🌐 Abstract Highlights

The following highlights spotlight selected abstracts presented at the European Respiratory Society (ERS) International Congress 2023. They cover key topics, including persistent airflow limitation in paediatric severe asthma, pulmonary rehabilitation, health-related quality of life, chronic cough and obstructive sleep apnoea, paediatric lung transplantation, dead space ventilation in acute respiratory distress syndrome, and virtual wards for remote patient monitoring.

Association Between Minimal Important Distance and Survival After Pulmonary Rehabilitation

IMPROVED walking distance more than the minimal important distance (MID) is positively associated with survival after pulmonary rehabilitation (PR), according to data presented by Thomas Ward, University of Leicester, UK, at the ERS International Congress 2023. While PR has been associated with survival, it is unknown whether this is due to a direct effect or unmeasured confounding, which is why Ward and colleagues aimed to investigate this association.

The team analysed data on consenting patients from PR services in England and Wales between January–April 2015, as well as mortality data until January 2017. They performed Cox proportional hazard regression, which compared time of death between achieving MID, and not achieving MID, using 35 m for the incremental shuttle walking distance, and 25 m for the 6-minute walking distance.

In total, 3,721 out of 4,159 (89%) patients completed walk tests before and after PR (55% male; mean age: 70.3 [standard deviation: 8.8] years; forced expiratory volume 1: 1.38 [0.58] L). Mean change was 63 (2) m for incremental shuttle walking distance, and 57 (2) m for 6-minute walking distance. By January 2017, 273 patients had died. The team noted lower unadjusted and adjusted mortality rates for those who achieved the MID in either of the walk tests.

> "The team noted lower unadjusted and adjusted mortality rates for those who achieved the MID."

The team concluded that there was a positive association between improved walking distance more than the MID and survival, which could indicate a direct effect of completing PR. ●

Paediatric Lung Transplantation for Children with Interstitial Lung Disease

CHILDREN'S interstitial lung disease (ChILD) is a rare and heterogenous condition that can cause significant morbidity and mortality. At present, little is known about patients with end-stage ChILD who undergo lung transplantation.

Research presented at the ERS International Congress 2023 analysed sub-entities of ChILD, according to the current classification, that lead to end-stage respiratory failure along with age at transplantation. Underlying diagnoses, clinical information, and outcome were also recorded for each included patient who underwent lung transplantation.

Overall, 103 patients were included (52% female; mean age at transplantation: 12.0±5.1 years). During the study period, 31 patients had ChILD (35% female; mean age at transplantation: 8.0±5.7 years), with the pretransplant status being 'ventilated' in seven of these patients. Most patients undergoing transplantation in the programme were in the B3 category, which consists mainly of children after stem cell transplantation with severe bronchiolitis, or children after radiation or chemotherapy for oncologic diseases.

Results showed that 27 (90%) of included patients were alive after a median follow-up time of 4.11 years. In the four deceased patients, the causes of death were chronic lung allograft dysfunction, unsuccessful re-transplantation, infection, graft failure, and adenovirus infection.

The authors acknowledge that the study is limited due to its short follow-up time, and use of a single centre cohort. However, there are no other cohorts available to investigate ChILD in this way. Overall, the research suggests paediatric lung transplantation is feasible for patients with ChILD and end-stage lung disease, as the overall outcome in this cohort is "excellent." ●

> "Paediatric lung transplantation is feasible for patients with ChILD and end-stage lung disease."

Virtual Wards in Respiratory Medicine

VIRTUAL wards took centre stage in the form of an abstract presentation at the ERS International Congress 2023. Sivakamasundari Narayani Ampikaipakan, Norfolk and Norwich University Hospitals (NNUH) NHS Foundation Trust, UK, described the effectiveness of a virtual ward in delivering respiratory care, and looked at whether this is a sustainable enterprise for the future.

"One of the biggest changes was the use of digital technology, and the evolution of the virtual ward," is how Ampikaipakan described their experience working at NNUH in the post COVID-19 era. The ward operates 24/7, and was established to mirror a full clinical team, featuring 40 beds, full monitoring of observations, and a daily consultant review.

This research involved a retrospective review of prospectively collected data on all patients admitted to the virtual ward at NNUH, conducted between February 2021–2023. Patient inclusion criteria for the study were conditions of chronic obstructive pulmonary disease, bronchiectasis, pneumonia, empyema, COVID-19, and tuberculosis. In total, 484 patients were put through the ward, with an average length of stay of 6.8 days, and 98.6% satisfaction rate. The bed days saved by this virtual ward was a staggering 3,282.

Benefits of the virtual ward include a lower risk of hospital-acquired infections and associated issues with extended stays in hospital, as well as improved recovery and comfort for a patient receiving care in their own home environment. Ampikaipakan drew attention to the support clinicians have provided for this practice as a new and flexible way of working, especially as it promotes increased flow in a busy tertiary care hospital.

Across all specialties, over 2,500 patients have made their way through the NNUH ward to date, with close to 600 coming from the respiratory bracket. This research received a lot of positive media attention as the first 24/7 virtual ward in the UK, and this success is expected to encourage more of this type of practice to spread across the UK, and internationally. Ampikaipakan concluded: "We believe that the virtual ward for respiratory medicine is indeed sustainable." ●

"In total, 484 patients were put through the ward, with an average length of stay of 6.8 days, and 98.6% satisfaction rate."

   EMJ

Severe Asthma: Impact of Symptoms on Health-Related Quality of Life

DYSPNOEA is the main symptom impacting asthma health-related quality of life (HRQoL) for patients with severe asthma, findings from a cross-sectional study presented at the ERS International Congress 2023 reveal.

Gilles Louis, Department of Public Health, University of Liège, Belgium, and colleagues enrolled 143 patients from the Liège University Hospital asthma clinic aged ≥18 years, with a diagnosis of severe asthma prior to commencement of biologic therapy. They aimed to assess the relationship between the five main patient-reported asthma symptoms, and asthma-HRQoL and its four dimensions (symptom, activity, emotive, and environmental).

The five main patient-reported symptoms were airway secretion, chest tightness, cough, dyspnoea, and wheezing. Asthma-HRQoL was measured using the mini Asthma Quality of Life questionnaire (AQLQ), and symptom intensity was measured through use of five-point Likert scales.

Baseline characteristics revealed that the mean participant age was 52±16 years, mean BMI was 28.0±5.3, and 64% of patients were female. The percentage predicted forced expiratory volume in 1 second (FEV_1; % predicted FEV_1), and the percentage forced expiratory volume/forced vital capacity ($\%FEV_1/FVC$) were measured for all participants. The mean % predicted FEV_1 was 70%±19%, and mean $\%FEV_1/FVC$ was 70%±12%. The mean global AQLQ was 4.0±1.4, and the Asthma Control Test (ACT) mean was 13.0±5.5.

Each of the five main asthma symptoms were found to be significantly correlated with global AQLQ. Multiple linear regression analyses were performed to identify symptoms independently associated with global AQLQ and its dimensions, after adjusting for the ACT, age, BMI, % predicted FEV_1, $\%FEV_1/FVC$, and sex. This identified dyspnoea as the only symptom significantly associated with global AQLQ ($p<0.0500$), and an independent predictor of the activity dimension ($p<0.0001$). Cough was found to be an independent predictor of the environmental dimension ($p<0.01$), and both cough and airway secretion were found to be independent predictors with the emotive dimension ($p<0.01$).

From these findings, the authors concluded that dyspnoea is the main symptom associated with global AQLQ in patients with severe asthma, and that each symptom has a variable impact on different dimensions of the AQLQ. ●

> **"Each of the five main asthma symptoms were found to be significantly correlated with global AQLQ."**

Dead Space Ventilation and Mortality in Acute Respiratory Distress Syndrome

ACUTE respiratory distress syndrome (ARDS) is commonly linked with elevated levels of ventilation-perfusion heterogeneity and dead space ventilation. However, the precise connection between the extent of dead space ventilation and patient outcomes has remained unclear.

At the ERS International Congress 2023, Dilip Jayasimhan, Waikato Hospital, Hamilton, New Zealand, unveiled their systematic review and meta-analysis. Their research delved into the potential of various dead space ventilation metrics to serve as predictors of mortality among patients with ARDS.

Jayasimhan and colleagues systematically searched through MEDLINE Central and Google Scholar databases. Their inclusion criteria comprised studies involving adults with ARDS that reported dead space ventilation metrics and mortality rates. Utilising a random effects model, they conducted a comprehensive meta-analysis of both unadjusted and adjusted outcomes. The I^2 statistic was employed to evaluate heterogeneity among the studies, while the quality in prognostic studies tool was used to assess the risk of bias.

Incorporating a total of 28 studies into their review, they were able to include 21 of these in their subsequent meta-analysis. All but one of these studies exhibited a low risk of bias. Notably, the review primarily focused on two widely studied indices: space fraction (VD/V_T) and ventilatory ratio.

A VD/V_T exceeding 0.6 showed a substantial association with elevated mortality risk (odds ratio: 3.53; 95% confidence interval: 2.22–5.58). Furthermore, for each 0.05 increment in VD/V_T, there was an independent and significant increase in the odds of death (odds ratio: 1.25; 95% confidence interval: 1.06–1.48). Notably, sensitivity analysis demonstrated robustness, even in limited studies adjusting for oxygenation, lung compliance, positive end-expiratory pressure, and baseline illness severity.

In summary, the findings reveal that among adults with ARDS, a high dead space ventilation measure (particularly VD/V_T and ventilatory ratio) is independently associated with increased mortality. ●

> "Utilising a random effects model, they conducted a comprehensive meta-analysis of both unadjusted and adjusted outcomes."

Is Chronic Cough Associated with Obstructive Sleep Apnoea?

CHRONIC cough is not associated with obstructive sleep apnoea (OSA), according to a late-breaking abstract presented at the ERS International Congress 2023.

Laurent Guilleminault, Toulouse University Hospital; Toulouse Institute for Infectious and Inflammatory Diseases, INSERM U1291, France; and University of Toulouse, F-CRIN CRISALIS, France, and colleagues, conducted a cohort study to investigate if an association between chronic cough and severe OSA exists.

Consecutive patients undergoing nocturnal polygraphy or polysomnography for suspected OSA in two French hospitals were prospectively enrolled; in total, 822 were included in the study. OSA was defined as an apnoea-hypopnoea index (AHI) of ≥15 events/hour, and chronic cough was defined as a cough present for ≥8 weeks.

The authors collected demographic data and nocturnal recording parameters. Bias introduced by confounding variables was controlled for using propensity score matching based on age; BMI; sex; and the presence of asthma, rhinosinusitis, and gastro-oesophageal reflux. The mean age of the cohort was 52.9±14.9 years, mean BMI was 30.18±7.00 kg/m^2, and 44.3% were female.

Within the cohort, the mean AHI was 20.1±22.0 events/hour, and severe OSA, defined as ≥30 events/hour, was seen in 25.1%. The overall prevalence of chronic cough was 13.4%. Interestingly, the authors found no difference in AHI values and categories between those with and without chronic cough (p=0.62). Furthermore, no association between chronic cough and severe OSA was observed after applying the propensity score (p=0.84), and these findings were similar for patients with mild and moderate OSA.

> **"No association between chronic cough and severe OSA was observed."**

The researchers concluded that there was no association between chronic cough and OSA in this large cohort of patients being investigated for suspected OSA, given that AHI values were similar between those with and without chronic cough, there was no excess of OSA in those with chronic cough, and the prevalence of chronic cough was similar in patients with and without OSA. ●

Early Life Factors and Persistent Airflow Limitation in Childhood Severe Asthma

ADVERSE exposures in early life are associated with unfavourable lung function trajectories and persistent airflow limitation (PAL), according to several population-based studies. The relationship in children with severe therapy-resistant asthma (STRA) and PAL is not as well documented. New data presented by Sormeh Salehian, Imperial College London, UK, presented at the ERS International Congress 2023, aim to analyse the relationship between early life disadvantage factors and PAL in children with STRA.

Salehian and colleagues carried out their research on 147 children with STRA. Of this group, 120 had spirometry data to assess PAL, which was defined as a forced expiratory volume in 1 second z-score of no more than -1.96 post-bronchodilator and post-systemic steroid trial (IM triamcinolone).

PAL was identified in 30 out of 120 (25%) children with STRA. Birthweight, gestational age, infant feeding, passive smoking, and index of multiple deprivation were the early life factors assessed.

The results showed that low birthweight, defined as below 2.6 kg, was associated with a lower overall forced expiratory volume in 1 second z-score of -1.553 versus -0.658 (p=0.04). However, low birthweight was not significantly associated with PAL. Furthermore, there was no significant association between PAL and gestational age or method of infant feeding.

The team concluded that PAL is common in children with STRA; however, there are no associations between early life risk factors and the development of PAL. This indicates that the mechanism for PAL in children with STRA may differ to that of those with less severe asthma. ●

> "The relationship in children with severe therapy-resistant asthma (STRA) and PAL is not as well documented."

Emphysema: Treatable Traits in Patients Eligible for Bronchoscopic Lung Volume Reduction

TREATABLE traits are highly prevalent in patients with advanced emphysema who are eligible for bronchoscopic lung volume reduction (BLVR). The number of these traits is correlated with health-related quality of life (HRQoL), according to research presented at the ERS International Congress 2023.

Treatable traits characterise the heterogeneity and complexity of chronic obstructive pulmonary disease. BLVR using one-way endobronchial valves (EBV) is an effective treatment in patients who have a specific phenotype with the treatable traits. This phenotype is advanced emphysema with severe hyperinflation. However, the prevalence of other treatable traits in patients with this phenotype, and the relationship of these to HRQoL, is not well understood.

To overcome this, Rein Posthuma, Ciro, Horn, the Netherlands, and colleagues evaluated the spectrum of treatable traits in patients with chronic obstructive pulmonary disease eligible for BLVR-endobronchial valve treatment, to determine which of the 16 pre-defined treatable traits were associated with worse HRQoL. These treatable traits included severe dyspnoea, very severe airflow limitation, frequent exacerbations, poor exercise capacity, low physical activity, hypoxaemia, hypercapnia, underweight, obesity, low muscle mass, decreased bone mineral density, impaired handgrip force, impaired quadriceps force, severe fatigue, anxiety, and depression.

HRQoL was based on the St. George's Respiratory Questionnaire (SGRQ), and scores were split into high (SGRQ ≥60) and low (SGRQ <60). Logistic regression analysis was used to assess odds ratios for the treatable traits.

In total, 96 patients were included in the study, of whom 36.5% were male. The mean forced expiratory volume in 1 second in the cohort was 28.3%±7.8% predicted, and mean residual volume was 231.1%±39.3% predicted. Fifty-three percent of participants had an SGRQ score of ≥60 points, and the mean SGRQ score was 60±12 points. The overall mean number of treatable traits per person was 7.6±2.7, with low physical activity, severe fatigue, and low muscle mass being most prevalent. A unique combination of treatable traits was seen in 96% of patients (n=92). The findings showed that with increased numbers of treatable traits per patient, the SGRQ score was higher (r=0.527; p<0.001).

> "A unique combination of treatable traits was seen in 96% of patients."

In patients with an SGRQ score of ≥60 points, severe fatigue, anxiety, and depression had statistically significant odds ratios for poorer HRQoL when compared to those with an SGRQ score of <60 points. The highest odds ratio was seen for severe fatigue, measured with checklist individual strength (6.5).

The team concluded that in the cohort of patients with advanced emphysema eligible for BLVR EBV, there was a high prevalence and co-occurrence of multiple treatable traits, and that having a higher number of these treatable traits correlated with poorer HRQoL. This highlights the need to study the efficacy of combined management with EBV and pulmonary rehabilitation in the future. ●