ERS Congress 2024: highlights from the Clinical Techniques, Imaging and Endoscopy Assembly

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Shareable abstract (@ERSpublications)
Excellent presentations at the #ERSCongress 2024 highlight the growing role of interventional pulmonology, imaging and thoracic ultrasound in the diagnosis and management of respiratory disease https://bit.ly/4km8leX

The theme of the 2024 European Respiratory Society (ERS) Congress was "Humans and machines: getting the balance right", which provided the perfect setting for Assembly 14 (Clinical Techniques, Imaging and Endoscopy) to demonstrate recent advances and hot topics in interventional pulmonology, imaging and ultrasound. In this article, early career members and leaders of the assembly present some of the highlights from the 2024 ERS Congress in Vienna, Austria. A summary of the main topics covered is shown in figure 1.

Interventional pulmonology

As tradition dictates, Tuesday morning (10 September 2024) was packed with the latest advancements in bronchoscopy at the endoscopy session titled "Diagnostic updates from the bronchoscopy suite". In diseases such as tuberculosis, sarcoidosis and lymphoma, the diagnostic yield of endobronchial ultrasound (EBUS) transbronchial needle aspiration (TBNA) remains low. In these subgroups, EBUS transbronchial cryobiopsy offers a significantly higher diagnostic yield (88% versus 60% on a recent meta-analysis [1]), possibly due to a better pattern of histology. A. Rozman (Golnik, Slovenia) presented the evidence on EBUS cryobiopsy and highlighted the tips and tricks of a successful procedure. A 1.1-mm cryoprobe is introduced through the puncture site of TBNA two or three times after assessing for lymph node vascularity. Identifying the puncture tract in the ultrasound image instead of looking for the hole makes the process easier. The use of cryoprobes in properly selected patients may further reduce the need for mediastinoscopies and improve the diagnosis of mediastinal lymph node diseases.

Cryobiopsy is not only of use for diagnosing mediastinal lymphadenopathy. In cases of unclear interstitial lung disease (ILD), lung biopsy (surgical or transbronchial) changes diagnosis in 20–25% of cases and the treatment strategy in 34% [2, 3]. K. Kalverda (Amsterdam, the Netherlands) presented the techniques for obtaining peripheral cryobiopsy in ILDs and highlighted the importance of being able to address adverse events. Furthermore, she gave us the highlight from the COLD study, which demonstrated that transbronchial cryobiopsy and add-on surgical biopsy in comparison to surgical biopsy alone had similar diagnostic yields but fewer adverse events and shorter length of hospital stay [4]. A brief history and advances in thoracoscopy for pleural diseases were presented by M. Munavvar (Preston, UK). The positive impact of thoracic ultrasound (TUS) in the safety of thoracoscopy was shown. Narrow band imaging and probe confocal laser endomicroscopy might have a potential role in identifying better biopsy targets,
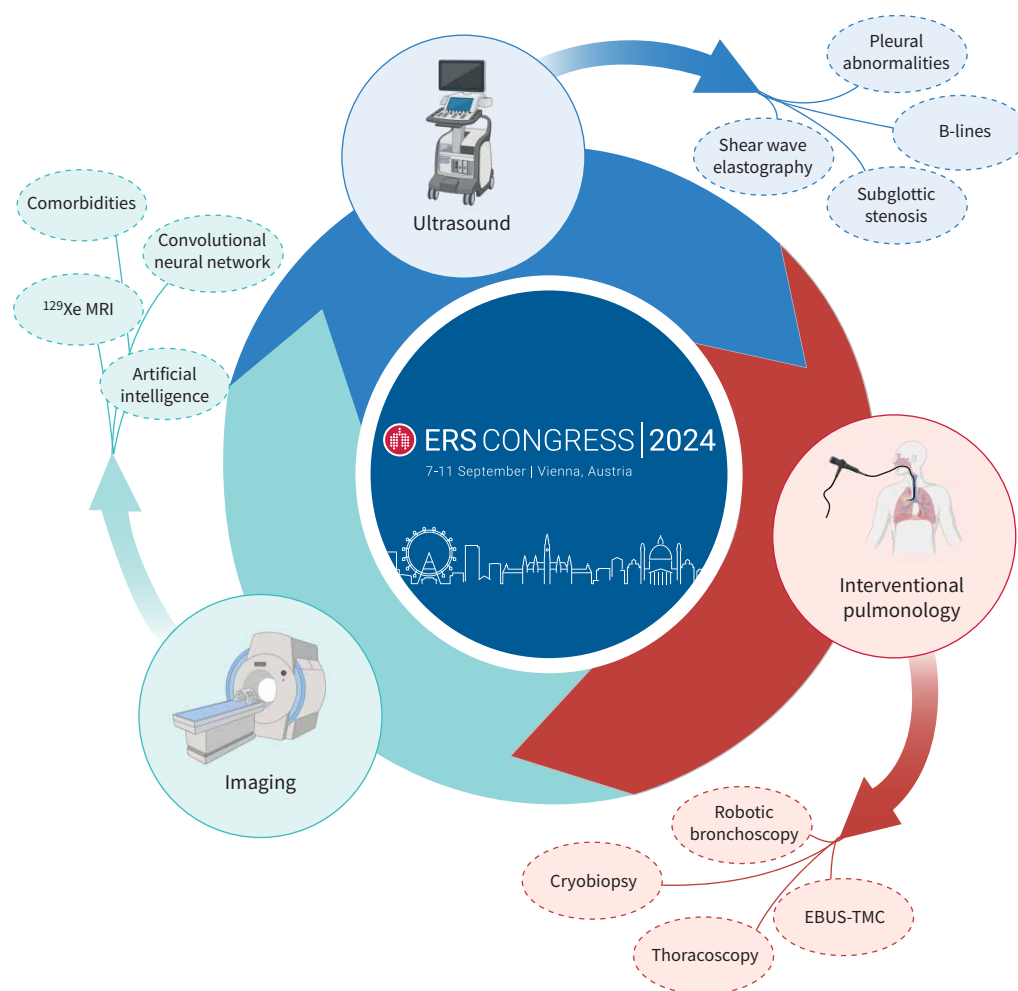
FIGURE 1 Highlights from the Clinical Techniques, Imaging and Endoscopy Assembly. ^{129}Xe MRI: xenon-129 magnetic resonance imaging; EBUS-TMC: endobronchial ultrasound-guided transbronchial mediastinal cryobiopsy. Figure partially created with BioRender.com

especially in cases with diffuse pleural thickening or subtle abnormalities, while new larger biopsy forceps (FB-420K) and pleural cryobiopsy might further improve the diagnostic yield.

J. Brock (Heidelberg, Germany) presented the use of robotic-assisted bronchoscopy. There are currently three robots (MONARCH, ION and GALAXY), while new robots are soon expected (two-arm robot and artificial intelligence (AI) copilot robot). With the robotic systems it is possible to sample multiple nodules in one session and the procedure time decreases after a small number of cases. Cryobiopsy is feasible in a robotic bronchoscopy setting but adverse events such as bleeding, pneumothorax and pneumatocoele have been described. Diagnostic yield seems to be similar to computed tomography (CT)-guided biopsies (80%), based on three recent meta-analyses [5–7].

Imaging

Personalised treatment has emerged as an increasingly important objective in the management of diseases, with a particular emphasis on tailoring therapeutic strategies to individual patient profiles. This aim could be significantly advanced by incorporating innovative imaging methods and by integrating rapidly evolving AI solutions into existing imaging techniques. An interesting hot topic session at the 2024 ERS Congress titled "Imaging for precision treatment in obstructive lung diseases: ready for prime time?" centred on how novel imaging tools, techniques, and approaches could transform the diagnosis, management, and prognosis of patients with obstructive lung disease, and explored how these techniques could also drive regulatory and clinical development.

J.P. de Torres Tajes (Zizur Mayor, Spain) opened the session, focusing on the importance of imaging in the detection of comorbidities in COPD patients [8]. They described 10 different comorbidities frequently associated with COPD, such as coronary artery calcification (CAC), ascending aortic and pulmonary artery enlargement, malnutrition (measured by psoas muscle density), bronchiectasis and liver steatosis [9]. The presenter emphasised that all of these comorbidities were clinically significantly underdiagnosed. Bronchiectasis, CAC and low psoas muscle density were independently associated with all-cause mortality. The presenter suggested that systematic reporting of comorbidities on chest CT could lead to personalised treatment and have an impact on mortality.

Xenon-129 magnetic resonance imaging (^{129}Xe MRI) is a novel imaging technique that allows for the visualisation and measurement of ventilation, acinar dimensions and gas transfer, without harmful radiation. A subgroup of the NOVELTY cohort was chosen by H. Marshall (Sheffield, UK) to better phenotype patients using ^{129}Xe MRI and advanced pulmonary function tests [10]. The method appears to be sensitive for early disease detection and complementary to pulmonary function tests, and has identified emphysema as a longitudinal predictor of worsening gas exchange [11]. Therefore, it may be useful in identifying phenotypes to guide future treatments.

Mucus plug formation is a common finding in COPD patients, contributing to airway obstruction and worsening disease outcomes. Based on recent studies, A. Bourdin (Montpellier, France) demonstrated that the number of mucus plugs in the lungs is associated with increased mortality. A manually trained convolutional neural network was able to detect bronchiectasis, peribronchial thickening, bronchial and bronchiolar mucus, and collapse/consolidation, with near-perfect correlation between AI and manual analysis [12]. The initial results in evaluating therapeutic interventions using this AI system are also promising.

Lung volume reduction therapy with endobronchial valves (EBV) is a guideline treatment option for patients with advanced emphysema [13]. However, as D-J. Slebos (Groningen, the Netherlands) highlighted, not all patients benefit from EBV therapy. Selecting the right candidates and targeting lobes for EBV is challenging and requires perfusion scans and detailed CT analysis, now supported by AI quantification tools [13, 14]. The presenter concluded the session by emphasising that AI solutions will be able to extract perfusion and lung function data, which could serve as valid markers in the future.

Ultrasound

Ultrasound continues to showcase its versatility as a diagnostic and monitoring tool across a range of diseases within respiratory medicine. At the 2024 ERS Congress, the session "The wide world of thoracic ultrasound" presented key research focused on the use of ultrasound in respiratory diseases, with particular attention to B-lines and pleural abnormalities.

A significant study presented by B. Sofíudóttir (Odense, Denmark) involved 77 rheumatoid arthritis (RA) patients who underwent TUS to assess for ILD. The study used criteria of >10 B-lines or bilateral thickened and fragmented pleural lines as indicators of ILD [15]. When compared with high-resolution CT and clinical assessments by experienced pulmonologists, TUS demonstrated a sensitivity of 82.6% (95% CI 61.2–95.0%) and a specificity of 51.9% (95% CI 37.8–65.7%). As 1% of RA patients present with ILD, these findings suggest that TUS could potentially serve as a low-cost and radiation-free screening tool for detecting RA-ILD, whereas screening with high-resolution CT would be costly, time-consuming, expose non-RA-ILD patients to unnecessary radiation and be difficult to implement.

A case–control study presented by S. Boonpeng (Bangkok, Thailand) showed that B-lines and pleural abnormalities could also be valuable when evaluating thoracic involvement in systemic sclerosis [16]. Similarly, a study by M. Daverio (Padua, Italy) examined pleural involvement in RA patients, showing that 50% of RA patients had pleural abnormalities, compared to just 12% of healthy controls [17]. The study demonstrated that ILD in RA commonly affects the lower lung regions, with significant pleural involvement observed in the inferior-posterior zones. In light of the potential of TUS as a screening tool for these patients, the presented studies advocate that future research and potential screening through TUS should concentrate on both B-lines and pleural abnormalities, and predominantly on inferior-posterior zones.

In the context of post-COVID-19 monitoring, K. Zimna (Warsaw, Poland) demonstrated that TUS could aid in evaluating residual lung damage [18]. In their study of 101 pairs of tests, ultrasound severity scores were found to correlate inversely with pulmonary function test results, despite patients being examined an average of 277±189 days post-COVID-19 infection. This suggests a potential role for TUS in the long-term follow-up of post-COVID-19 patients.

Beyond B-mode imaging, the session also discussed ultrasound elastography. C. Kildegaard (Odense, Denmark) presented a diagnostic accuracy study exploring shear wave elastography's ability to differentiate between malignant and benign thoracic lesions. The technique yielded a sensitivity of 73.3% (95% CI 58.1–85.4%) and a specificity of 72.7% (95% CI 59.0–83.9%), although its utility in clinical practice remains uncertain [19]. In a different setting, M. Deng (Beijing, China) demonstrated with a multicentre, observational study of 113 subglottic stenosis patients that ultrasound was a reliable tool to assess the diameter of subglottic trachea, with an excellent intra- and inter-observer agreement [20].

These studies highlight the growing role of TUS in diagnosing and managing respiratory diseases, offering promising noninvasive tools for clinical practice.

Concluding remarks

Presentations in interventional pulmonology, imaging and ultrasound demonstrated how the use of different technologies in respiratory medicine can improve our diagnostic capabilities and advance personalised medicine without compromising the safety of the patients. We are grateful to all researchers and presenters who contributed to the success of the 2024 ERS Congress and we are looking forward to the next ERS Congress, in Amsterdam, the Netherlands.

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