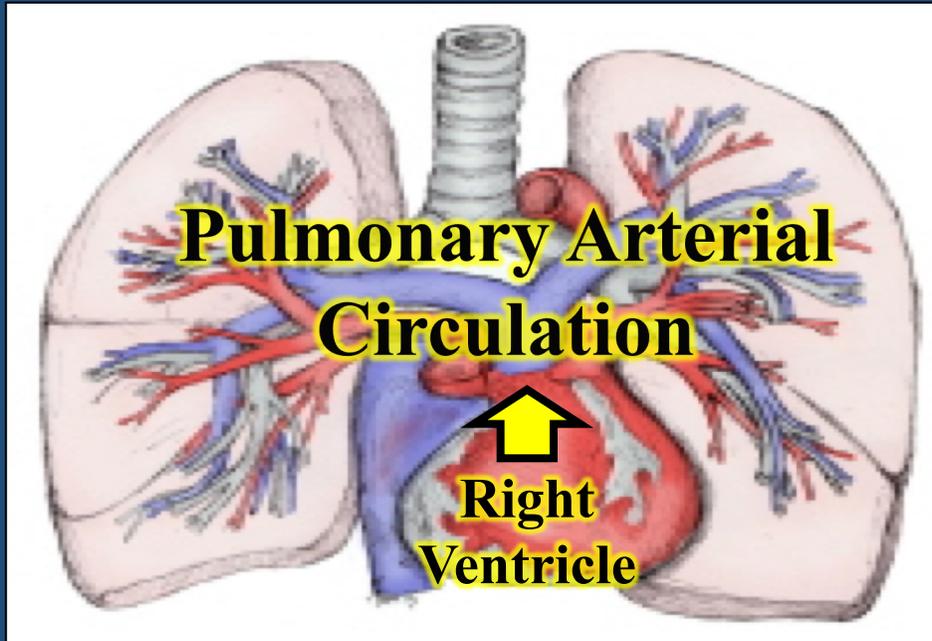
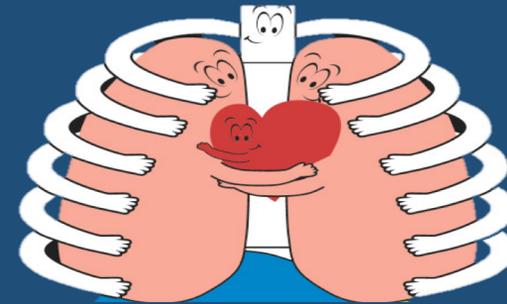


RV performance

RV-PA Coupling



Coupling = Δ Energy = Work



RV-PA Coupling \equiv

RV Function

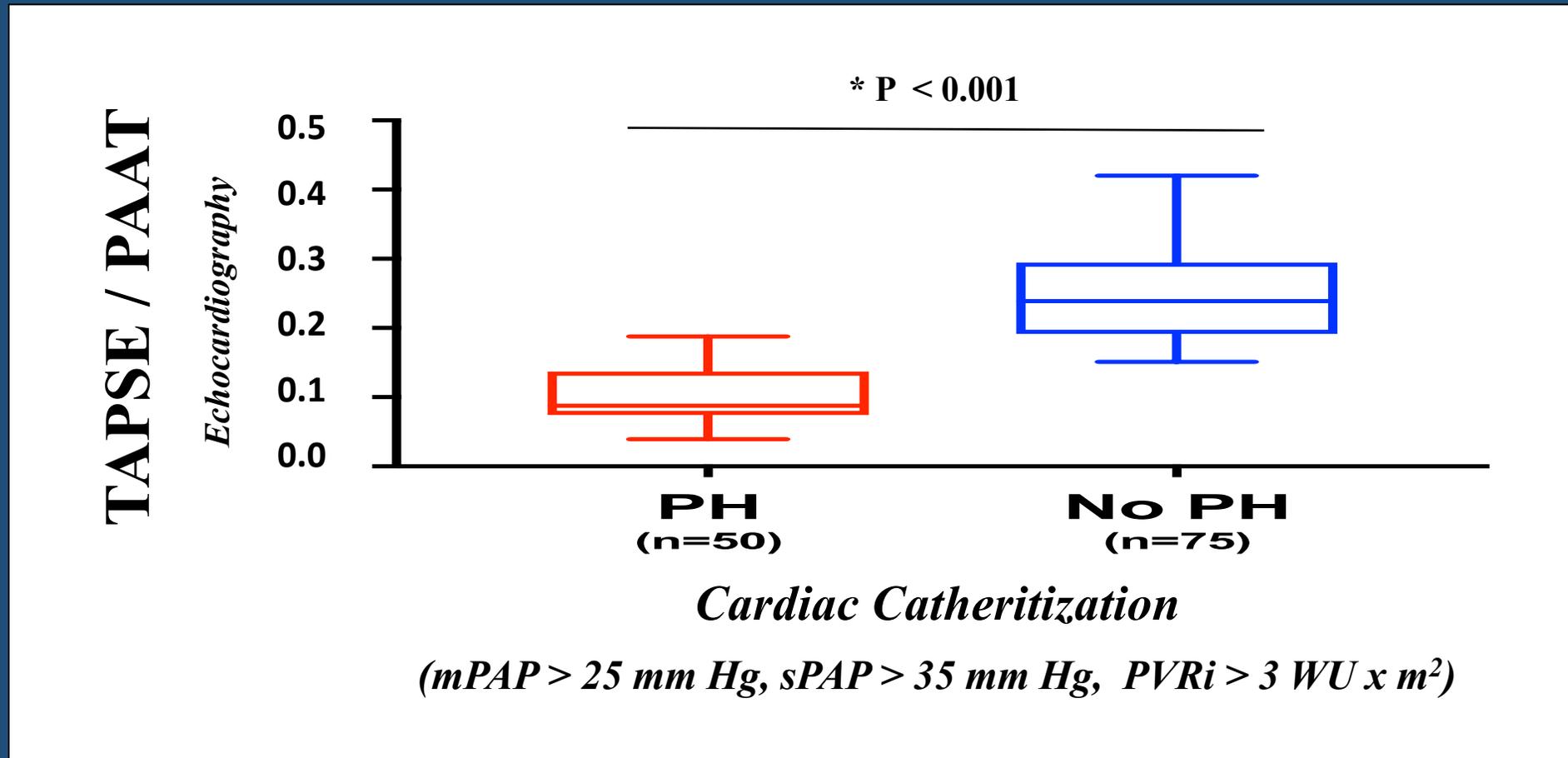
RV Afterload

=

TAPSE

PAAT

TAPSE / PAAT provides a reliable estimate of invasive RV-PV coupling in children



Ventricular interdependence

Influence of LV function on RV performance

Function	Good RV	Poor RV
Good LV	Normal function	RV Dysfunction
Poor LV	LV Dysfunction	RV + LV Dysfunction

Validation of quantitative measures

3- step approach

I. Reliability testing

- Feasibility
- Reproducibility

II. Mechanistic approach

- Tell a story ?
- Maturational changes / Reference values

III. Therapeutic Models

Validation of deformation measures

Feasibility and Reproducibility of Systolic Right Ventricular Strain Measurement by Speckle-Tracking Echocardiography in Premature Infants

Philip Thaler Levy, MD, Mark R. Holland, PhD, Timothy J. Sekarski, RDCS, Aaron Hamvas, MD, and Gautam K. Singh, MD

(J Am Soc Echocardiogr 2013;26:1201-13.)

Maturational Patterns of Systolic Ventricular Deformation Mechanics by Two-Dimensional Speckle-Tracking Echocardiography in Preterm Infants over the First Year of Age

Philip T. Levy, MD, Afif EL-Khuffash, FRCPI, MD, DCE, Meghna D. Patel, MD, Colm R. Breatnach, MB, Adam T. James, MD, Aura A. Sanchez, MD, Cristina Abuchabe, MD, Sarah R. Rogal, BS, Mark R. Holland, PhD, Patrick J. McNamara, MD, MRCPCH, Amish Jain, MD, Orla Franklin, MD, Luc Mertens, MD, Aaron Hamvas, MD, and Gautam K. Singh, MD. *St. Louis, Missouri; Morristown, New Jersey; Dublin, Ireland; Minneapolis, Minnesota; Indianapolis, Indiana*

(J Am Soc Echocardiogr 2017;30:685-98.)

Right ventricular function mirrors clinical improvement with use of prostacyclin analogues in pediatric pulmonary hypertension

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Measures of right ventricle performance

Know your

Afterload

- Resistance
- Compliance
- Impedance

Preload

- Diastolic function
- Hydration / Shunts
- Pericardial effusion

Contractility

- Acidosis / sepsis
- Ischemia / asphyxia
- Inotropes

Morphology

- Macroscopic
- Ultrastructure
- Cellular

1. Pressure-dependent

- TR velocity jet
- Septal wall motion
- RA / RV morphology
- LV eccentricity index
- Shunts / directions

2. PA acceleration time

- PAAT / RVET

1. IVC (?)

2. Volumes (?)

1. RV contractility

- dp/dt
- Strain rate

2. RV systolic function

- FAC / MPI / Strain
- TAPSE / Strain

3. RV diastolic function

- Tissue Doppler velocities
- Strain rate

1. RV Areas

- Systolic
- Diastolic
- 4-ch / 3-ch

2. Dimensions

- RV inflow
- RV outflow

measure

Selected references in neonates

- Review: **Neonatology 2016;110:248–260.**
- FAC: **J Am Soc Echocardiogr 2015;28:559-69.**
- TAPSE: **Neonatology 2011;100:85–92**
- Strain: **J Am Soc Echocardiogr 2017;30:685-98.**
- 3 -chamber: **J Am Soc Echocardiogr 2014;1293-304**
- PAAT: **J Am Soc Echocardiogr. 2016;29:1056-1065**
- Dimensions: **J Peds 2018.**
- Tissue Doppler: **Early Hum Dev 2017;108:33-39.**

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