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# The Impact of the New Hemodynamic Definition on the Prevalence of Pre-Capillary Pulmonary Hypertension

## Yeni Hemodinamik Tanımlamanın Pre-Kapiller Pulmoner Hipertansiyon Prevalansına Etkisi

**LETTER TO THE EDITOR**
EDİTÖRE MEKTUP

The underlying mechanism of pulmonary hypertension (PH) is increased right ventricle (RV) afterload due to pulmonary vascular negative remodeling and vasculopathy and it is characterized with increased mortality risk due to RV failure if not diagnosed and treated early.[1] Five PH groups with similar pathophysiology, clinical presentation, and treatment strategy are diagnosed by the World Heart Organization (WHO).[2] In 2015 European Society of Cardiology (ESC)/European Respiratory Society (ERS) Guidelines for the diagnosis and treatment of PH, pre-capillary PH has been defined as mPAP ≥ 25 mmHg, PCWP ≤ 15 mmHg and PVR >3 WU and described group 1,3,4, and 5 of PH patients.[3] In this guideline while patients with mPAP ≥ 25 mmHg, PCWP > 15 mmHg, and PVR <3WU described as isolated post-capillary PH (Ipc-PH), if the patient had PVR higher than 3 WU with similar mPAP and PCWP the hemodynamic definition has been made as combined pre- and post-capillary PH (Cpc-PH).[3]

Data accumulated from healthy individuals showed us that a normal mPAP at rest is 14.0 ± 3.3 mmHg. The upper limit of normal PVR in healthy volunteers and the lowest prognostically relevant threshold of PVR is ~ 2WU. Hence, the definition of pre-capillary PH is updated as mPAP > 20 mmHg, PCWP ≤ 15 mmHg, and PVR >2WU in 2022 ESC/ERS PH guideline.[4] Furthermore, for the first time in this new guideline, patients with mPAP > 20 mmHg but PVR < 2 WU are defined as undefined PH.[4] After this new hemodynamic definition, we re-evaluated our right heart catheterization (RHC) procedures that have been performed between 2017 and 2023. The clinical indications for RHC were suspicion of congenital heart disease associated pulmonary arterial hypertension (APAH-CHD) in 32.5% of patients, idiopathic PAH in 43.9% of patients, PH associated with left heart disease (APAH-LHD) in 17.9% of patients, and chronic thromboembolic pulmonary hypertension in 5.7% (Figure 1). As the results of the evaluation 123 incident cases, we realized almost 10% increase in the prevalence of pre-capillary PH patient population (Table 1). Puigrenier et al.[5] realized a 13% of increase in the prevalence of pre-capillary PH among 126 systemic sclerosis (SSc) patients underwent RHC between 2003 and 2018. In another study, Güder et al.[6] identified mildly increased the proportion of patients diagnosed with post-capillary PH (5.5%) according to current guideline in 242 patients underwent RHC due to suspicion of APAH-LHD.

Although the number of patients diagnosed with pre-capillary PH is increasing after releasing of new ESC guideline, PAH-specific drugs have not yet been tested and approved for efficacy and safety in these patient groups. As the old definition (mPAP ≥ 25 mmHg, PVR > 3WU, and PCWP < 15 mmHg) was used in randomized controlled trials that PAH-specific treatments were approved, we should only treat PAH patients who meet this hemodynamic criteria. We must keep this fact in mind. If the PAH specific drugs are approved in these patients in the future, we will be able to protect RV and improve life expectancy with early diagnosis and rapid onset of initial combination therapy.

Furthermore, we should keep in mind that clinical suspicion is initiated the PH diagnostic algorithm. In patients with symptoms, risk factors, and clinical signs suggesting PH, evaluating the probability of PH with echocardiography is the main strategy of the

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**Table 1. The comparison of the prevalence of pre, post and combined pre, post-capillary PH patients according to the 2015 and 2022 ESC/ERS PH guidelines.**

| Definition | 2015 ESC/ERS PH Guideline, n (%) | 2022 ESC/ERS PH Guideline Newly Diagnosed, n (%) |
|---|---|---|
| Pre-capillary PH | 35 (28.5) | 12 (9.8) |
| Isolated post-capillary PH | 0 | 2 (1,6) |
| Combined pre-and post capillary PH | 20 (16.3) | 10 (8.1) |
| Undefined PH | - | 19 (15.4) |
| No PH | - | 25 (20.3) |

ERS, European Respiratory Society; ESC, European Society of Cardiology; PH, pulmonary hypertension.

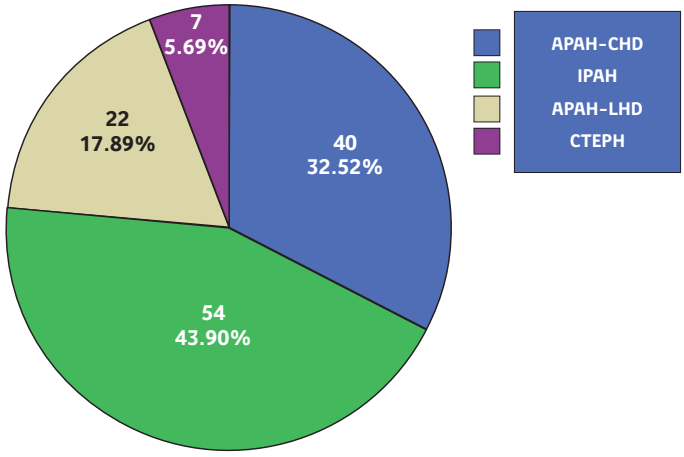


**Figure 1. Indications of RHC.**
APAH-CHD, pulmonary arterial hypertension associated with congenital heart disease; APAH-LHD, pulmonary arterial hypertension associated with left heart disease; CTEPH, chronic thromboembolic hypertension; IPAH, idiopathic pulmonary arterial hypertension; RHC, right heart catheterization.

diagnostic algorithm. The threshold of tricuspid regurgitation velocity for low, intermediate, and high PH probability remained unchanged (<2.8 m/s, 2.9–3.4 m/s, >3.4 m/s, respectively).

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