

# Pediatric Partial Heart Transplants: An Innovative Approach to Decrease Waitlist Mortality and Organ Discards?

## TODAY'S PANELISTS



**Joseph Turek**

MD, PhD, MBA

Chief, Paediatric Cardiac  
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**DukeHealth**



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Manager, Training and  
Professional Development



WASHINGTON REGIONAL TRANSPLANT COMMUNITY

**Wednesday, December 7, 2022, 2:00pm – 3:00pm ET**

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The Organ Donation and Transplantation Alliance is offering **1.0 hours of continuing education credit** for this offering, approved by The California Board of Registered Nursing, Provider Number CEP17117. No partial credits will be awarded. CE credit will be issued upon request within 30 days post-webinar.

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The Organ Donation and Transplantation Alliance will be offering **1.0 Category I CEPTC credits** from the American Board for Transplant Certification. Certified clinical transplant and procurement coordinators and certified clinical transplant nurses seeking CEPTC credit must complete the evaluation form within 30 days of the event.

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- Group leaders, please share the follow-up email with all group participants who attended the webinar.



**Deanna Fenton**

Senior Manager, Program  
Development and  
Operations



## Need Assistance?

Contact Us via Zoom Chat, or  
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786-866-8730

# Meet Our Moderator



**Sarah Casalinova**

Clinical Research Coordinator



**DukeHealth**

# Meet Our Panelists



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# Pediatric Partial Heart Transplants: An Innovative Approach to Decrease Waitlist Mortality and Organ Discards

The Alliance: Advancement Series  
December 7, 2022

Joseph W. Turek, MD, PhD, MBA

Chief, Pediatric Cardiac Surgery, Duke University  
Executive Co-Director, Duke Children's Pediatric & Congenital Heart Center  
Durham, North Carolina



Duke Surgery

DUKE UNIVERSITY MEDICAL CENTER





# Dilemma of the Newborn with a Poorly-Functioning Truncal Valve

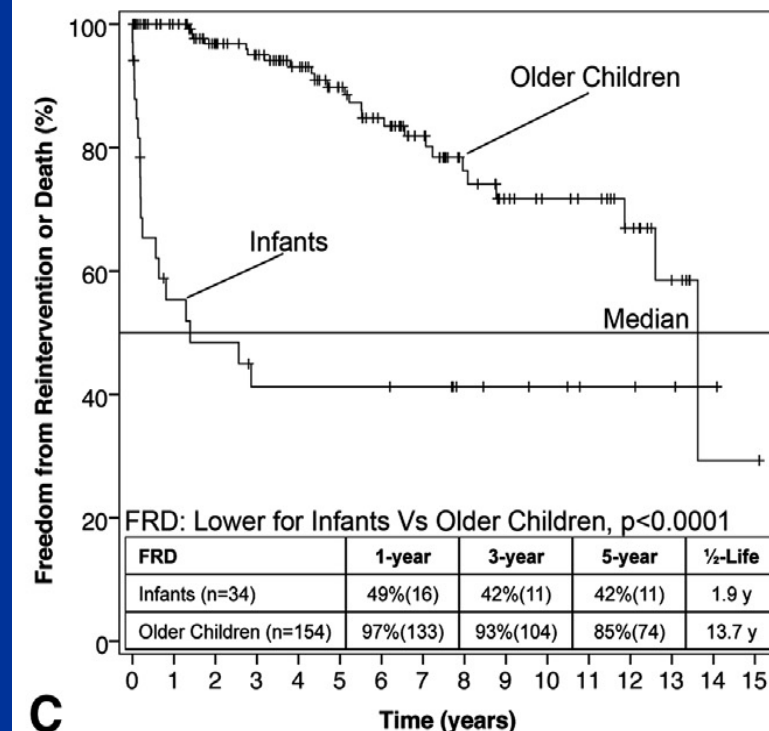
- Attempt repair
- Replace (Ozaki/valve)
- Replace with cadaver homograft roots



# Outcomes in Children

		Neonates and infants	Older children
Autologous tissue	Aortic valve repair	<ul style="list-style-type: none"> <li>• Early mortality: 3–4%</li> <li>• 10-year survival: 94%</li> <li>• 10-year freedom from reoperation: 66%</li> </ul>	<ul style="list-style-type: none"> <li>• Early mortality: 0.4–1.8%</li> <li>• 10-year survival: 94%</li> <li>• 10-year freedom from reoperation: 70%</li> </ul>
	Ross operation	<ul style="list-style-type: none"> <li>• Early mortality: 10–17%</li> <li>• 10-year survival: 79%</li> <li>• 10-year freedom from reoperation: 62%</li> </ul>	<ul style="list-style-type: none"> <li>• Early mortality: 0–4%</li> <li>• 10-year survival: 96%</li> <li>• 10-year freedom from reoperation: 90%</li> </ul>
	Ozaki aortic valve replacement	<ul style="list-style-type: none"> <li>• Not reported</li> </ul>	<ul style="list-style-type: none"> <li>• Early mortality: 0%</li> <li>• 10-year survival: not reported</li> <li>• 3-year freedom from reoperation: 80%</li> </ul>
Non-autologous material	Mechanical aortic valve replacement	<ul style="list-style-type: none"> <li>• Not feasible</li> </ul>	<ul style="list-style-type: none"> <li>• Early mortality: 0.5–7%</li> <li>• 10-year survival: 82%</li> <li>• 10-year freedom from reoperation: 78%</li> </ul>
	Homograft aortic valve replacement	<ul style="list-style-type: none"> <li>• Not reported</li> </ul>	<ul style="list-style-type: none"> <li>• Early mortality: 5–13%</li> <li>• 10-year survival: 85%</li> <li>• 10-year freedom from valve reoperation: 50–60%</li> </ul>

Contemporary experience with surgical treatment of aortic valve disease in children



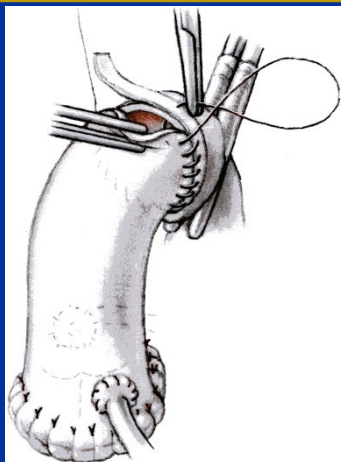




# Living Double Root Replacement (Partial Heart Transplant)

**Something Borrowed, Something Blue,  
Something Old, Something New**

Technique: aortic  
root replacement



Immunosuppression:  
heart transplantation

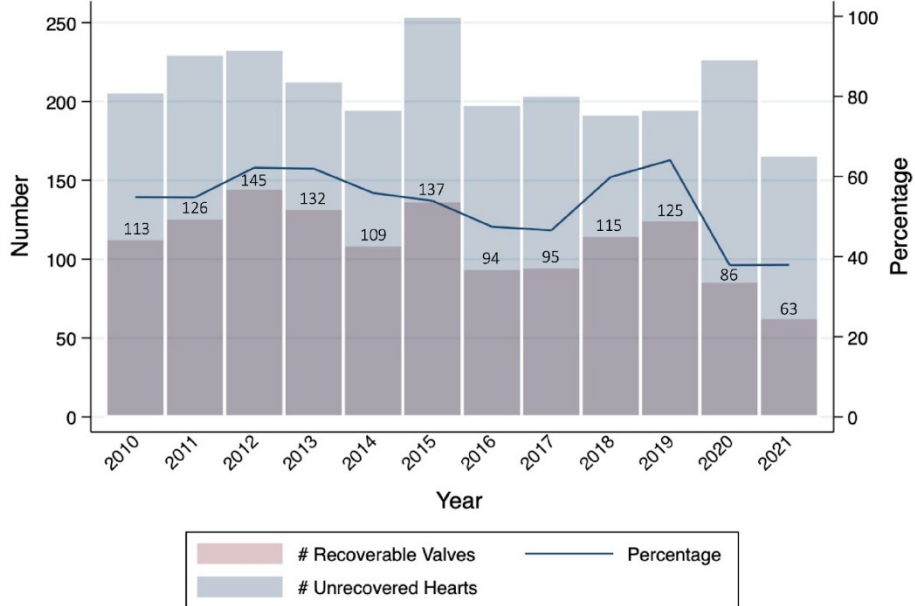


Partial Heart  
Transplantation

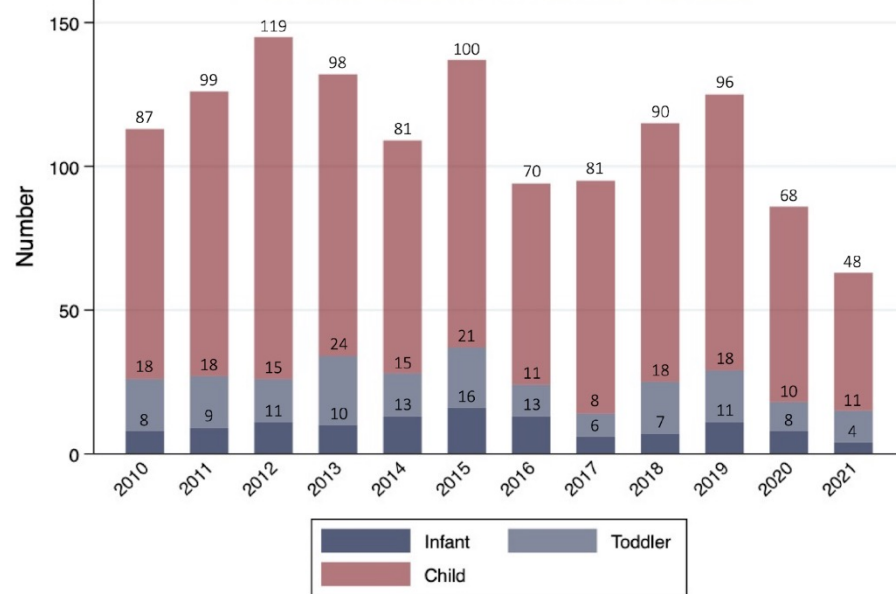


# Procurement

Recoverable Valves and Unrecovered Pediatric Donor Hearts Per Year

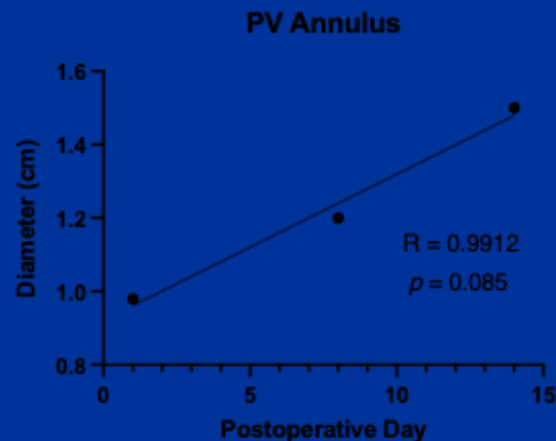
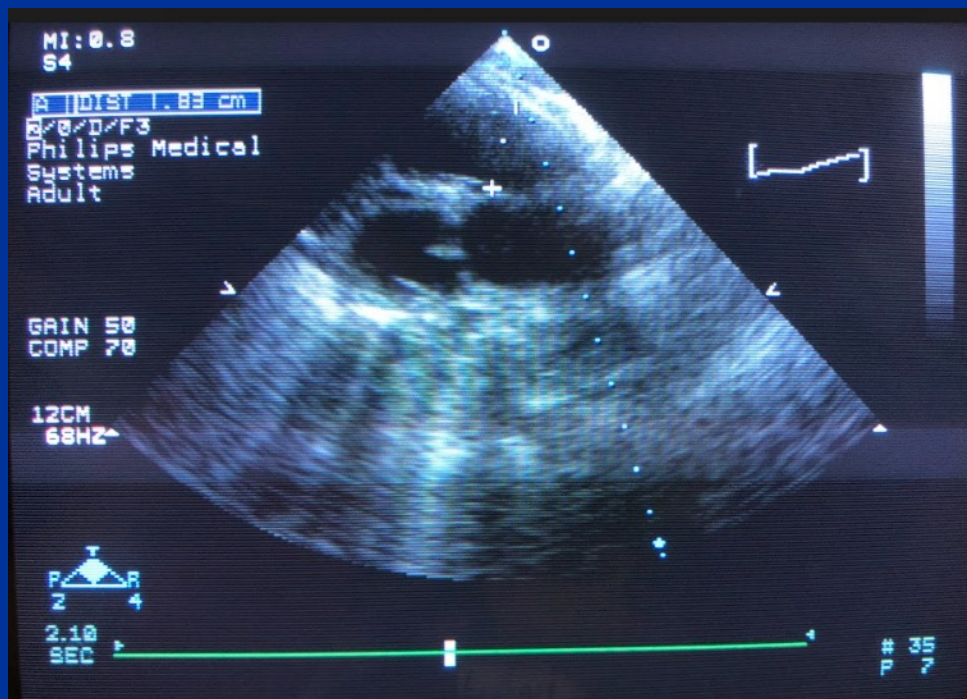


Recoverable Valves per Year by Donor Age Group



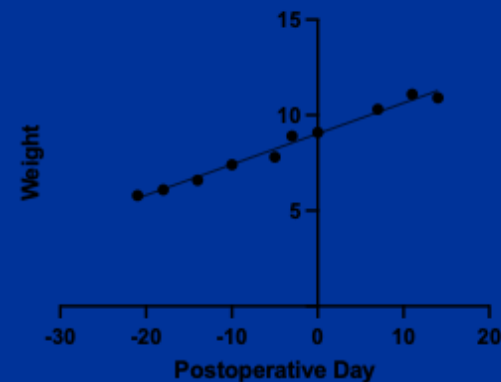


# Benchtop: Piglets (Courtesy: K Rajab, MUSC)



All weights  
 $R = 0.9909$   
 $p < 0.001$

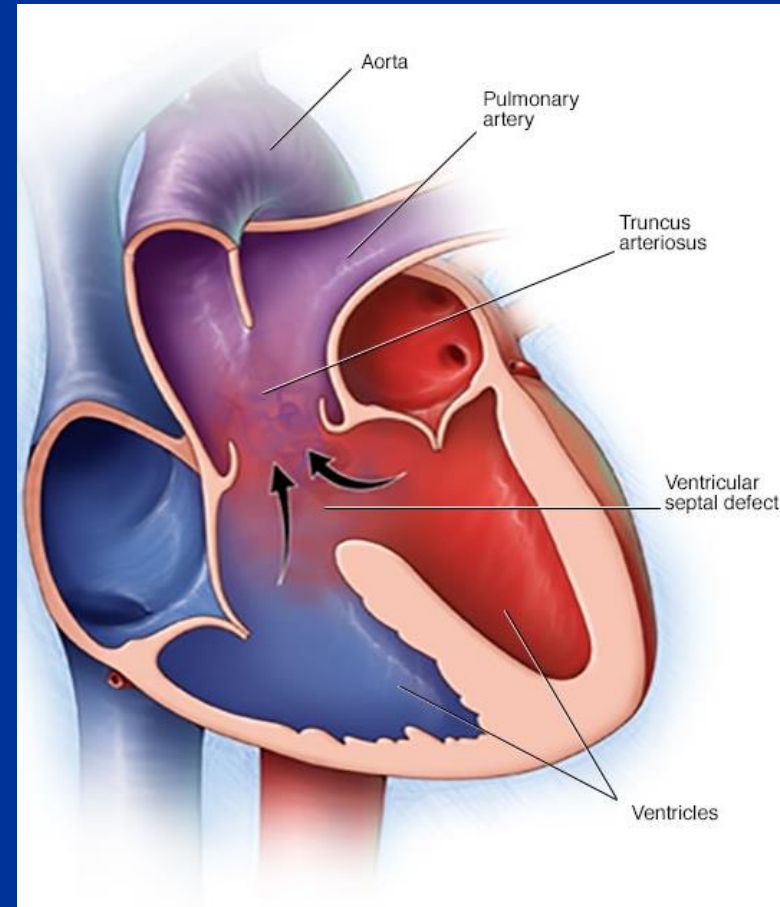
Postoperative weights  
 $R = 0.9541$   
 $p = 0.046$





# Patient

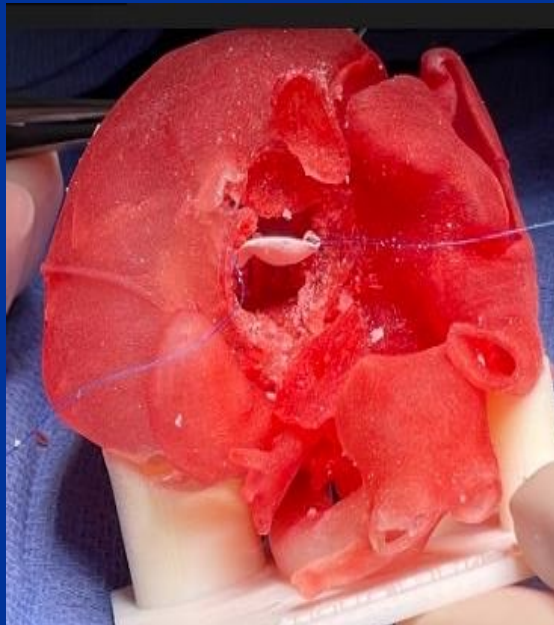
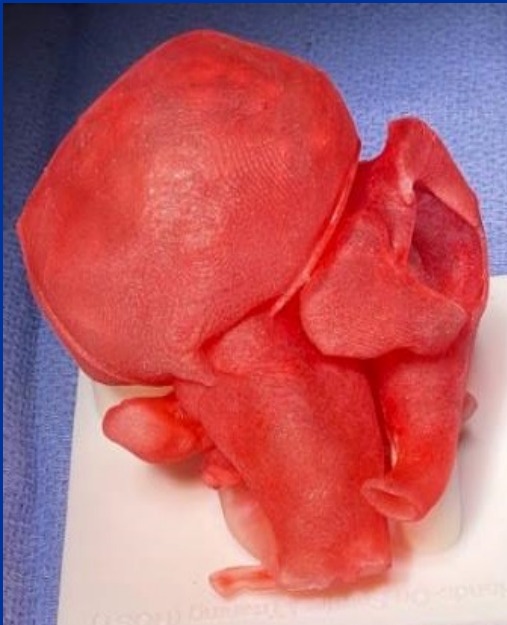
- Prenatally diagnosed truncus arteriosus with a highly dysplastic truncal valve with severe regurgitation





# Logistics

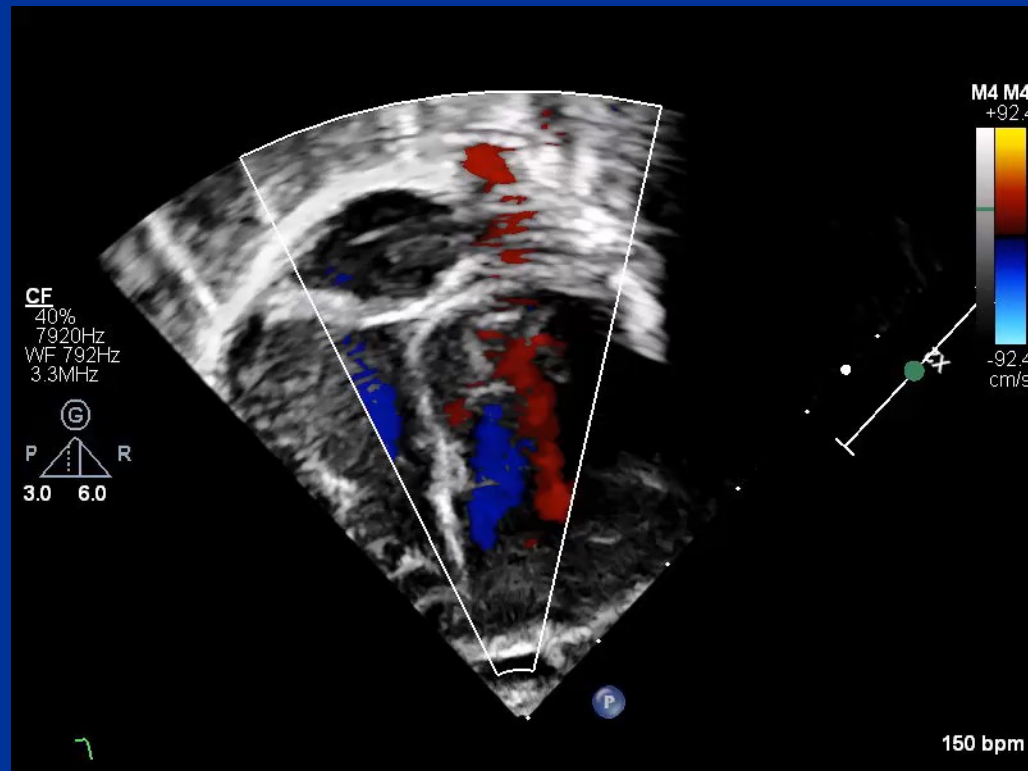
- Plans arranged prenatally for possible partial heart transplant (IRB; discussion; OPO letters; UNOS permission; OR pre-gaming)





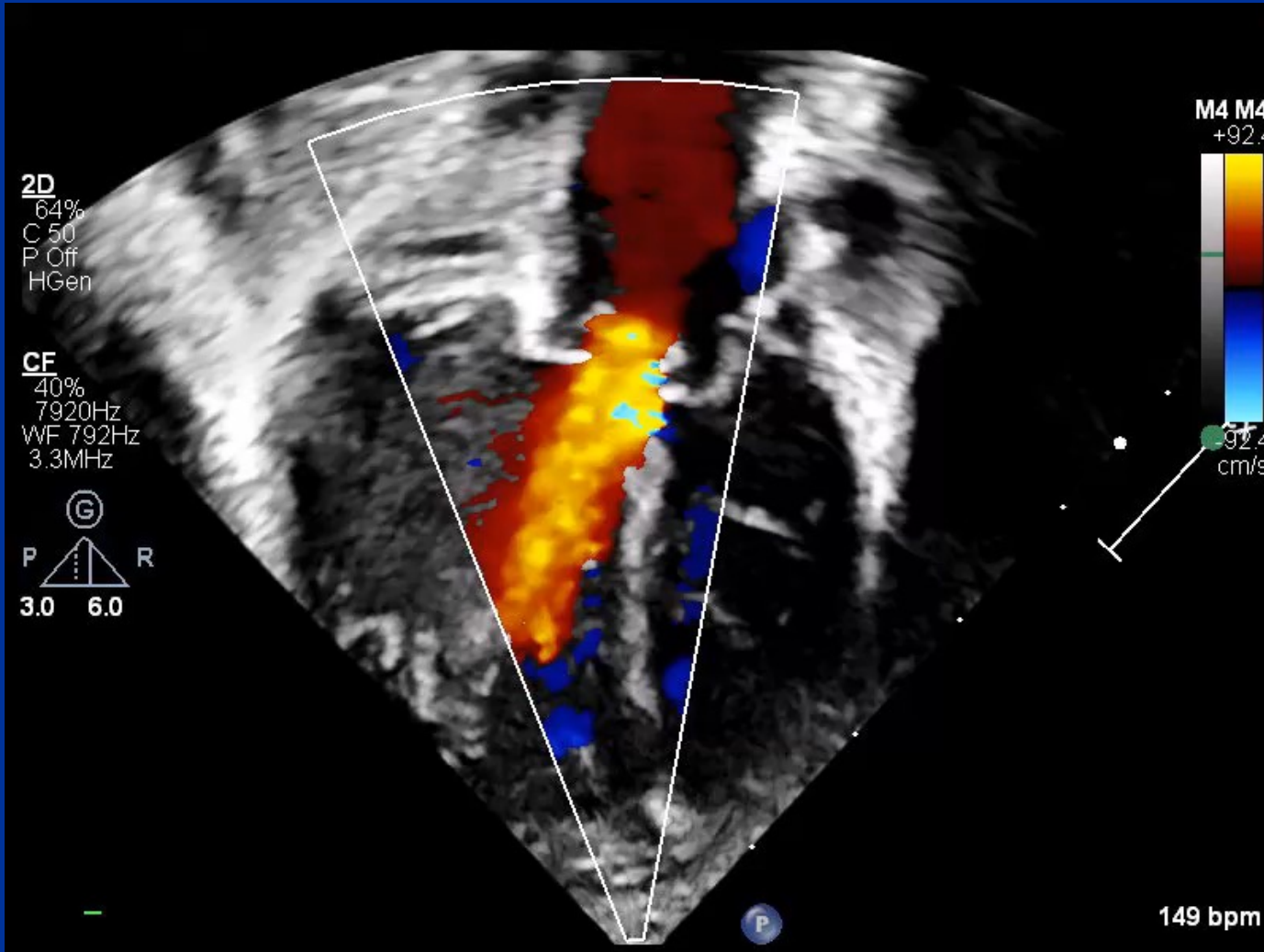
# Patient

- Born at 38w2d at 2.5kg
- Severe truncal valve insufficiency, but stable
- OPO letters sent and dually listed for heart transplant and tissue procurement across the country and for DCD





# Bedside





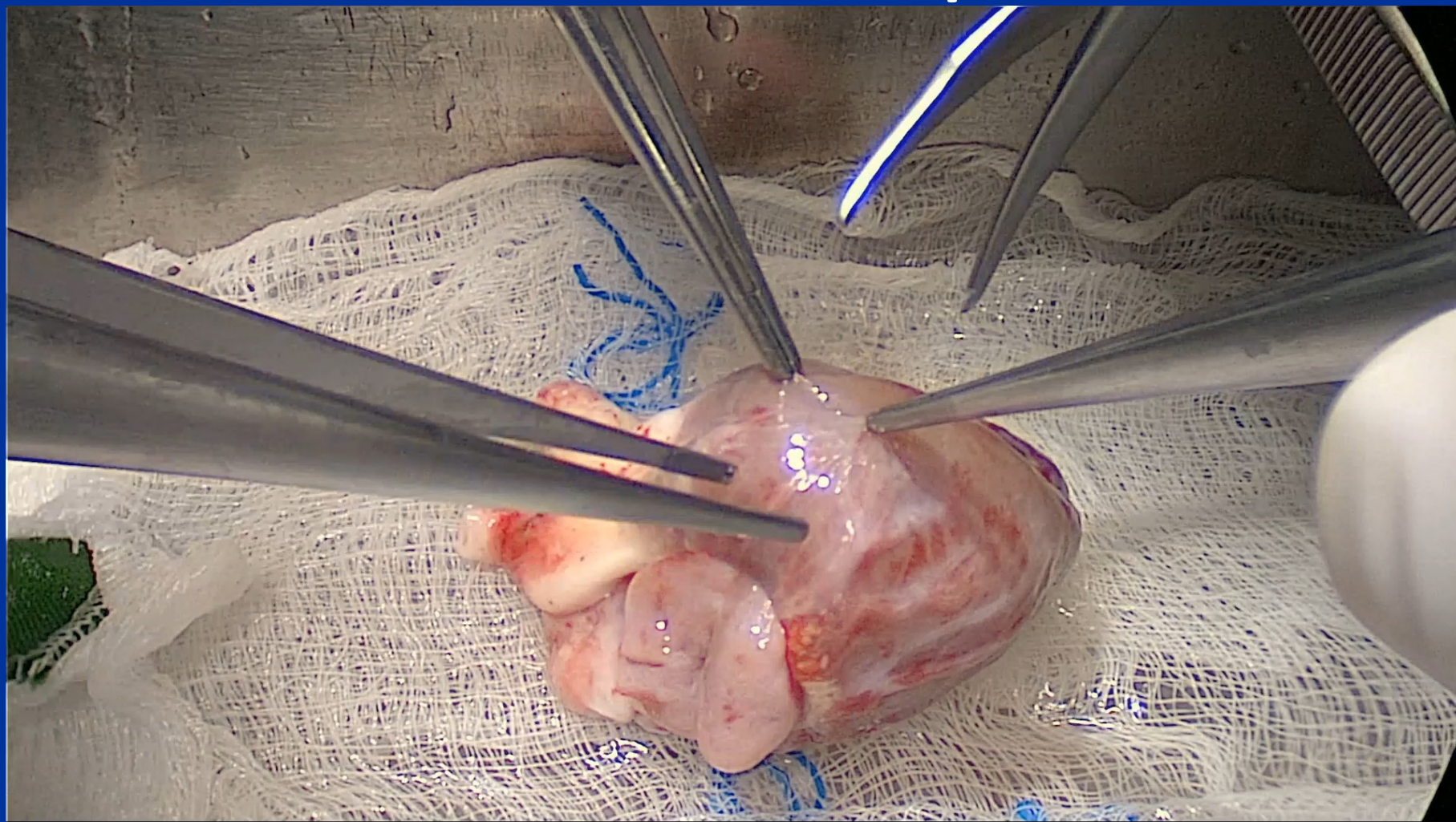
# Donor

- Recipient DOL 13
- 3kg
- DCD due to HIE
- Responsive OPO coordinator
- Family desperately wanted to donate heart
- 2 hour total transit time
- Process breakdowns – Duke coordinator;  
Transportation; UNOS ID



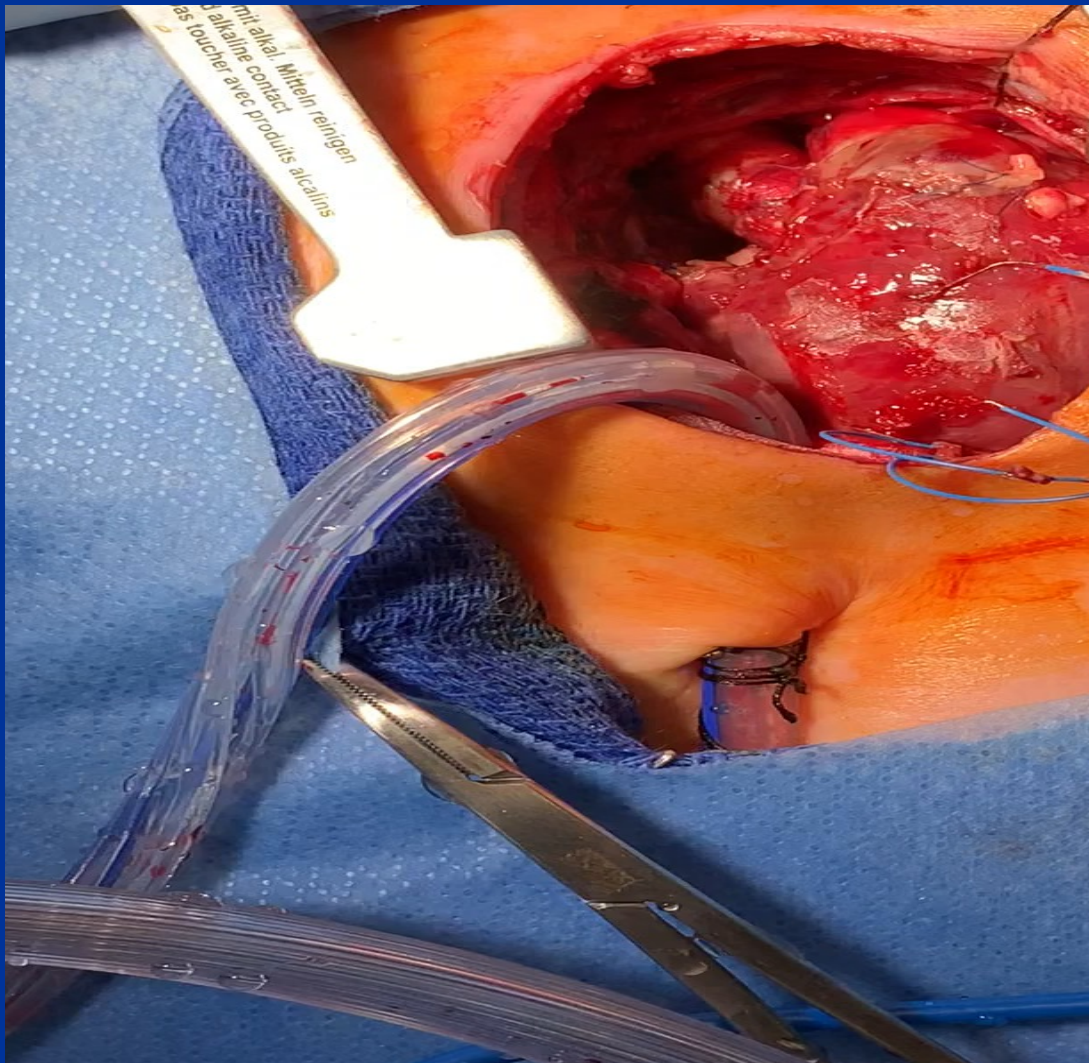


# Living Double Root Replacement “Partial Heart Transplant”



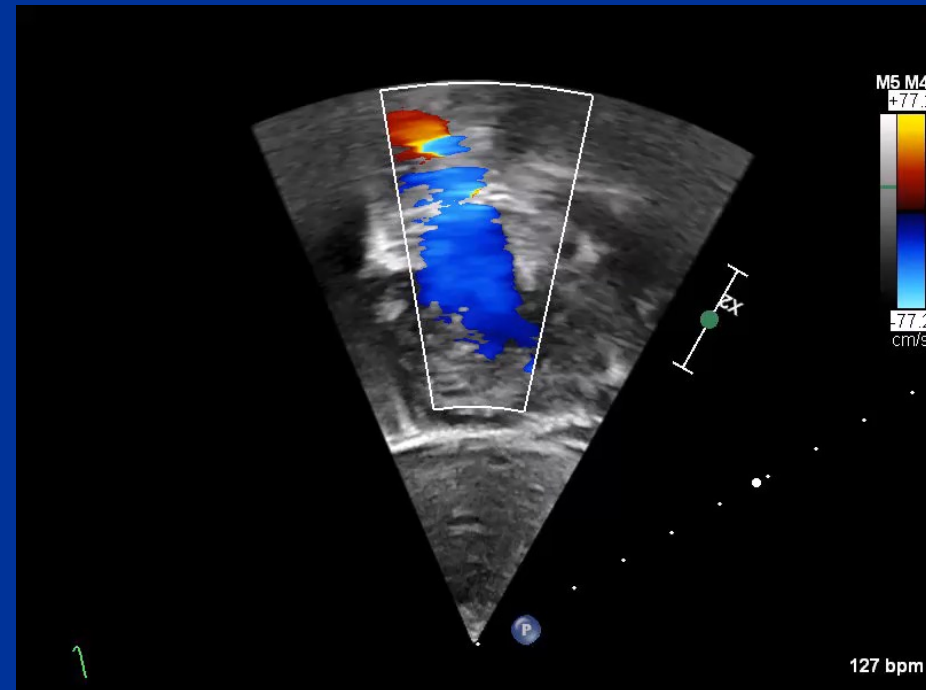
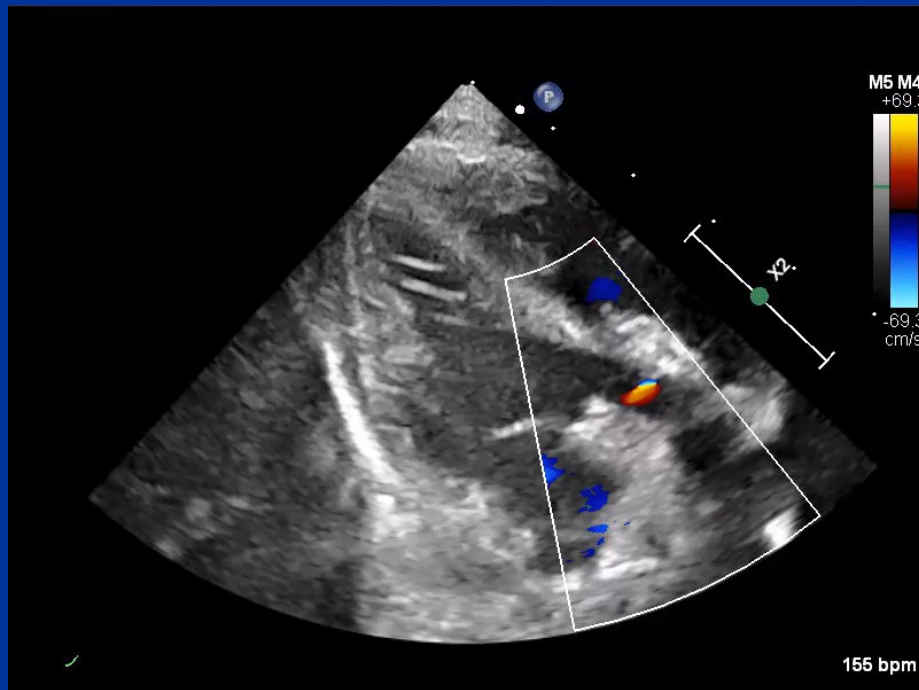


# Result





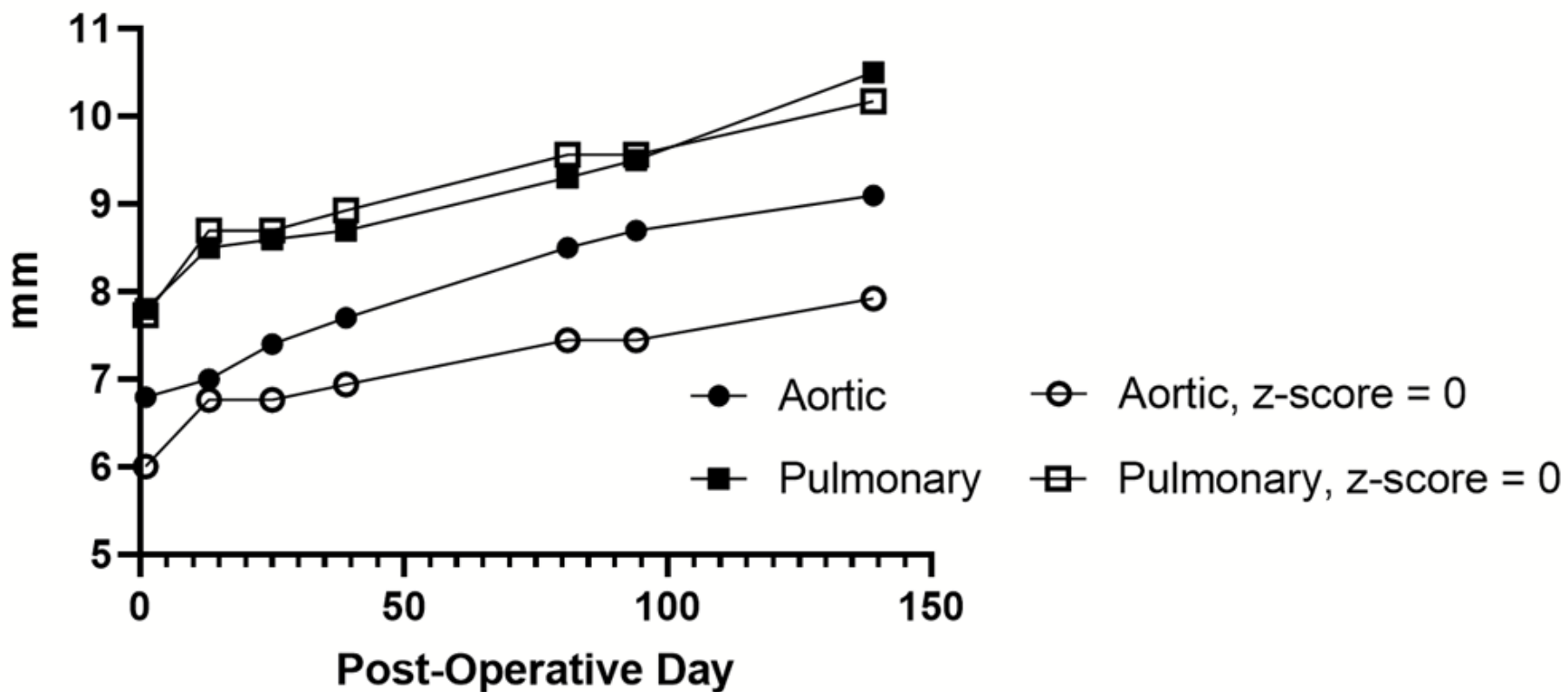
# Postop Echo





# Fate of the Roots

**Post-Operative Valve Size**





# What's Next for Owen?

- Currently on standard Tacrolimus and Cellcept (steroid discontinued during hospitalization)
- Forego immunosuppression wean until aortic valve of “replaceable” size; until pig studies suggest low dose regimen that prevents rejection and maintains growth; or until side effects of immunosuppression ensue



# What's Next with Living Roots?

- More research - define favorable conditions to keep roots “alive”
- Further elucidate “process” with UNOS and OPOs
- Clinical trial for pediatric RV-to-PA conduits on low dose tacrolimus – primary endpoint of growth
  - TOF/PA with ductal stents
  - Ross pulmonary conduits
  - Redo RV-PA conduits in prior TOF repair
- Apply to aortic valve replacement in young adults



# Life-Changing Approach



Pediatric Partial Heart Transplant:  
An Innovative Approach to Decrease  
Waitlist Mortality and Organ Discards.

# WRTC

WASHINGTON REGIONAL  
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Caitrin Conroy





**It Started with an Email...**



**WRTC**  
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# Referral and Review

## History

38 1/7 gestation  
3kg

No pre-natal complications,  
normal pregnancy.

APGAR 5 at 1 minute  
APGAR 3 at 5 minutes

Transferred to Children's National.  
Presenting as BD on arrival.

## Referral to OPO

Initially ruled out due to weight  
under what this OPO pursued  
at that time.

Medical Director and Clinical  
Director contacted for  
permission to consult Duke.

Dr. Turek had requests to assess  
for matching and case was  
followed.

Test lists run to ensure right of  
first refusal.

## Hospital Partnership

AOC to NICU Attending  
communication about why we  
were following this case.

Full support from NICU.  
ABO and Echo completed with  
measurements to assess size  
match.

All communication is timely,  
thorough and considerate of  
donor family.



# Approach and Authorization

# ICU Management

Intermittent instability, managed with epinephrine and fluids.

Oscillation is continued with oxygenation monitored overnight.

Concerns for arrest are communicated with Dr. Turek in real time who states if the condition worsens he will personally begin driving up to ensure they can recover as quickly as possible.



**Family time with the donor was prioritized**



**NICU, WRTC and Duke communicated constantly.**



# The Operating Room

**Family First**

**Normal DCD  
Procedures and  
Packaging**

# Family Care

Children's National Medical Center raised the flag in a family ceremony after the operating room was complete.

WRTC's Donor Family Advocates continue to stay in touch with the family, offering grief support and the same care all donor families receive.



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# How We Found Success

Early and frequent communication.

- Transparency with Children's National Medical Center.
- Real time communication with Dr. Turek, and the Duke Team.
- Diagnostics prior to approaching the family.
- Approach and authorization for transplant, research, education,



## What Did We Learn?



Organ Recovery vs. Tissue Recovery



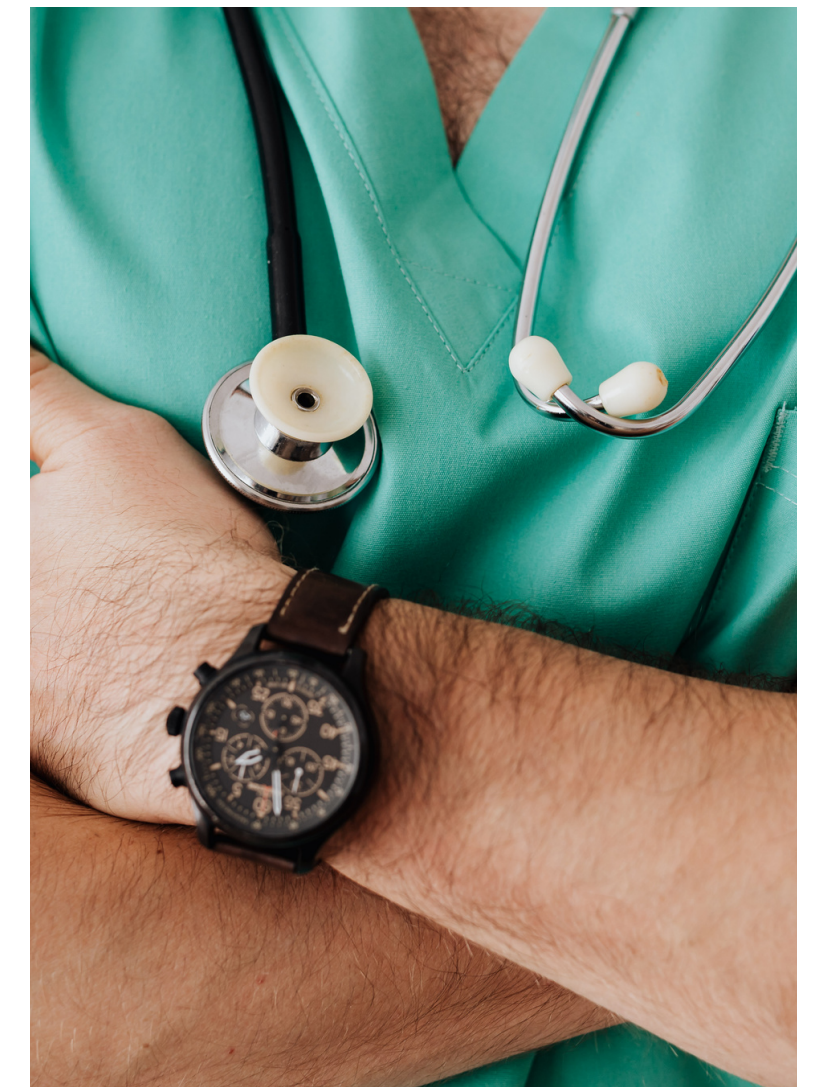


## Next Time...

Research Proposal and Application approval

Run UNOS lists and offer organ to any transplant patient,  
then offer to Duke.

Work together to make this cutting-edge procedure  
easier to navigate, document and save more lives.



# A Special Thanks to Our Panelists



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# Q & A

QUESTIONS & ANSWERS