candidate.

Plastic bronchitis with known right to left shunts and history of stroke

Monroe E
Presented by Eric Monroe

Clinical History

A 10-year-old female with Fontan circulation and debilitating plastic bronchitis was referred for lymphatic imaging and intervention. Her history was additionally notable for recurrent stroke, known central venous to left atrial shunts, and chronic bilateral lower extremity venous occlusion.

Solution

Bilateral inguinal water-soluble contrast lymphangiography demonstrated faint, transient opacification of the retroperitoneal lymphatics. Cone beam CT of the abdomen and chest further characterized lymphatic anatomy and reflux into pulmonary lymphatics. Retrograde thoracic duct catheterization was performed from left upper extremity venous access. Central venous to left atrial shunts were again identified. Lymphatic outflow occlusion was achieved via base catheter advancement through the venolymphatic junction and pulmonary lymphatic embolization was performed with n-butyl cyanoacrylate.

Clinical Outcome

The procedure was uncomplicated and the patient had immediate resolution of plastic bronchitis that is sustained at 6-month follow-up. Right-to-left shunts following Fontan palliation place patients at risk for cerebrovascular accident from oil-based contrast lymphangiography. Water-soluble contrast lymphangiography mitigates risk of stroke but creates challenges due to inconspicuous anatomy and rapid transit, aspects that may be approached with cone beam CT imaging. Transvenous lymphatic embolization, while occasionally challenging, avoids risks of transabdominal access such as visceral injury and chylous ascites after thoracic duct embolization.

Staged embolisation and cryoablation of a large thoracic MPNST

Runge JH, Smits MLJ, De la Mar ACJ, Lo LH, Van de Ven CP, Van Noesel MM
Presented by Jurgen Runge

Clinical History

Teenager with multilevel, thoracic paraspinal Ewing Sarcoma invading the neural foramen. As this was the 4th recurrence, the family requested cryoablation rather than surgery or radiation. Due to the proximity of the spinal cord, multiple safety measures were used to minimize potential thermal damage.

Solution

Carbon dioxide displacement of thecal sac was performed, allowing live, constant temperature monitoring both within the spinal canal and in the neural foramen.

Clinical Outcome

Successful cryoablation performed at 2 levels. Cryoablation plan actively modified based on temperature feedback (2 levels) during the case. (Temperature curves are available.) No neural or spinal injury noted. Multi-level Intercostal nerve cryoneurolysis performed for post procedure pain control. Patient recovered well (being able to compete in a dance competition 2 days later). Follow-up imaging (PET) pending.

Spinal Protective Measures for Cryoablation of Paraspinal Ewing Sarcoma

Temple M, Aguado A
Presented by Michael Temple

Clinical History

A 13 y/o girl with neurofibromatosis type 1 presented with a large, growing thoracic neurofibroma. CT-guided biopsy confirmed imaging concerns that it had partly degenerated into a malignant peripheral nerve sheath tumour (MPNST). After radiochemotherapy induction, resection was deemed impossible. IR were consulted to discuss further treatment options.

Solution

Additional CTA was performed, highlighting the feeding vessels of the neurofibroma and residual MPNST within. A staged procedure was proposed. First, coil and particle embolisation of three arterial branches was performed. Two weeks later, a five-probe conebeam-CT-guided cryoablation procedure successfully targeted the bulk of the residual MPNST, using fusion with pre-procedural MR images, bearing in mind the vicinity of the spinal canal due to the patient’s scoliosis.

Clinical Outcome

Both procedures were technically successful without 30-day complications. Six-week follow-up MRI showed complete lack of enhancement of the cryoablated part of the MPNST. PET/CT is planned at 6 months after cryoablation.

TARE-Y90 for unresectable fibrolamellar carcinoma

Aguado A
Presented by Michael Temple

Clinical History

-19 yo female with unresectable bilobar fibrolamellar carcinoma and thoracic paraspinal soft tissue and periportal metastases
-Received gemcitabine/oxaliplatin/Lenvatinib
-Endoscopic biliary stents placed with resolution of hyperbilirubinemia/jaundice
-Received radiation to thoracic soft tissue metastasis

Solution

-Multidisciplinary decision at solid tumor board to proceed with transarterial radioembolization with yttrium-90 (TARE-Y90).
-Mapping angiogram showed supply by anterior and posterior divisions of right hepatic artery and segment 4 left hepatic artery.
-Lung shunt fraction = 2.3%
-Right hepatic artery radiation lobectomy and segment 4 left hepatic artery radiation segmentectomy performed 4 months apart with interim chemotherapy and extended moxifloxacin prophylaxis for biliary stents.

Clinical Outcome

-Post TARE-y90 x2 showed decrease in size of tumor with significant necrosis.
-Patient scheduled for surgery July 2025.
-More research is required to determine the efficacy of TARE-Y90 treatment in children and to define the clinical scenarios where benefit is likely to be optimized.

Thoracic aortic recanalization

Roebuck D, Larkins N, Hockley J
Presented by Derek Roebuck

Clinical History

An otherwise normal girl was found to have a systolic murmur at the age of 8 months. Her systolic blood pressure (BP) was consistently around 190 mmHg. Imaging showed occlusion of the thoracic aorta and left ventricular hypertrophy.
By the age of 3 years her BP was becoming difficult to control despite treatment with hydrochlorothiazide, minoxidil, prazosin and propranolol. At age 6 years CT showed an 85-mm occlusion of the descending thoracic aorta.

Solution

The occluded segment was recanalized with endovascular ultrasound and fluoroscopic assistance and overlapping covered stents were inserted and dilated to about 6 mm. The stents were post-dilated to 7 mm at 10 months and 9 mm at 3 years.

Clinical Outcome

Blood pressure 3.5 years after the initial procedure was 103/56 mmHg (50th centile 103/61) on lisinopril 10 mg daily.