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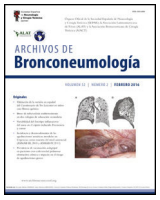

Editorial

Diagnostic and Therapeutic Innovations in Pulmonary Hypertension: News From the 2024 World Symposium on Pulmonary Hypertension

The 7th World Symposium on Pulmonary Hypertension (WSPH), held in Barcelona from June 29 to July 1, 2024, marked a pivotal moment for the field of pulmonary hypertension (PH). Every five years, this global assembly of experts identifies and addresses emerging challenges in PH, shaping the future of research, diagnosis, and treatment. The 2024 symposium gathered 1700 professionals from diverse specialties, fostering collaborative discussions and driving forward innovation. Prepared over two years by 15 committees of 125 experts, the symposium's proceedings were published in the *European Respiratory Journal* at the end of August 2024. This editorial highlight key advancements and themes from the event, emphasizing diagnostic refinements, therapeutic innovations, and research directions.

The WSPH commenced with a powerful and essential focus: the patient perspective, underscoring the importance of integrating patient experiences into clinical care and research. Discussions centered on key challenges faced by PH patients worldwide, including access to specialized care, the role of patient associations, and the implementation of patient-reported outcome measures to improve quality of life. The symposium highlighted disparities in treatment accessibility and explored solutions for ensuring equitable care. Additionally, the impact of global threats such as pandemics, climate change, and armed conflicts on PH patients was addressed, emphasizing the need for advanced contingency planning.

In accordance with this, assessing therapeutic impact beyond traditional physiological metrics was also highlighted. Quality of life (QoL) emerged as a critical endpoint in clinical trials and routine care. This shift highlights the growing recognition of patient-reported outcomes as essential measures for evaluating treatment success. Such outcomes now serve as primary endpoints in the design of new trials, ensuring that the patient's perspective is integral to therapeutic evaluation. Furthermore, this approach emphasizes a more holistic understanding of treatment impact, encompassing not only clinical and physiological improvements but also the broader well-being and daily functioning of patients.

This shift aligns with broader trends in medicine that prioritize patient experiences and long-term functional outcomes.[1] For example, new antiproliferative therapies in PAH trials are evaluated not only for their hemodynamic effects but also for their ability to improve exercise tolerance and daily activities. Such patient-centered innovations underscore the evolving priorities in PH management.[2]

The Task Force on Genetics and Genomics have identified new rare and common genetic variants linked to PAH risk, refining clinical genetic testing and interpretation marking a crucial step toward personalized medicine. Additionally, the integration of other omics data and the establishment of gene-specific registries will be vital for developing targeted therapies and supporting genetically informed clinical trials.

One of the most significant updates presented at the symposium concerns the classification of PH. Historically, classifications focused on functional alterations, prioritizing the physiological impact of the disease. This year's revised approach adopts a disease-centered framework, enabling clinicians to align diagnostic and therapeutic strategies more closely with underlying pathologies.[3] For instance, PH associated with respiratory diseases now encompasses specific clinical forms, with detailed characterization aided by advanced imaging techniques.[4] Additionally, the integrated diagnostic algorithm for PH now emphasizes the recognition of severe PH in patients with lung diseases or left heart diseases. Such patients should be presented at PH expert centers, where individualized therapeutic approaches can be considered. This represents a significant evolution from previous algorithms, which primarily focused on pulmonary arterial hypertension (PAH) and, to a lesser extent, chronic thromboembolic pulmonary hypertension (CTEPH).

Imaging advancements were particularly emphasized, heralding a new era of precision in PH diagnosis. Techniques such as high-resolution computed tomography (HRCT) and advanced magnetic resonance imaging (MRI) have enhanced the ability to distinguish between primary and secondary PH. These modalities not only improve diagnostic accuracy but also help define disease subtypes, which are critical for tailoring patient management strategies.[5]

A hallmark of the symposium was the introduction of updated therapeutic algorithms tailored to specific PH etiologies. Pulmonary arterial hypertension (PAH), for instance, benefits from a novel algorithm that integrates antiproliferative agents targeting the activin pathway. These next-generation drugs offer a promising avenue for mitigating disease progression by modulating cellular proliferation in the pulmonary vasculature.[6] The updated algorithm also emphasizes the importance of risk stratification as a critical guide for both initial and subsequent treatment decisions. This stratification incorporates a holistic approach that goes beyond traditional parameters. In addition to simple yet highly informative clinical indicators such as WHO functional class (WHO-FC), brain natriuretic peptide (BNP) levels, and the six-minute walk distance (6MWD), advanced imaging and hemodynamic assessments are increasingly integrated into decision-making processes.

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Table 1
Main Innovations From the 7th World Symposium on PH.

Category	Innovation	Impact
Classification	Shift from functional to disease-based classification	Tailored diagnosis and management strategies
Imaging	Advanced HRCT and MRI techniques	Improved diagnostic precision and disease subtype definition
PAH therapy	New algorithm incorporating antiproliferative drugs (activin pathway)	Enhanced disease control and long-term outcomes
Clinical trials	Inclusion of patient-reported outcomes in trial design	Holistic evaluation of therapeutic success
PH-lung disease	Disease-specific management strategies for PH associated with interstitial lung diseases	Early intervention and personalized treatment
CTEPH management	Hybrid strategies combining BPA and pharmacological interventions	Better outcomes for inoperable or residual CTEPH
Global health	Focus on PH related to post-tuberculosis sequelae	Targeted strategies for high-burden regions

In PH associated with interstitial lung diseases (ILDs), a new algorithm prioritizes early intervention and disease-specific management. This update reflects a growing recognition of the heterogeneity within ILDs, with PH presentations varying by disease subtype. Advanced imaging again plays a pivotal role, allowing clinicians to discern patterns that inform individualized treatment approaches.[4]

Chronic thromboembolic pulmonary hypertension (CTEPH) also featured prominently in the therapeutic discourse. Emerging strategies include hybrid approaches combining balloon pulmonary angioplasty (BPA) with pharmacological interventions. The integration of these modalities, supported by patient-specific imaging, is expected to enhance outcomes for individuals with inoperable or residual CTEPH.[7]

A particularly impactful topic was the recognition of PH associated with post-tuberculosis sequelae. Tuberculosis remains a significant global health challenge, and its pulmonary aftermath contributes substantially to PH prevalence. The symposium highlighted the need for heightened awareness and targeted research in this domain, especially in low- and middle-income countries disproportionately affected by tuberculosis. The incorporation of tailored diagnostic and therapeutic approaches for this population represents an urgent priority for the field[4] (Table 1).

The 2024 symposium underscored the need for robust, collaborative research frameworks to address lingering challenges in PH. In addition to refining treatment strategies, there is a growing focus on understanding disease mechanisms, particularly in understudied subgroups such as PH associated with tuberculosis or rare connective tissue diseases. Multi-center studies and international registries are likely to play a critical role in advancing these efforts.

Moreover, the integration of artificial intelligence (AI) and machine learning into diagnostic pathways holds promise for early detection and risk stratification. These technologies, combined with novel imaging techniques, could redefine how clinicians approach PH in the coming decade.

In conclusion, the 7th World Symposium on Pulmonary Hypertension provided a comprehensive overview of the field's progress while charting an ambitious path forward. The shift toward disease-centered classifications, the incorporation of cutting-edge imaging and therapeutics, and the emphasis on patient-centered outcomes represent transformative steps in PH care. As the proceedings are published and disseminated, the global community must work collectively to translate these advances into practice, ensuring that all patients benefit from the remarkable strides made in Barcelona last summer.

Conflict of Interests

The authors state that they have no conflict of interests.

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