

**TURIN,  
October  
25<sup>th</sup>-27<sup>th</sup>  
2018  
Starhotels  
Majestic**

# GIORNATE CARDIOLOGICHE TORINESI



**I HAVE WAITED FOR TOO LONG:  
IS MY PULMONARY HYPERTENSION IRREVERSIBLE?**

**CARDIOLOGIST**

**Dott.ssa Cannillo Margherita  
Cardiologia  
Ospedale Santa Croce  
Moncalieri, ASL TO5**



TURIN,  
October  
25<sup>th</sup>-27<sup>th</sup>  
2018  
Starhotels  
Majestic

# GIORNATE CARDIOLOGICHE TORINESI



- **Increased pulmonary venous pressure secondary to left heart disease is the most common cause of pulmonary hypertension (PH).**
- **The prevalence of Cpc-PH in PH-LHD is not exactly known, but may be around 12% to 14% in patients with HF referred to the catheterization laboratory.**

Circ Heart Fail. 2017 Sep;10(9)

TURIN,  
**October**  
**25<sup>th</sup>-27<sup>th</sup>**  
**2018**  
 Starhotels  
 Majestic

# GIORNATE CARDIOLOGICHE TORINESI



| Definition   | Characteristics <sup>a</sup>                          | Clinical group(s) <sup>b</sup>  |
|--|---|---|
| PH   | PAPm $\geq 25$ mmHg                                   | All   |
| Pre-capillary PH   | PAPm $\geq 25$ mmHg<br>PAWP $\leq 15$ mmHg            | 1. Pulmonary arterial hypertension<br>3. PH due to lung diseases<br>4. Chronic thromboembolic PH<br>5. PH with unclear and/or multifactorial mechanisms |
| Post-capillary PH  | PAPm $\geq 25$ mmHg<br>PAWP $> 15$ mmHg               | 2. PH due to left heart disease<br>5. PH with unclear and/or multifactorial mechanisms  |
| Isolated post-capillary PH<br>(lpc-PH)                   | DPG $< 7$ mmHg and/or<br>PVR $\leq 3$ WU <sup>c</sup> |   |
| Combined post-capillary and pre-capillary PH<br>(Cpc-PH) | DPG $\geq 7$ mmHg and/or<br>PVR $> 3$ WU <sup>c</sup> |   |

TURIN,  
October  
25<sup>th</sup>-27<sup>th</sup>  
2018  
Starhotels  
Majestic

# GIORNATE CARDIOLOGICHE TORINESI



- 1. Is the PH a PH-LDH?**
- 2. There is only a LHD or there is a PH-LDH too?**
- 3. There is a Ipc-PH or Cpc-PH ?**

# **1. Is the PH a PH-LDH?**

**2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension**

**Although no single variable can differentiate PH-LHD from pre-capillary PH, the presence of multiple risk factors and findings should raise suspicion for PH-LHD**

**Table 30** Examples of key factors suggestive of group 2 pulmonary hypertension

| Clinical presentation                      | Echocardiography  | Other features   |
|--|---|--|
| Age >65 years                              | Structural left heart abnormality <ul style="list-style-type: none"> <li>• Disease of left heart valves</li> <li>• LA enlargement (&gt;4.2 cm)</li> <li>• Bowing of the IAS to the right</li> <li>• LV dysfunction</li> <li>• Concentric LV hypertrophy and/or increased LV mass</li> </ul> | ECG <ul style="list-style-type: none"> <li>• LVH and/or LAH</li> <li>• AF/Afib</li> <li>• LBBB</li> <li>• Presence of Q waves</li> </ul>                           |
| Symptoms of left heart failure             | Doppler indices of increased filling pressures <ul style="list-style-type: none"> <li>• Increased E/e'</li> <li>• &gt;Type 2–3 mitral flow abnormality</li> </ul>   | Other imaging <ul style="list-style-type: none"> <li>• Kerley B lines</li> <li>• Pleural effusion</li> <li>• Pulmonary oedema</li> <li>• LA enlargement</li> </ul> |
| Features of metabolic syndrome             | Absence of <ul style="list-style-type: none"> <li>• RV dysfunction</li> <li>• Mid systolic notching of the PA flow</li> <li>• Pericardial effusion</li> </ul>   |  |
| History of heart disease (past or current) |   |  |
| Persistent atrial fibrillation             |   |  |

## **2. There is only a LHD or there is a PH-LDH too?**

### **2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension**

**In LHDs, and more specifically in left heart failure, PH can easily be suspected by a stepwise approach, combining clinical presentation, specific echocardiographic features and other modalities such as ECG and other imaging techniques**

### **3. There is a Ipc-PH or Cpc-PH ?**

- **PH despite optimal management of the underlying condition**
- **Focus on diastolic function >> warning for valvulopathies and previous cardiac surgery**

### **3. There is a lpc-PH or Cpc-PH ?**

- **Look for concomitant disorders leading to PH including COPD, sleep apnoea syndrome and PE**
- **Pulmonary function tests: mild to moderate reduction of lung volumes, decreased lung diffusion capacity for carbon monoxide (DLCO)**

### 3. There is a Ipc-PH or Cpc-PH ?

#### **Pulmonary Hypertension Due to Left Heart Diseases**

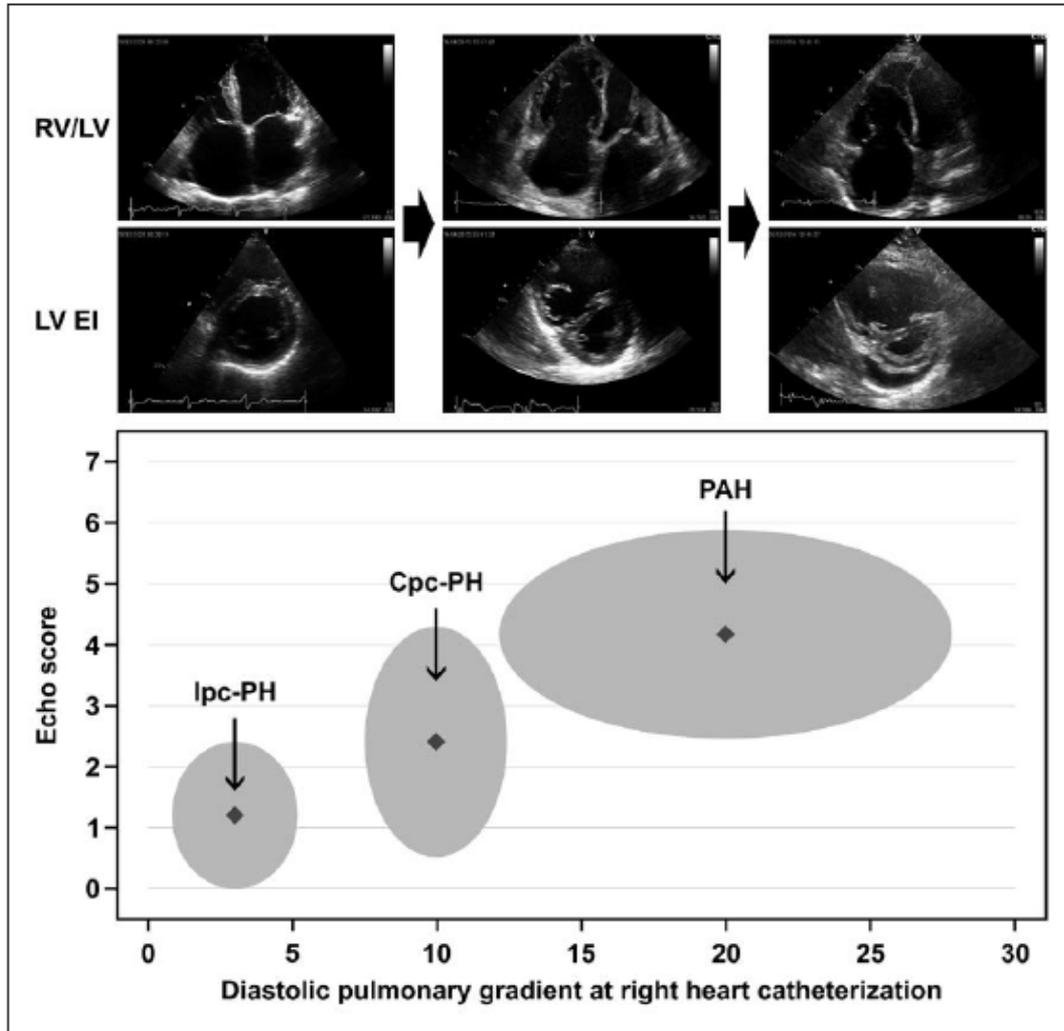
Jean-Luc Vachiéry, MD,\* Yochai Adir, MD, MHA,† Joan Albert Barberà, MD, PhD,‡  
Hunter Champion, MD,§ John Gerard Coghlan, MD,|| Vincent Cottin, MD, PhD,¶  
Teresa De Marco, MD,# Nazzareno Galiè, MD,\*\* Stefano Ghio, MD,†† J. Simon R. Gibbs, MD,‡‡  
Fernando Martinez, MD,§§ Marc Semigran, MD,||| Gerald Simonneau, MD,¶¶  
Athol Wells, MD, MBSHB,## Werner Seeger, MD, PhD\*\*\*

*Brussels, Belgium; Haifa, Israel; Barcelona, Spain; London, United Kingdom; Lyon, France;  
San Francisco, California; Bologna and Pavia, Italy; Ann Arbor, Michigan; Boston, Massachusetts;  
Le Kremlin Bicêtre, France; and Giessen/Bad Nauheim, Germany*

**There might be a spectrum of clinical phenotypes in PH-LHD that might evolve from one to the other, from isolated post-capillary PH with little effect on the RV to more advanced disease where the failing RV is the key determinant of outcome**

## Look for the signs and symptoms of RV dysfunction:

- shortness of breath, fatigue, weakness, angina and syncope
- abdominal distension and ankle oedema
- ECG abnormalities: P pulmonale, right axis deviation, RV hypertrophy, RV strain, right bundle branch block
- chest radiograph: central pulmonary arterial dilatation, which contrasts with 'pruning' (loss) of the peripheral blood vessels
- Transthoracic echocardiography: peak tricuspid regurgitation velocity (m/s), presence of other echo 'PH signs', RV analysis



**Figure 4.** Clustering of isolated postcapillary pulmonary hypertension (Ipc-PH), combined pre- and postcapillary pulmonary hypertension (Cpc-PH), and pulmonary arterial hypertension (PAH) as a function of diastolic pulmonary pressure gradient (DPG).

A high DPG is closely associated with an increased ratio of right ventricular (RV) to left ventricular (LV) surface areas (RV/LV) and decreased LV eccentricity index (EI). A scoring system from 1 to 6 facilitates the diagnosis of precapillary pulmonary hypertension (PH) in patients referred for PH. Adapted from D'Alto et al<sup>64</sup> with permission. Copyright ©2017, Wolters Kluwer Health, Inc.

**TAPSE/sPAP < 0.27 mm/mm Hg identified Cpc-PH in SHF with a specificity of 61.1% and sensitivity of 80%.**



## 2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension

RHC may be considered in patients with suspected PH and left heart disease or lung disease to assist in the differential diagnosis and support treatment decisions

**IIb**

Patients with PH-LHD and a severe pre-capillary component as indicated by a high DPG and/or high PVR should be referred to an expert PH centre for a complete diagnostic workup and an individual treatment decision

**IIa**

TURIN,  
October  
25<sup>th</sup>-27<sup>th</sup>  
2018  
Starhotels  
Majestic

# GIORNATE CARDIOLOGICHE TORINESI



## Follow-up:

1. How?
2. Who?

TURIN,  
**October**  
**25<sup>th</sup>-27<sup>th</sup>**  
**2018**  
**Starhotels**  
**Majestic**

# GIORNATE CARDIOLOGICHE TORINESI



**Table 14** Suggested assessment and timing for the follow-up of patients with pulmonary arterial hypertension

|  | At baseline | Every 3–6 months <sup>a</sup> | Every 6–12 months <sup>a</sup> | 3–6 months after changes in therapy <sup>a</sup> | In case of clinical worsening |
|--|-------------|-------------------------------|--------------------------------|--|-------------------------------|
| Medical assessment and determination of functional class | +           | +                             | +                              | +  | +                             |
| ECG  | +           | +                             | +                              | +  | +                             |
| 6MWT/Borg dyspnoea score                                 | +           | +                             | +                              | +  | +                             |
| CPET   | +           |                               | +                              |  | + <sup>a</sup>                |
| Echo   | +           |                               | +                              | +  | +                             |
| Basic lab <sup>b</sup>                                   | +           | +                             | +                              | +  | +                             |
| Extended lab <sup>c</sup>                                | +           |                               | +                              |  | +                             |
| Blood gas analysis <sup>d</sup>                          | +           |                               | +                              | +  | +                             |
| Right heart catheterization                              | +           |                               | + <sup>f</sup>                 | + <sup>a</sup>                                   | + <sup>a</sup>                |

**TURIN,  
October  
25<sup>th</sup>-27<sup>th</sup>  
2018  
Starhotels  
Majestic**

# GIORNATE CARDIOLOGICHE TORINESI



**I HAVE WAITED FOR TOO LONG:  
IS MY PULMONARY HYPERTENSION IRREVERSIBLE?**

**CARDIOLOGIST**

**THANKS**

**Dott.ssa Cannillo Margherita  
Cardiologia  
Ospedale Santa Croce  
Moncalieri, ASL TO5**

