

# ePLAR echocardiographic Pulmonary to Left Atrial Ratio Echo Hawaii 2020

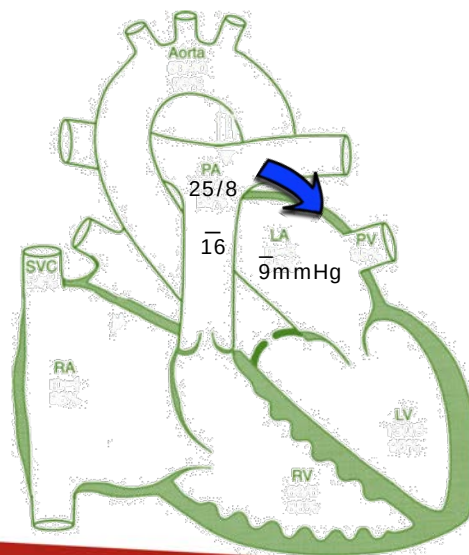
Gregory M Scalia  
Professor of Medicine  
Director of Echocardiography  
The Prince Charles Hospital  
M.B.B.S.(Hons), M.Med.Sc., F.R.A.C.P., F.A.C.C.,  
F.C.S.A.N.Z., F.A.S.E.

1

## Pulmonary hypertension

### Right heart catheterisation gold-standard

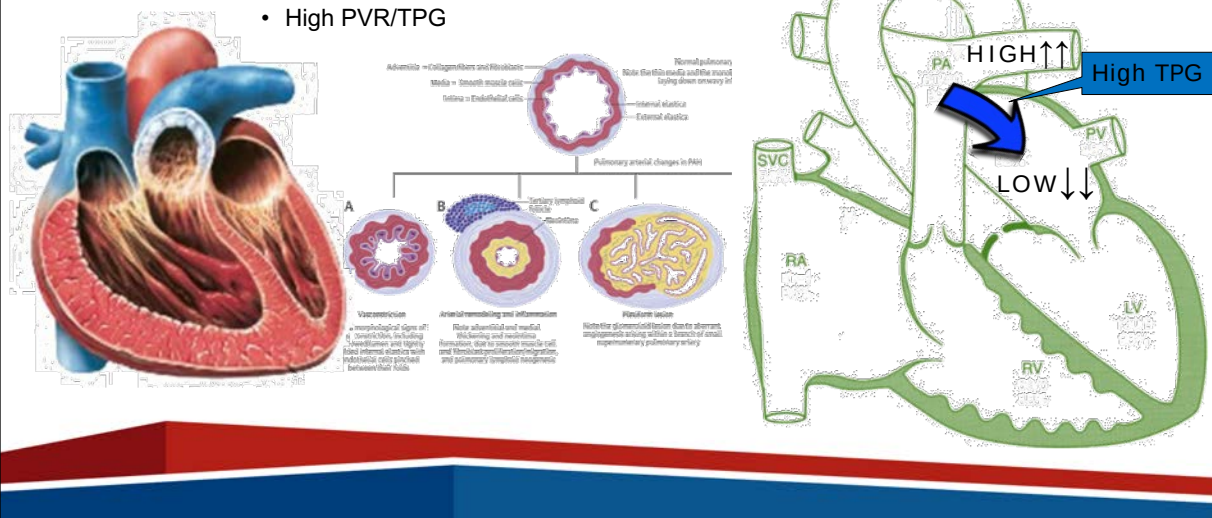
- Pulmonary artery pressure (PAP)
- Pulmonary capillary wedge pressure (PCWP) as a surrogate for left atrial pressure (LAP)
- Trans-pulmonary gradient
  - $TPG = PAP_{mean} - PCWP$
- Diastolic pressure gradient
  - $DPG = PAP_{diast} - PCWP$
- Pulmonary vascular resistance
  - $(PVR = TPG / \text{Cardiac Output})$



2

## Pre-capillary Pulmonary Hypertension ASE American Society of Echocardiography

- obstructed arterial tree
  - Very high PAP
  - Low LAP
  - High PVR/TPG



3

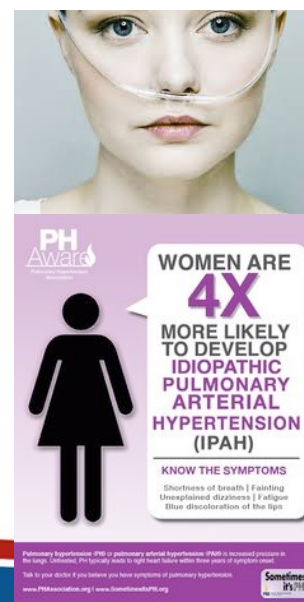
## Pulmonary arterial hypertension ASE American Society of Echocardiography

### Revolutionary new treatments for pulmonary hypertension (PHT) over the last decade

- specific pulmonary vasodilator therapies
- symptomatic and prognostic

### Specific subsets PHT benefit

- idiopathic pulmonary arterial hypertension (PAH/PPH)
- Connective tissue disease
  - (Group 1)
- Lung disease related (Group 3)



4

## Post-capillary Pulmonary



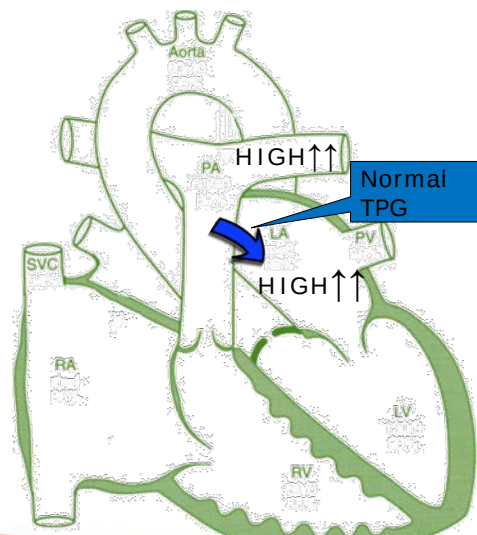
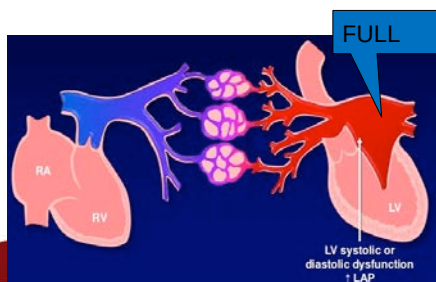
- obstructed venous efflux from lungs

□ High LAP

□ High PAP

□ Normal TPG

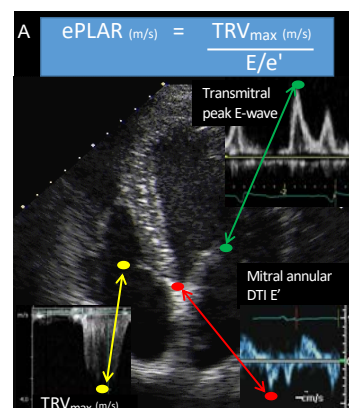
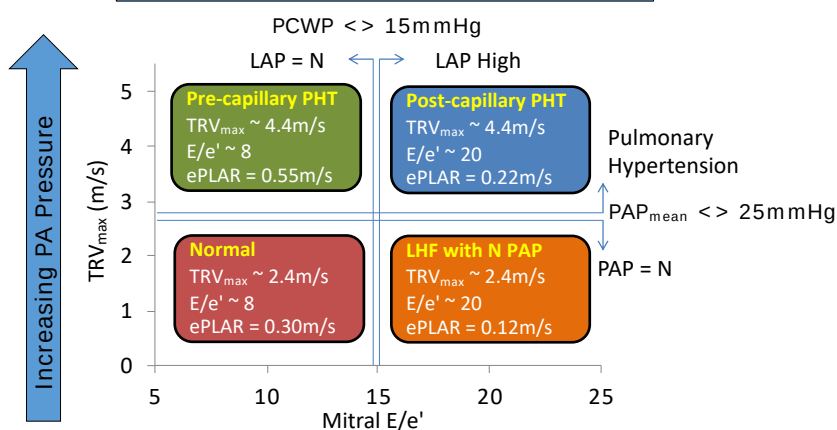
■ (+/- "Out-of-proportion")



5

Idea

$$ePLAR = \frac{TRV_{max}}{\text{Mitral } E/e'}$$



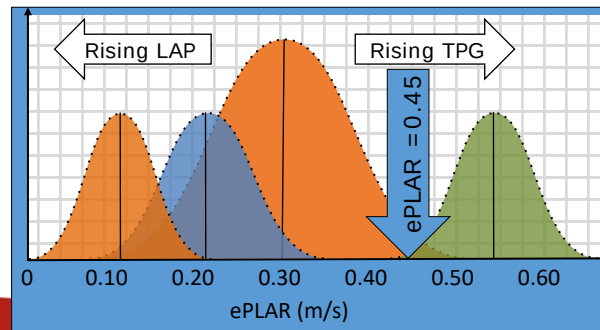
6



## Case 37 woman PAH

$$\text{ePLAR} = \frac{\text{TRVmax}}{\text{Mitral E/e'}}$$

$$= 3.6 \div 8 = 0.45 \text{ m/s}$$



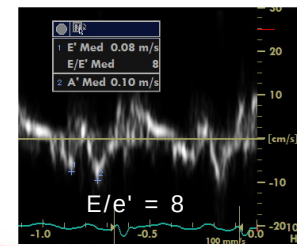
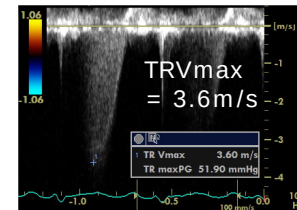
Pre-capillary PHT

Post-capillary PHT

American Society of  
Echocardiography

Normal

LHF with N PAP

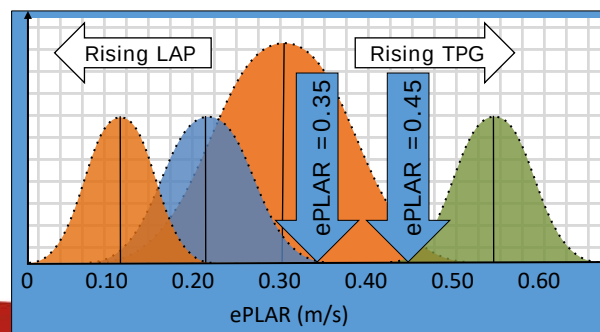


9

## Case 37 PAH on Rx 1 month

$$\text{ePLAR} = \frac{\text{TRVmax}}{\text{Mitral E/e'}}$$

$$= 2.5 \div 7 = 0.35 \text{ m/s}$$



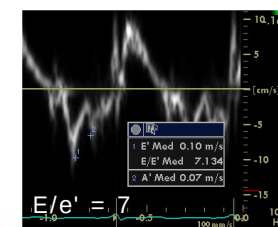
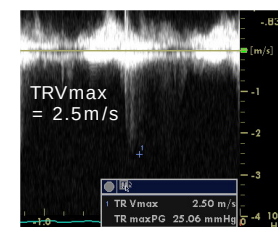
Pre-capillary PHT

Post-capillary PHT

American Society of  
Echocardiography

Normal

LHF with N PAP



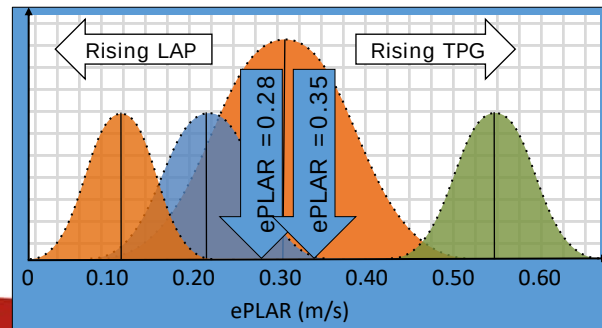
10



## Case 37 PAH on Rx 1 year

$$ePLAR = \frac{TRV_{max}}{\text{Mitral } E/e'}$$

$$= 2.1 \div 7.6 = 0.28 \text{ m/s}$$



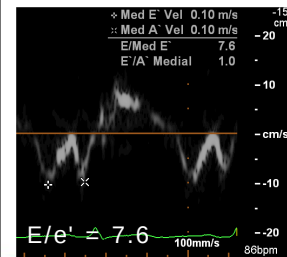
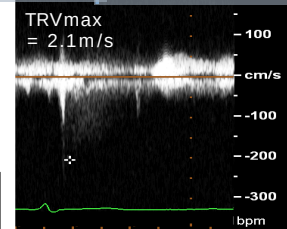
Pre-capillary PHT

Post-capillary PHT

American Society of  
Echocardiography

Normal

LHF with N PAP

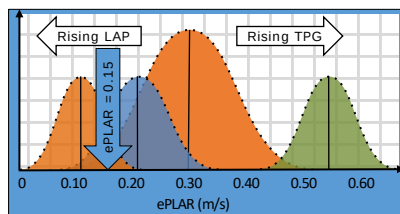


11

## PHT secondary to LHF

$$ePLAR = \frac{TRV_{max}}{\text{Mitral } E/e'}$$

$$= 4.2 \div 27 = 0.15 \text{ m/s}$$



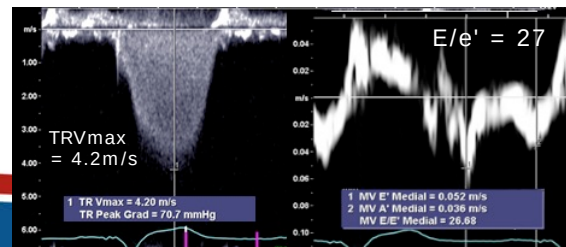
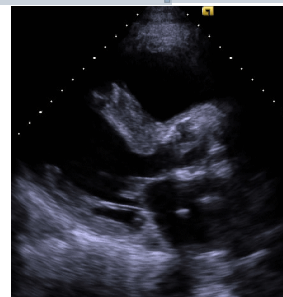
Pre-capillary PHT

Post-capillary PHT

American Society of  
Echocardiography

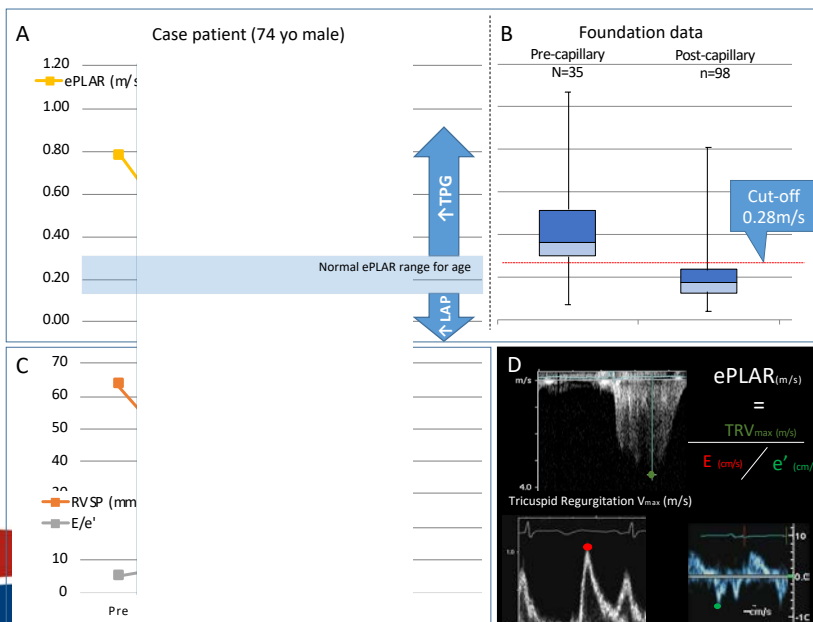
Normal

LHF with N PAP



12

## Case 3 – 74 male with acute PE



13

International Journal of Cardiology 212 (2016) 376–386

Contents lists available at ScienceDirect

**International Journal of Cardiology**

journal homepage: [www.elsevier.com/locate/ijcard](http://www.elsevier.com/locate/ijcard)

**ePLAR – The echocardiographic Pulmonary to Left Atrial Ratio – A novel non-invasive parameter to differentiate pre-capillary and post-capillary pulmonary hypertension**

Gregory M. Scalia<sup>a,b,c,d,e</sup>, Isabel G. Scalia<sup>d</sup>, Rebecca Kierle<sup>b</sup>, Rebekka Beaumont<sup>c</sup>, David B. Cross<sup>b,c</sup>, John Feenstra<sup>a</sup>, Darryl J. Burstow<sup>a,d</sup>, Benjamin T. Fitzgerald<sup>a,b,e</sup>, David G. Platts<sup>a</sup>

International Journal of Cardiology 221 (2016) 181–188

Contents lists available at ScienceDirect

**International Journal of Cardiology**

journal homepage: [www.elsevier.com/locate/ijcard](http://www.elsevier.com/locate/ijcard)

**Correspondence**

Incremental value of ePLAR – echocardiographic Pulmonary to Left Atrial Ratio – in the diagnosis of chronic thromboembolic pulmonary hypertension

Anna M. Waidie<sup>a</sup>, David G. Platts<sup>a,d</sup>, Gregory M. Scalia<sup>a,b,c,d,e</sup>

**Dramatic Normalization of the Echocardiographic Pulmonary-to-Left Atrial Ratio with Thrombolysis in a Case of Life-Threatening Submassive Pulmonary Emboli**

Isabel G. Scalia, BSc, Andrea Z. Riha, MBBS, FRACP, Agatha Kwon, BSc, Katrina Newbigin, MBBS, RANZACR, and Gregory M. Scalia, MBBS, MMedSci, FRACP, FCSANZ, FACC, FASE, Brisbane, Australia

CASE: Cardiovascular Imaging Case Reports

■ 2017

**ASE** American Society of Echocardiography

**Echocardiographic Pulmonary to Left Atrial Ratio (ePLAR): A Comparison Study between Ironman Athletes, Age Matched Controls and A General Community Cohort**

*J. Clin. Med.* 2019, 8, 1756; doi:10.3390/jcm8101756

Mai Tran<sup>1</sup>, Agatha Kwon<sup>2</sup>, David Holt<sup>3</sup>, Rebecca Kierle<sup>2</sup>, Benjamin Fitzgerald<sup>2</sup>, Isabel Scalia<sup>1</sup>, William Scalia<sup>1</sup>, Geoffrey Holt<sup>2</sup> and Gregory Scalia<sup>2,3,4,\*</sup>

**Article**

**Incremental Value of ePLAR—The Echocardiographic Pulmonary to Left Atrial Ratio in the Assessment of Sub-Massive Pulmonary Emboli**

Isabel G. Scalia<sup>1,2</sup>, William M. Scalia<sup>3</sup>, Jonathon Hunter<sup>4</sup>, Andrea Z. Riha<sup>5</sup>, David Wong<sup>6</sup>, Yael Celermajor<sup>1</sup>, David G. Platts<sup>2,3</sup>, Benjamin T. Fitzgerald<sup>5,6</sup> and Gregory M. Scalia<sup>2,3,5,6,\*</sup>

*J. Clin. Med.* 2020, 9, 247; doi:10.3390/jcm9010247

14