*Let's Exercise the Dunning-Kruger Effect:*
*Here Are My Predictions for the Next Decade…*

# PRENATAL CARE IN CARDIOVASCULAR DISEASE

Jack Rychik, MD

Children's Hospital of Philadelphia

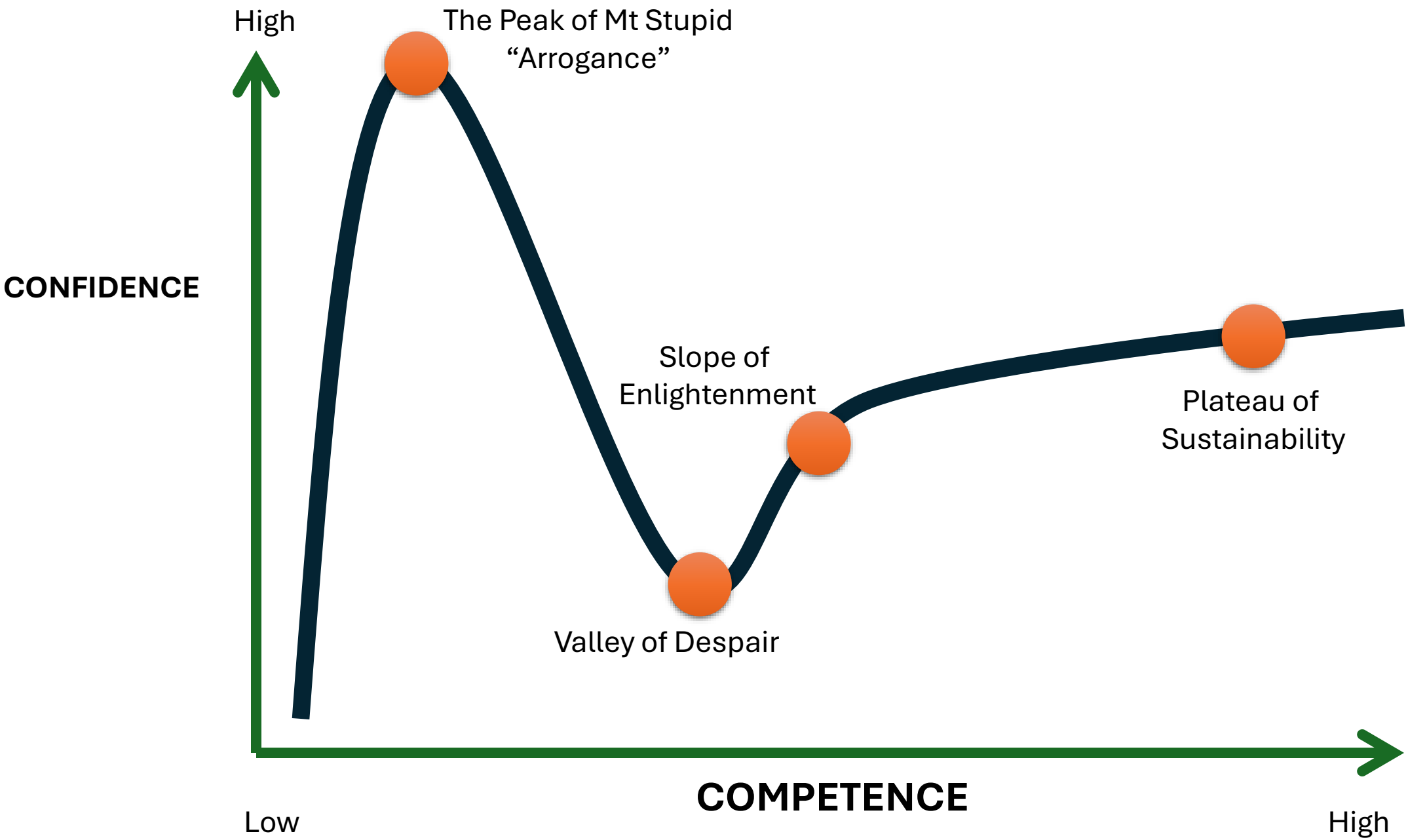
Journal of Personality and Social Psychology
1999, Vol. 77, No. 6, 1121–1134

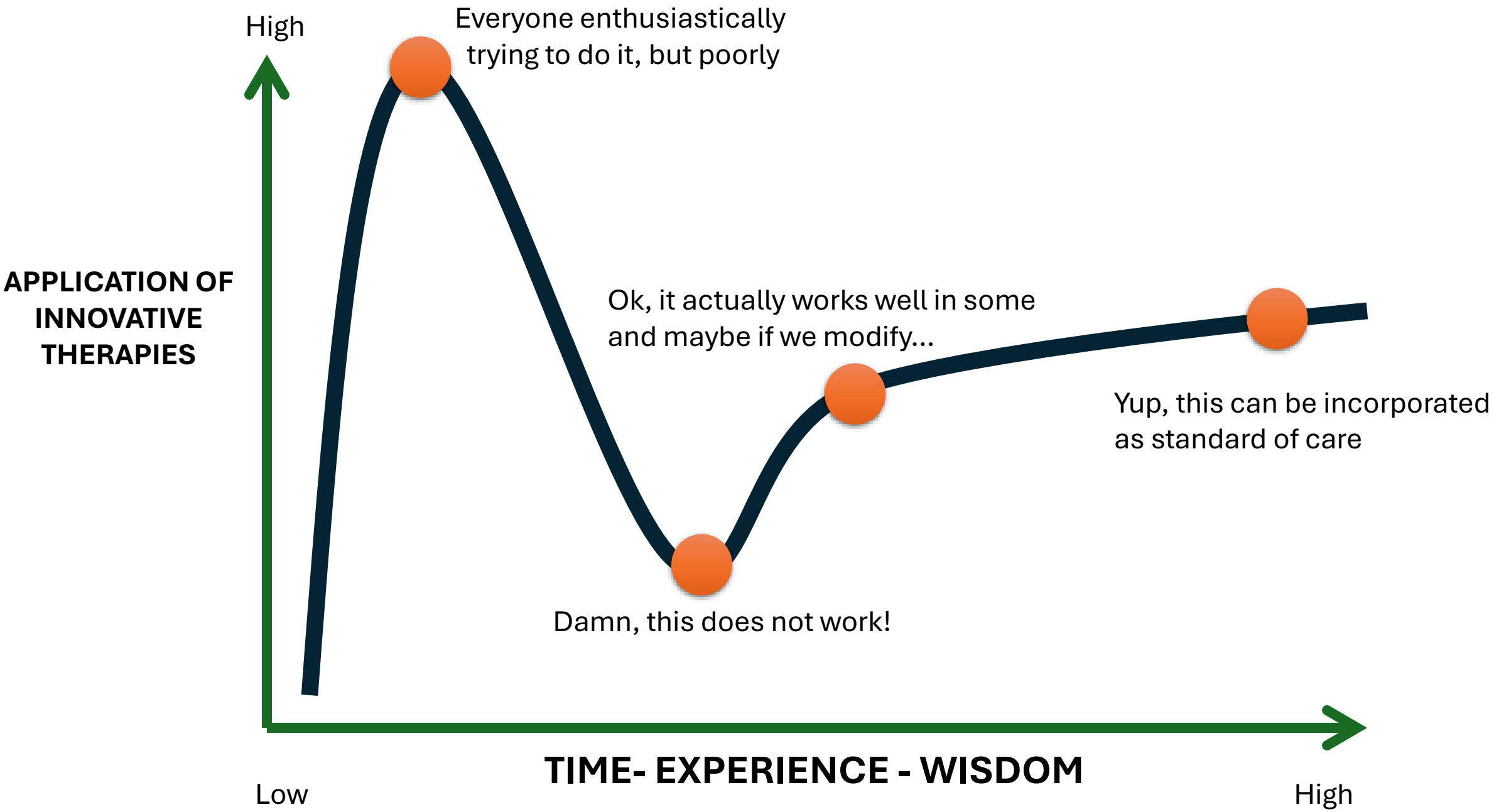

0022-3514/99/$3.00

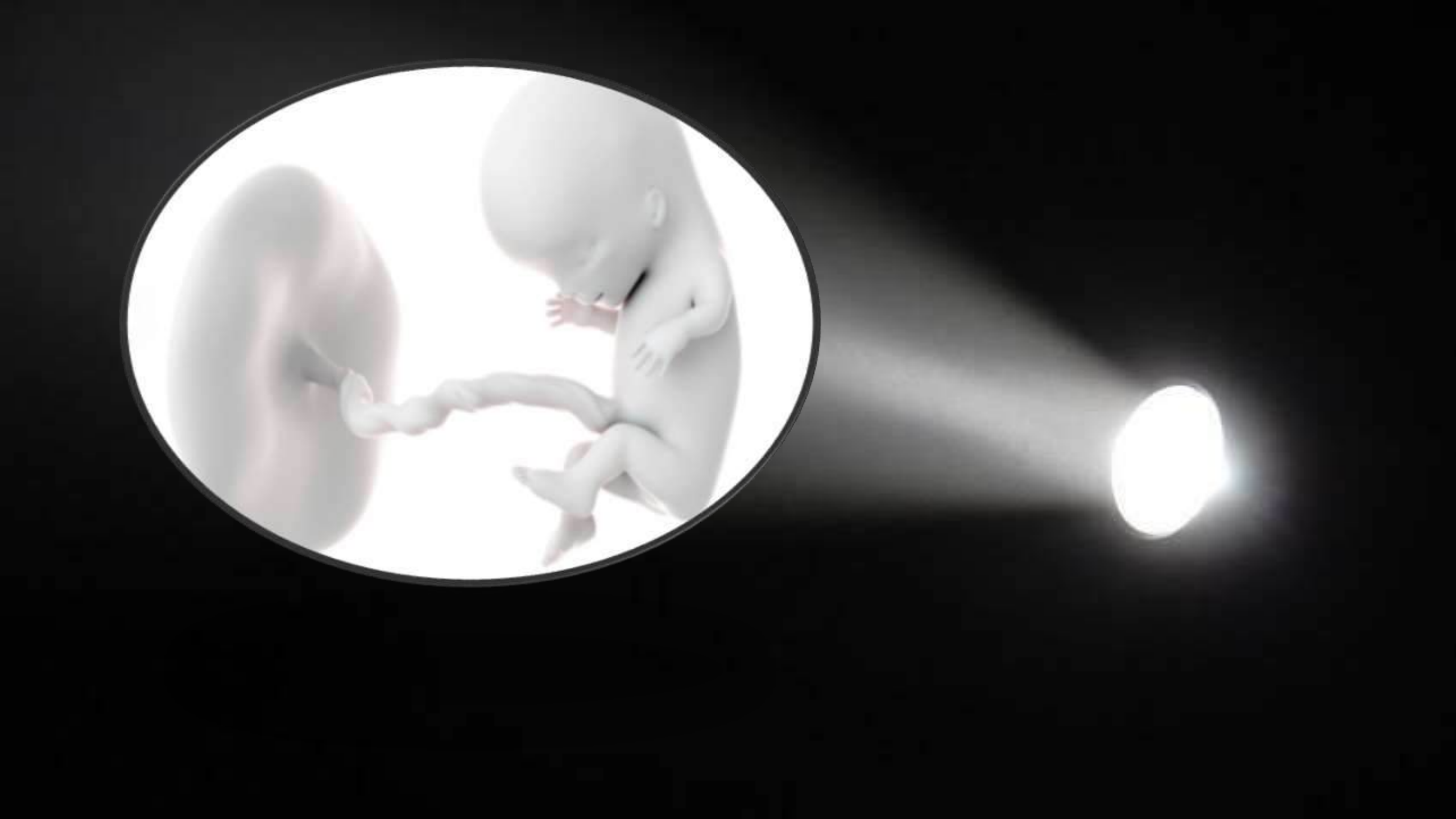
# Unskilled and Unaware of It: How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments

Justin Kruger and David Dunning
Cornell University

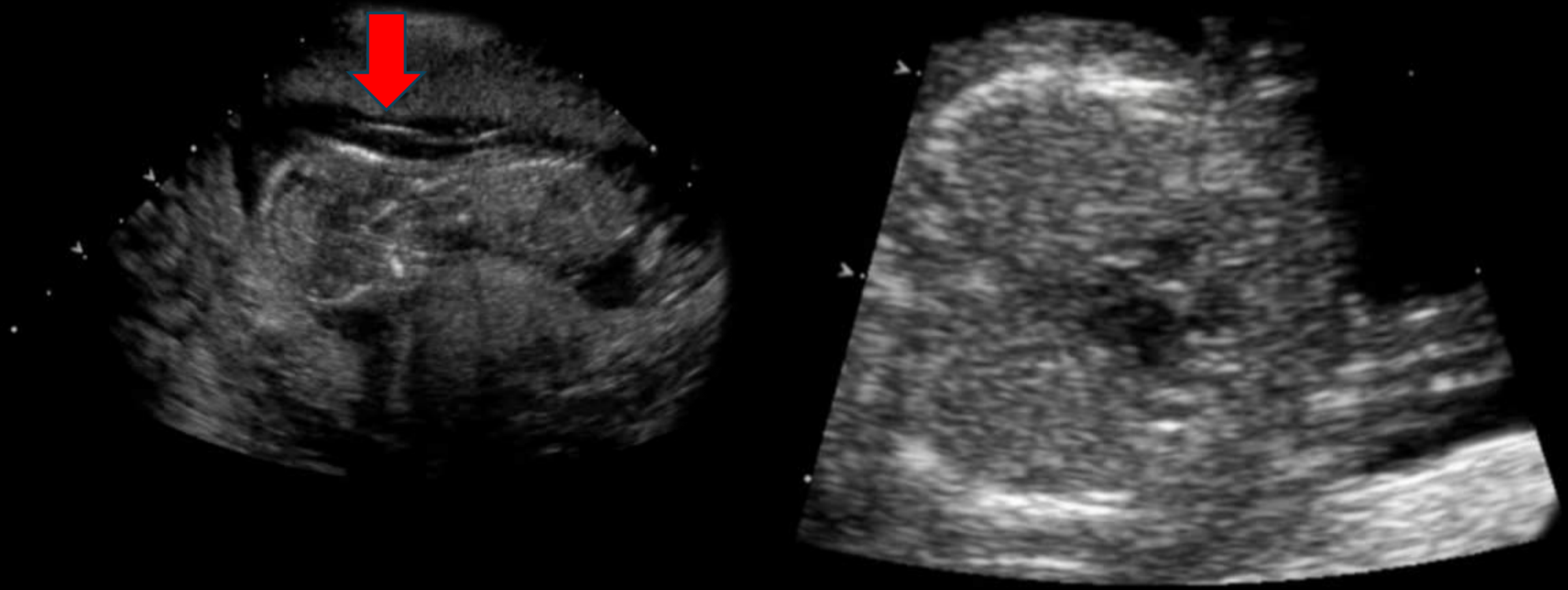
People tend to hold overly favorable views of their abilities in many social and intellectual domains. The authors suggest that this overestimation occurs, in part, because people who are unskilled in these domains suffer a dual burden: Not only do these people reach erroneous conclusions and make unfortunate choices, but their incompetence robs them of the metacognitive ability to realize it. Across 4 studies, the authors found that participants scoring in the bottom quartile on tests of humor, grammar, and logic grossly overestimated their test performance and ability. Although their test scores put them in the 12th percentile, they estimated themselves to be in the 62nd. Several analyses linked this miscalibration to deficits in metacognitive skill, or the capacity to distinguish accuracy from error. Paradoxically, improving the skills of participants, and thus increasing their metacognitive competence, helped them recognize the limitations of their abilities.


High
The Peak of Mt Stupid
“Arrogance”
CONFIDENCE
Slope of
Enlightenment
Plateau of
Sustainability
Valley of Despair
COMPETENCE
Low
High


High
Everyone enthusiastically trying to do it, but poorly
APPLICATION OF INNOVATIVE THERAPIES
Ok, it actually works well in some and maybe if we modify...
Yup, this can be incorporated as standard of care
Damn, this does not work!
TIME- EXPERIENCE - WISDOM
Low
High

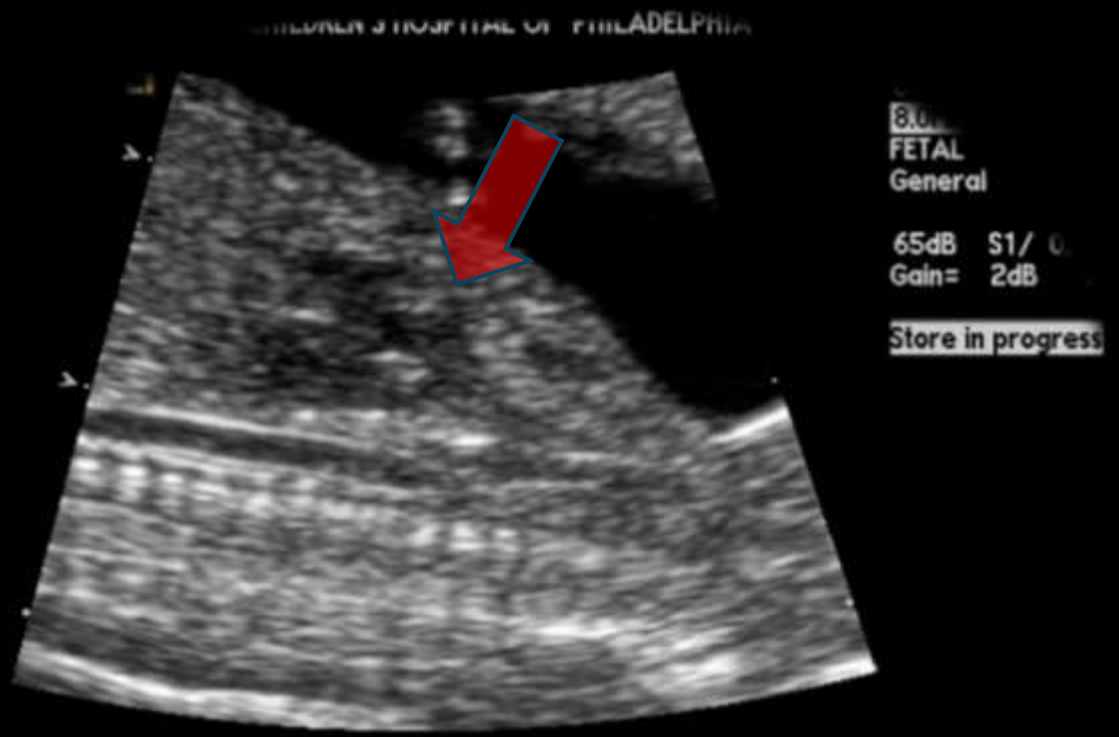


# Early Fetal Cardiovascular Imaging

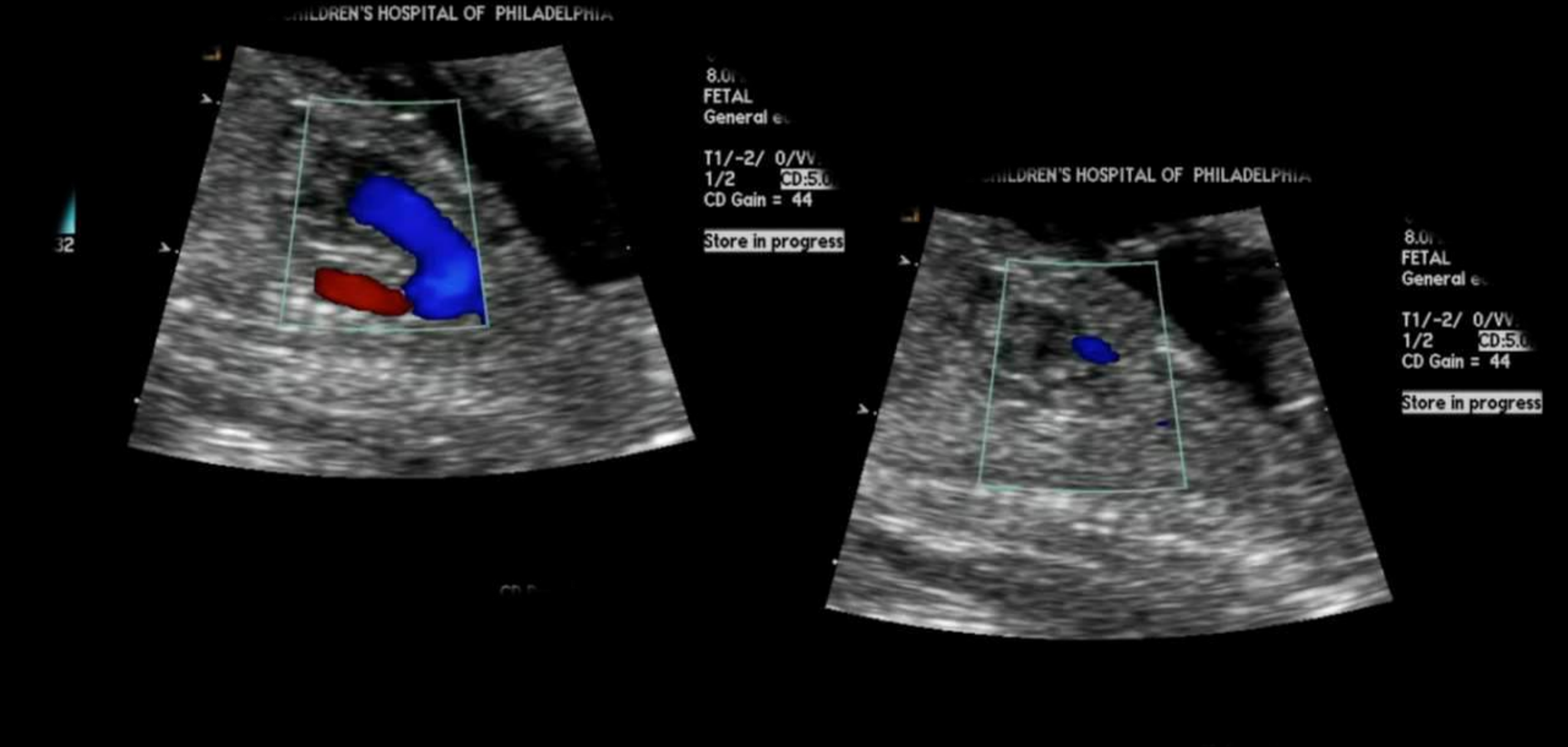


12-13 weeks gestation

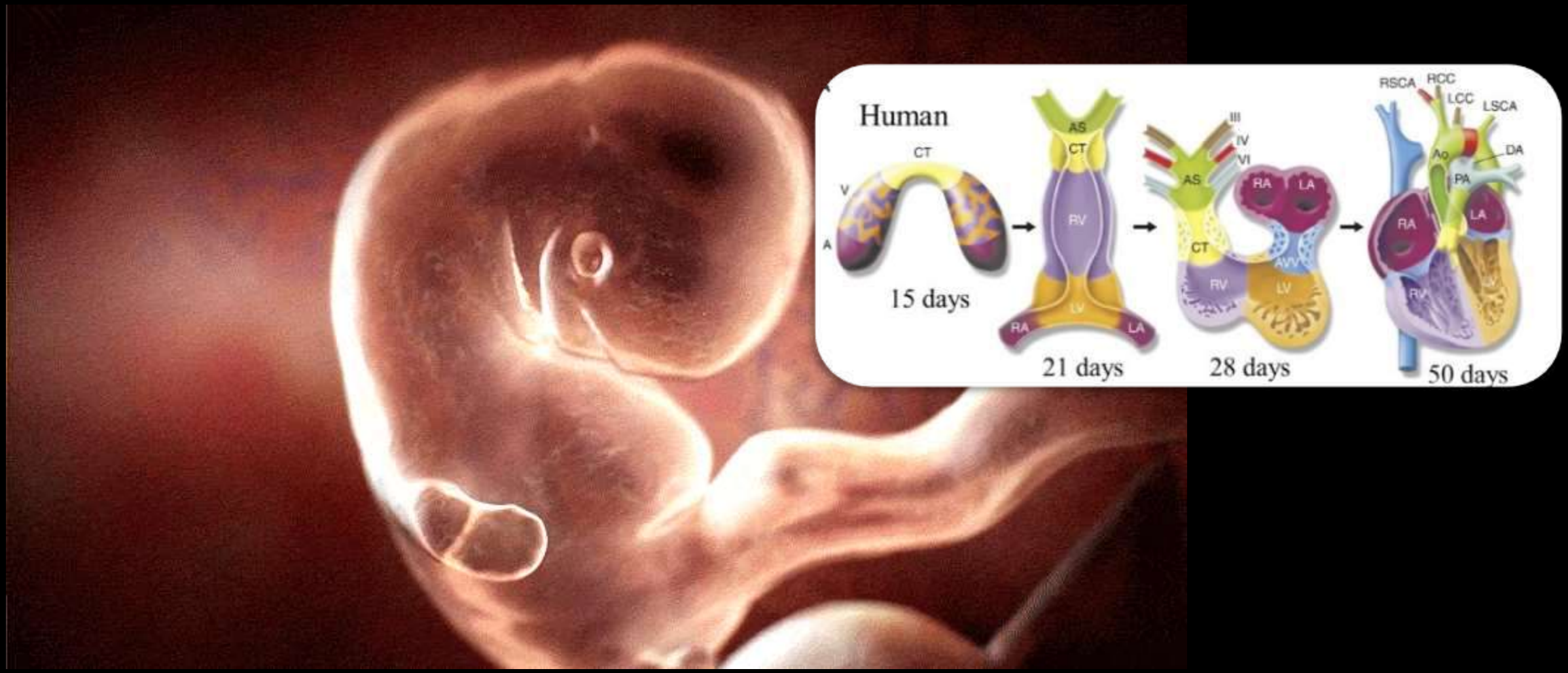
# Early Fetal Cardiovascular Imaging

# Early Fetal Cardiovascular Imaging



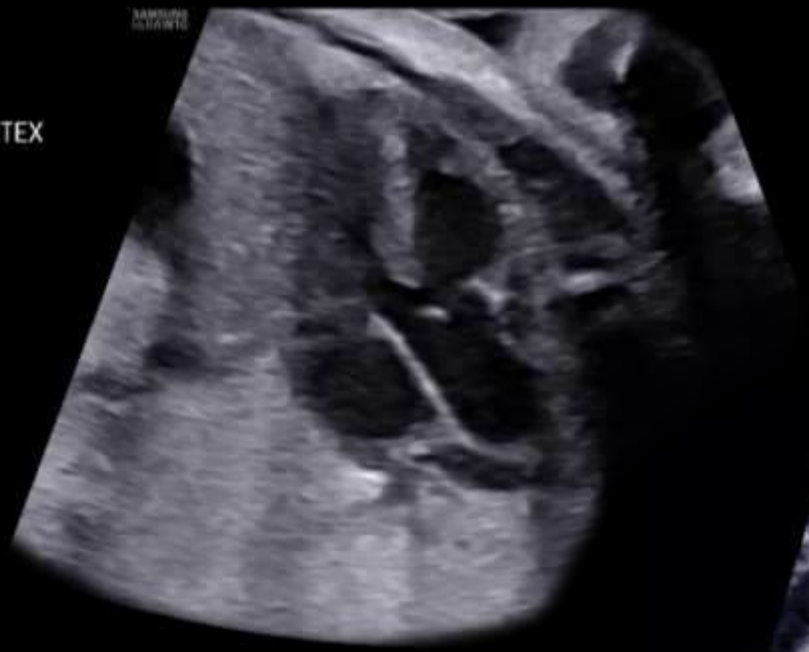
# Why not aim to image at completion of cardiovascular development?

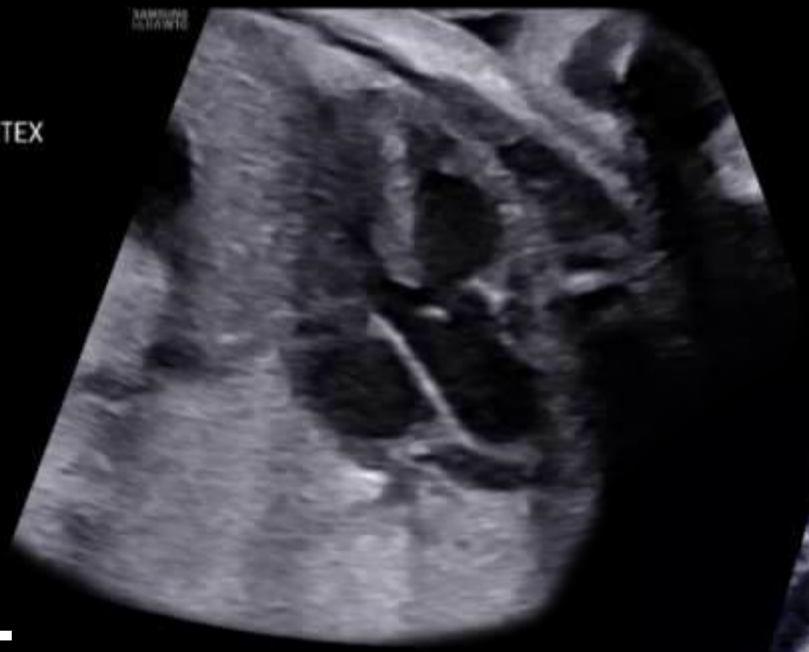


Let’s test some neural networks…

VERTEX

AoV






TOF

TGA

HLHS

STATE-OF-THE-ART REVIEW

# Advances in the Application of Artificial Intelligence in Fetal Echocardiography

Junmin Zhang, MD, Sushan Xiao, MD, Ye Zhu, MS, Zisang Zhang, MD, Haiyan Cao, MD, PhD, Mingxing Xie, MD, PhD, and Li Zhang, MD, PhD, *Wuhan, China*

www.nature.com/scientificreports

scientific reports

OPEN

# AI supported fetal echocardiography with quality assessment

Caroline A. Taksoee-Vester[1,2,3✉], Kamil Mikolaj[4], Zahra Bashir[1,3,5], Anders N. Christensen[4], Olav B. Petersen[1,2], Karin Sundberg[2], Aasa Feragen[4], Morten B. S. Svendsen[3], Mads Nielsen[6] & Martin G. Tolsgaard[1,2,3]

*Ultrasound Obstet Gynecol* 2024; 63: 44–52
Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/uog.27503

# Deep-learning model for prenatal congenital heart disease screening generalizes to community setting and outperforms clinical detection

C. ATHALYE[1], A. VAN NISSELROOIJ[2], S. RIZVI[1], M. C. HAAK[2], A. J. MOON-GRADY[3] and R. ARNAOUT[1,3,4]

[1]*Division of Cardiology, Department of Medicine, University of California, San Francisco, San Francisco, CA, USA;* [2]*Department of Obstetrics, Division of Fetal Medicine, Leiden University Medical Center, Leiden, The Netherlands;* [3]*Department of Pediatrics, Division of Cardiology, University of California, San Francisco, San Francisco, CA, USA;* [4]*Bakar Computational Health Sciences Institute; Department of Radiology; UCSF Berkeley Joint Program in Computational Precision Health; Center for Intelligent Imaging; Biological and Medical Informatics, University of California, San Francisco, San Francisco, CA, USA*

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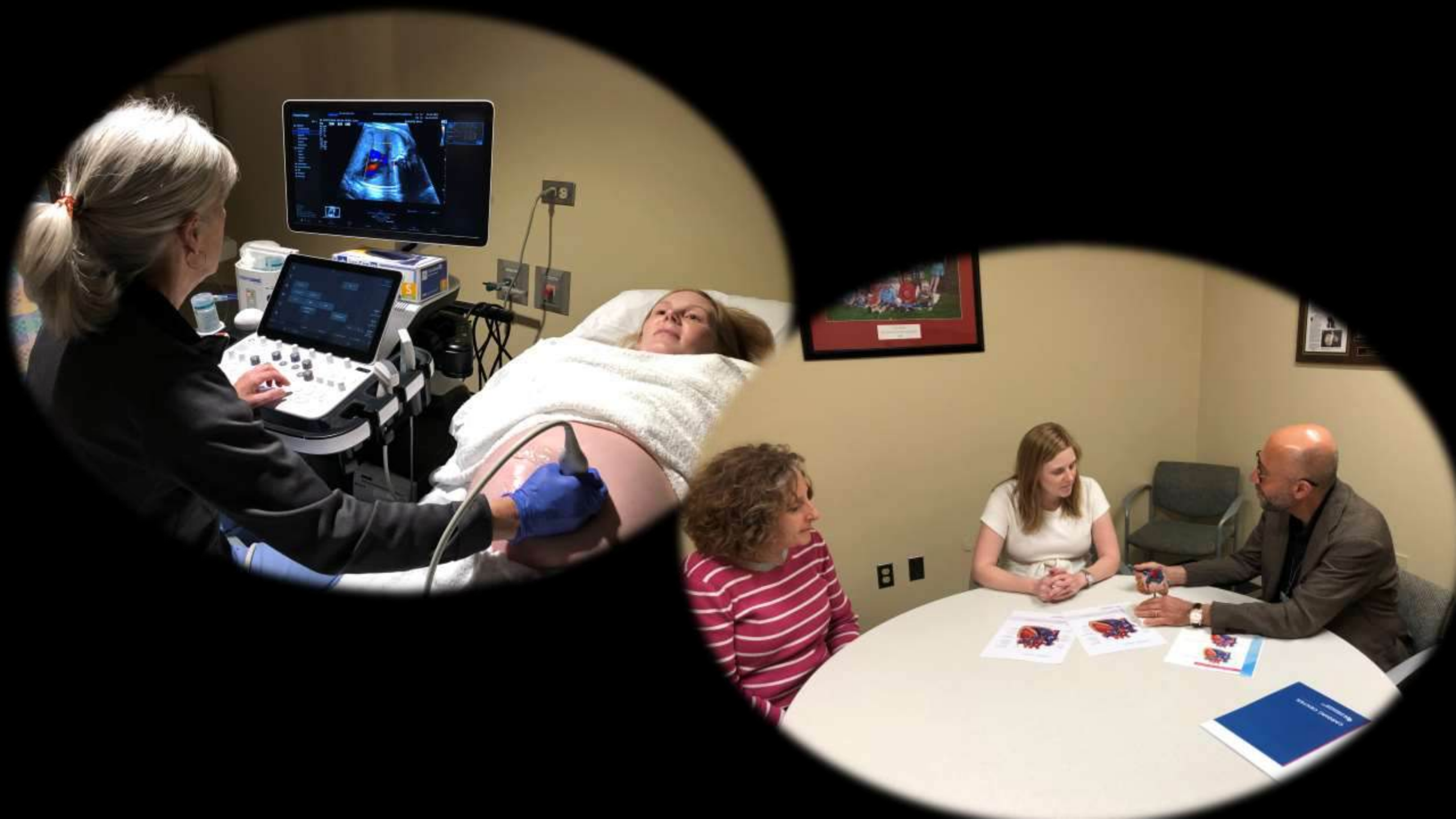
journal homepage: www.sciencedirect.com/journal/ijc-heart-and-vasculature

# Artificial intelligence in fetal echocardiography: Recent advances and future prospects

Mingming Ma[a], Li-Hua Sun[a], Ran Chen[a], Jiang Zhu[b], Bowen Zhao[a,*]

[a]*Department of Diagnostic Ultrasound & Echocardiography, Sir Run Run Shaw Hospital, Zhejiang University College of Medicine, Technical Guidance Center for Fetal Echocardiography of Zhejiang Province & Sir Run Run Shaw Institute of Clinical Medicine of Zhejiang University, Hangzhou 310016, China*
[b]*Zhejiang Provincial Key Laboratory of Precision Diagnosis and Therapy for Major Gynecological Diseases, Women's Hospital of Zhejiang University School of Medicine, Hangzhou 310000, China*

# Maternal-Fetal Environment



Nourishes and provides gas exchange for the fetus

Regulates maternal cardiovascular system

Programs fetal health lifelong

PRENATAL DIAGNOSIS

ORIGINAL ARTICLE

## Maternal Vascular Malperfusion and Anatomic Abnormalities Are Prevalent in Pregnancies W Congenital Heart Disease

Chrystalle Katte Carreon, Christina Ronai, Julia K. Hoffmann, Wayne Tworetzky
Louise E. Wilkins-Haug

First published: 30 August 2024 | https://doi.org/10.1002/pd.6650

JACC: ADVANCES VOL. 4, NO. 2, 2025


ORIGINAL RESEARCH

## Congenital Heart Disease Fetuses Have Decreased Mid-Gestational Placental Flow, Placental Malperfusion Defects, and Impaired Growth

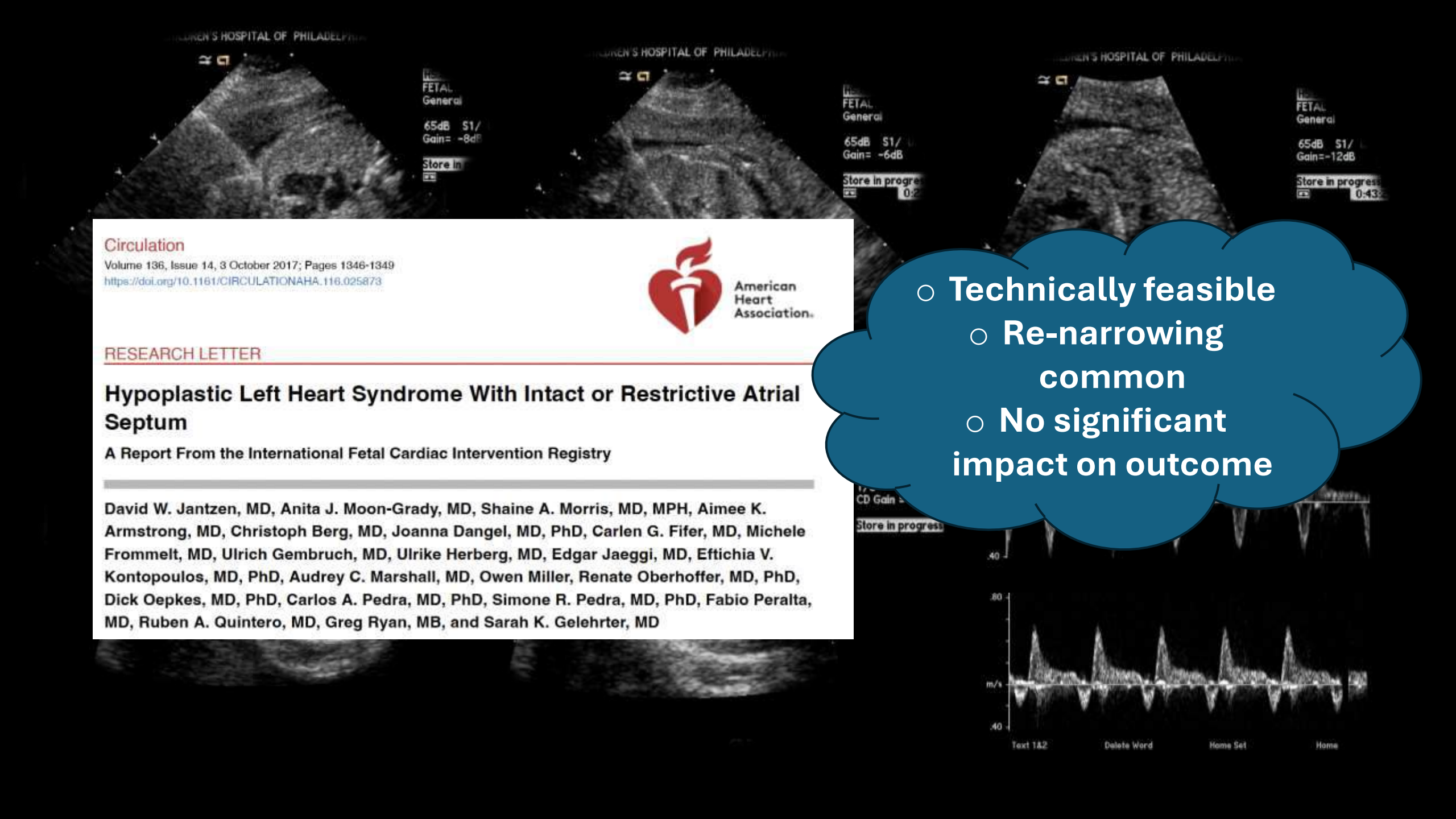
Rebecca Josowitz, MD, PhD,[a,*] Deborah Y. Ho, MD, MPH,[b,*] Somya Shankar, BS,[a] Antara Mondal, MS,[c] Alexis Zavez, PhD,[c] Rebecca L. Linn, MD,[d] Zhiyun Tian, MD,[a] J. William Gaynor, MD,[e] Jack Rychik, MD[a,f]

JAMA Network Open

Original Investigation | Pediatrics

## Progesterone for Neurodevelopment in Fetuses With Congenital Heart Defects
### A Randomized Clinical Trial

J. William Gaynor, MD; Julie S. Moldenhauer, MD; Erin E. Zullo, BSN; Nancy B. Burnham, RN, MSN, CRNP; Marsha Gerdes, PhD; Judy C. Bernbaum, MD; Jo Ann D'Agostino, DNP, CRNP; Rebecca L. Linn, MD; Brenna Klepczynski, BSN; Isabel Randazzo, BS; Gabrielle Gionet, MPH; Grace H. Choi, MS; Antoneta Karaj, MS; William W. Russell, MD; Elaine H. Zackai, MD; Mark P. Johnson, MD; Juliana S. Gebb, MD; Shelly Soni, MD; Suzanne E. DeBari, BS, RDMS, RVT; Anita L. Szwast, MD; Rebecca C. Ahrens-Nicklas, MD, PhD; Theodore G. Drivas, MD, PhD; Marin Jacobwitz, CRNP; Daniel J. Licht, MD; Arastoo Vossough, MD; Susan C. Nicolson, MD; Thomas L. Spray, MD; Jack Rychik, MD; Mary E. Putt, PhD, ScD



Circulation
Volume 136, Issue 14, 3 October 2017; Pages 1346-1349
https://doi.org/10.1161/CIRCULATIONAHA.116.025873

American Heart Association.

RESEARCH LETTER

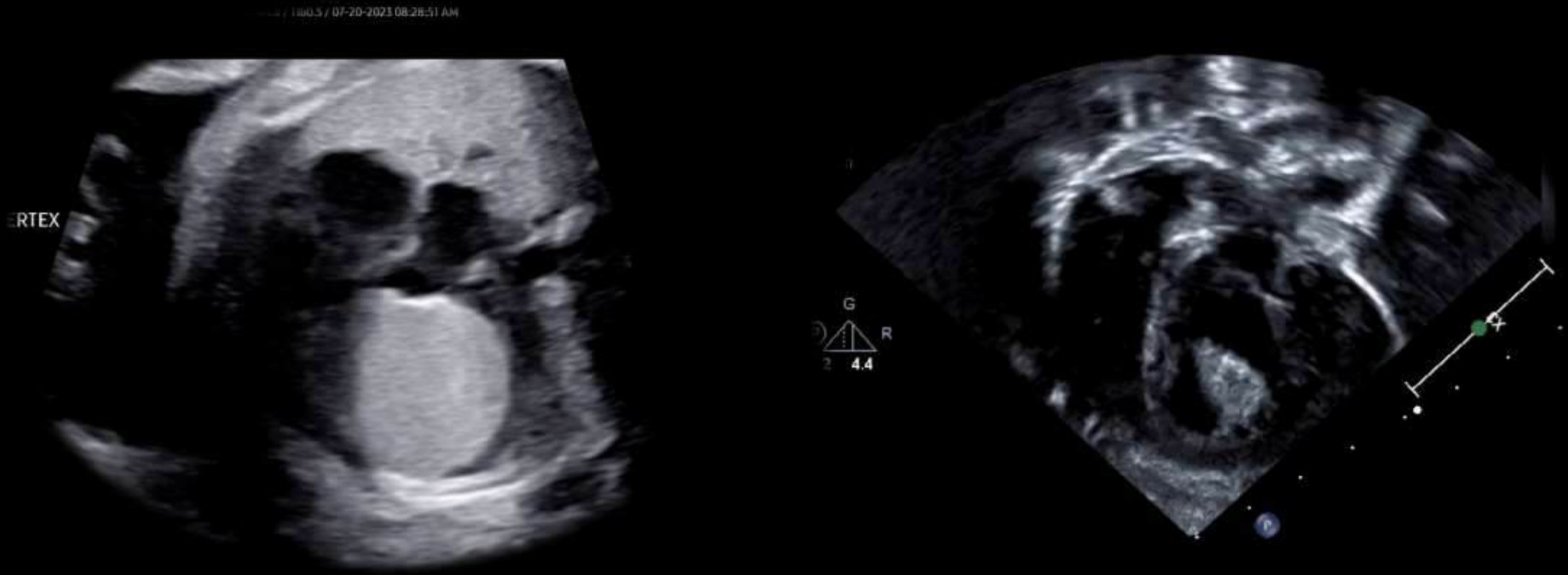
# Hypoplastic Left Heart Syndrome With Intact or Restrictive Atrial Septum

## A Report From the International Fetal Cardiac Intervention Registry

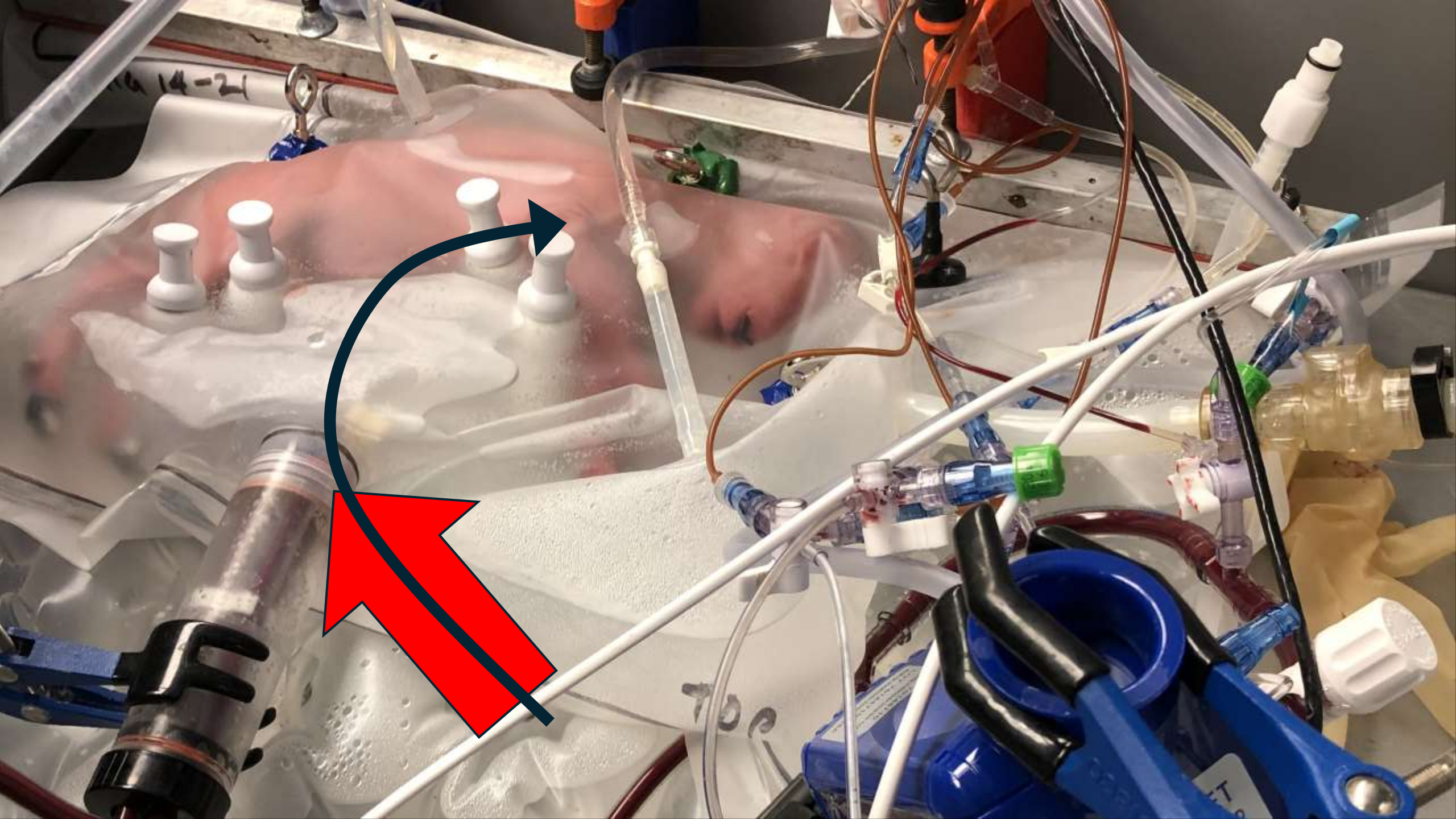
David W. Jantzen, MD, Anita J. Moon-Grady, MD, Shaine A. Morris, MD, MPH, Aimee K. Armstrong, MD, Christoph Berg, MD, Joanna Dangel, MD, PhD, Carlen G. Fifer, MD, Michele Frommelt, MD, Ulrich Gembruch, MD, Ulrike Herberg, MD, Edgar Jaeggi, MD, Eftichia V. Kontopoulos, MD, PhD, Audrey C. Marshall, MD, Owen Miller, Renate Oberhoffer, MD, PhD, Dick Oepkes, MD, PhD, Carlos A. Pedra, MD, PhD, Simone R. Pedra, MD, PhD, Fabio Peralta, MD, Ruben A. Quintero, MD, Greg Ryan, MB, and Sarah K. Gelehrter, MD

- Technically feasible
- Re-narrowing common
- No significant impact on outcome

# Maternal Oral Sirolimus Therapy for Fetal Rhabdomyoma




HG 14-24



# Where Will We Be Within The Next Decade?

- Early fetal cardiovascular imaging - 1st trimester
- Artificial Intelligence Image Interpretation
- Maternal-fetal environment and the placenta
- Fetal therapies for cardiovascular conditions
- Extrauterine artificial placental support

*“The Best Way to Predict the Future is to Create It.”*