ERS Congress 2024: highlights from the Thoracic Surgery and Lung Transplantation Assembly

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The European Respiratory Society (ERS) Congress 2024, which took place in Vienna, Austria, from 7–11 September, has sparked critical conversations and innovative ideas in the field of respiratory health. With experts from around the globe gathering to share their knowledge and experiences, this congress was a platform for scientific exchange but also an outstanding opportunity for all the early career members to shine, collaborate and interact with their peers. Assembly 8, which includes groups 8.01 Thoracic surgery and 8.02 Lung transplantation, arranged many interesting sessions for the 2024 ERS Congress, and we would like to highlight some of them in this editorial.

An inspiring session from group 8.01 was titled “Gender discrepancies in non-small cell lung cancer (NSCLC)”. As the landscape of lung cancer evolves, it becomes increasingly clear that women experience unique challenges that warrant our attention and action. First, G. Cardillo (Rome, Italy) highlighted the importance of dedicated screening in women, as confirmed by multiple large lung cancer screening trials showing an objective curative benefit considerately greater in women: the risk of dying from lung cancer was reduced by 24% in men and 33% in women according to the Nelson trial [1]. Nevertheless, women have been under-represented in most lung cancer screening studies, although adherence is particularly good among females, who can be role models for others and contribute to smoking prevention by encouraging their partners and children with smoking cessation, as women are more often concerned about the health of others than their own. Secondly, S. Halezeroglu (Sariyer, Turkey) focused on the long-lasting question about differences in the pathology of NSCLC between sexes. Since the late 1990s, the incidence of NSCLC has been steadily rising among women, with a higher prevalence of adenocarcinoma (59.5% in females *versus* 48.2% in males), while squamous cell carcinoma has dropped down to 22% in women [2]. Interestingly, over the past decades the incidence of lung cancer has been decreasing worldwide, with the exception of adenocarcinoma, which is still increasing in females [3, 4]. In addition to the existing sex disparity, S. Halezeroglu underscored the presence of geographical differences in NSCLC histology between men and women [5]. In the third presentation, on the role of precision medicine and surgery in NSCLC in women, K. Athanassiadi (Athens, Greece) emphasised the concept that social and economic differences have long contributed to sex disparities in NSCLC incidence and mortality, but evidence also suggests a role for underlying biological differences [6–8]. Indeed, genetic, molecular, immunological and hormonal factors play a crucial role in the biological differentiation of the disease from male patients [9]. Therefore, gaining a deeper understanding of these reasons may pave the way for new therapeutic

combinations or novel therapies based on different biological mechanisms between sexes, which might lead to the evolution of precision medicine and surgery in NSCLC in women. Lastly, M.J. Pereira Catarata (Porto, Portugal) discussed sex differences in surgical outcomes. The consensus is that men have a more advanced stage at diagnosis and a worse prognosis in resected NSCLC, with a higher recurrence rate, compared to women [10]. Several studies have demonstrated that females have better post-operative outcomes, in terms of both complications and mortality, in part due to lower comorbidity probably related to a younger age and a healthier lifestyle [11]. Interestingly, women tend to respond better to cytotoxic and targeted therapies, whereas men have a better response to immunotherapy [12].

A thought-provoking session from group 8.02 was titled "The changing landscape of lung transplantation", in which experts explored key innovations in the field of lung transplantation. M. Hellemons (Rotterdam, the Netherlands) discussed the evolving phenotype of lung transplant recipients, from selection to outcomes. While the indications for lung transplantation remain largely consistent, the characteristics of recipients have significantly changed [13]. Emphasis was placed on how lung transplantation is becoming more common among older patients with more comorbidities or as bridge candidates, increasing the procedure's complexity [14, 15]. M. Hellemons concluded with a reflection on the importance of weighing risks and tailoring decisions to the unique realities of each centre. Next, B. Vanaudenaerde (Leuven, Belgium) introduced innovative diagnostic and phenotyping strategies in lung transplantation, emphasising the potential of integrating omics technologies and artificial intelligence (AI). Combining existing biomarkers in a multiplexing approach shows promise in this field. The discussion underscored the importance of complementing advanced tools with fundamental physiological principles, particularly revisiting the concept of the secondary pulmonary lobule to ground modern approaches. A prime example of this is using radiomics, where AI is applied to radiology findings to better understand chronic rejection, like its application in COPD and interstitial lung disease [16, 17]. Then, P. Jaksch (Vienna, Austria) discussed personalised immunosuppression strategies, focusing on combining biomarkers to guide each patient's specific needs. He highlighted how these biomarkers (such as donor cell-free DNA or torque teno virus assessment, donor-specific antibody assessment on peripheral blood or lung tissue, and, in some cases, wide transcriptome assessment on graft biopsies) could signal the need for more intensive treatment or indicate when less aggressive immunosuppression is appropriate [18]. While immunosuppressive drug development has remained relatively stable, yielding good results in preventing rejection, side-effects like kidney disease and cancer persist. Novel therapies were discussed, including photopheresis and belatacept [19, 20]. Finally, E. Geissler (Regensburg, Germany) discussed cell-based therapies, particularly focusing on the use of regulatory T-cells. These therapies aim to reduce the reliance on traditional immunosuppressive drugs, which are often associated with significant side-effects, such as increased infection risk and toxicity. When analysing these therapies, the ONE Study had prevention of kidney rejection as a primary end-point, with a secondary end-point of minimising the use of other immunosuppression drugs [21]. E. Geissler emphasised the need for further research to confirm the long-term benefits and cost-effectiveness of these therapies, as well as to explore their application in lung transplantation settings.

Another session from group 8.02 entitled "The future of lung transplantation for cystic fibrosis (CF)" discussed the latest developments in CF treatment and the role of lung transplantation in the future for this group of patients. First, C. Martin (Paris, France) showed that, since 2019 when CF transmembrane conductance regulator modulators like elexacaftor–tezacaftor–ivacaftor (ETI) were introduced, a rapid and stable increase in lung function has been observed, especially in percent predicted forced expiratory volume in 1 s, alongside a decrease in exacerbations and antibiotic usage, starting from 3 months and lasting for even 24 months [22, 23]. Although ETI was first approved for the F508del variant, research has defined around 177 rare variants that are eligible for ETI and that have been approved for ETI treatment by the US Food and Drug Administration. Taking these data into consideration, lung transplantation seems to be a choice for ETI non-responders, patients that do not have access to this treatment and people who have an advanced lung disease with permanent changes that might not get better with ETI. A. Benazzo (Vienna, Austria) then discussed the future challenges for lung transplantation in CF patients. He pointed out that it is still unknown whether CF patients will need a lung transplantation one day, even though they use ETI, and this could add risk because of comorbidities that increase with age [24]. A. Benazzo also talked about some specific conditions, like severe chest deformities, destruction of lung due to fungal infections common in CF and recurrent haemoptysis, which still need a lung transplantation approach even if they might respond to ETI [25]. C. Benden (Boston, MA, USA) described current ETI practice and hypothesised that there may be an expansion of ETI use post-transplant for various indications. According to recent studies, ETI prescription after lung transplantation varies according to the centre's approach, and characteristics of patients like sinus disease, gastrointestinal symptoms, low body mass index, presence of diabetes, chronic lung allograft dysfunction or simply the patient's preference influence the approach [26]. Further research is needed to address the safety and drug interactions, and a case-by-case consideration is

recommended. C. Benden also discussed the two models of integrated care in CF: the "shared" model and the "all-in-one" model [27]. In the shared model, CF specialists continue to manage non-lung issues while the transplant centre focuses primarily on lung-related care. In contrast, the all-in-one model provides multidisciplinary care exclusively through the transplant centre. Even after a transplant, CF specialists and a CF-specific approach remain essential, as studies have indicated lower survival rates in non-certified CF centres, regardless of the annual lung transplant volume [28]. With the decreasing number of lung transplantations for CF, this might be a challenge we will face in the near future. Finally, in parallel with the ERS Congress theme "Humans and machines: getting the balance right", T. Vagg (Cork, Ireland) presented examples from studies demonstrating how machine learning can aid in phenotyping and predicting CF prognosis, as well as how it can be integrated into various aspects of lung transplantation care [29, 30].

In conclusion, we hope that the insights gained from these sessions will empower healthcare professionals to implement best practices, advocate for policy changes and adopt new technologies that can significantly elevate the standards of respiratory care including thoracic surgery and lung transplantation.

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