Conclusion

The results demonstrate promising accuracy in using audio phenotyping for diagnosing asthma and COPD. This work serves as an early proof of concept, highlighting the potential of utilizing breath sound to phenotype respiratory diseases.

Please refer to page A288 for declarations of interest related to this abstract.

Abstract S134 Figure 1

Abstract S135 Figure 1

Association between CRTI, severity of CRTI and lung function as measured by % predicted Forced Expiratory Volume in one second (FEV1), % predicted Forced Vital Capacity (FVC), and the ratio between FEV1 and FVC (FEV1/FVC). Spirometry was performed without a bronchodilator. Uninjured n=478; injured n=479. Values are the mean ± standard deviation.
Introduction During combat operations service personnel who sustain combat related traumatic injury (CRTI) are at risk of both direct and indirect injuries to the lungs, including blast lung injury. In this study we aim to investigate the relationship between lung function and CRTI in servicemen deployed to Afghanistan. We hypothesise that eight years post deployment, those who were injured will have a lower percent (%) predicted forced expiratory volume at 1 second (FEV1) than those who were uninjured.

Methods In the ADVANCE cohort, 579 UK servicemen injured while deployed in Afghanistan (2003–2014) were frequency matched by age, rank, role, regimen, service, and deployment period to 565 uninjured servicemen. Lung function was measured by spirometry. Primary outcome was% predicted FEV1 forced vital capacity (FVC) and FEV1/FVC as secondary outcomes. The New Injury Severity Score (NISS 2008) was used to stratify injury severity; mild-moderate severity (NISS<25) and severe injury (NISS>25). Multivariable linear regression was used to adjust for age and rank.

Results Spirometry data were available for 963 participants (84%) (n=479 injured and n= uninjured); 76% of injuries were blast related. Mean age at assessment was 34.6 years (standard deviation (SD) 5.24) at a median of 8 years post deployment.

The% predicted FEV1 was 94.8% (SD 11.8) in the injured group which was significantly lower than the uninjured group (97.1% (SD 11.0), p=0.002). Mean% predicted FEV1 in those with severe injuries was significantly lower in those with severe injuries compared with those with milder injuries: 90.8% (SD 12.9%) vs 96.6% (SD 10.8); p<0.001). Similar results were seen for FVC but there were no significant differences in FEV1/FVC (figure 1). When adjusted for age and rank at time of injury/deployment, CRTI was still associated with a significant decrease in% predicted FEV1 of 2.2% (95% CI -3.7%,-0.8%).

Conclusion In servicemen deployed to Afghanistan, CRTI was associated with a lower% predicted FEV1 independent of age and rank. While these differences are statistically significant, they are relatively small and of unknown clinical significance. Follow up will focus on longitudinal change and examine any association with type of injury.

Please refer to page A288 for declarations of interest related to this abstract.

S136 FEASIBILITY AND SAFETY OF CONTINUOUS BRONCHOSCOPY DURING EXERCISE TO ASSESS DYNAMIC LARGE AIRWAY COLLAPSE

1ZW Williams, 1,2CM Orton, 1,2JL Garner, 1,2PL Chan, 1,2Ph Shah, 1,2MI Polkey, 4,2T Semple, 1,1JH Hull, 3Department of Respiratory Medicine, Royal Brompton Hospital, London, UK; 3National Heart and Lung Institute, Imperial College, London, UK; 3Department of Radiology, Royal Brompton Hospital, London, UK; 3Institute of Sport, Exercise and Health (ISEH), Division of Surgery and Interventional Science, University College London, London, UK

Introduction Excessive dynamic airway collapse (EDAC) is a recognised cause of exertional dyspnoea. EDAC is diagnosed by evaluating inward movement of the trachea and main bronchi, during a forced expiratory manoeuvre, typically during semi-supine bronchoscopy. This differs from stress placed on large airways during physical activity. We aimed to explore the feasibility of conducting continuous bronchoscopy during exercise (CBE) to evaluate large airway movement and to compare this with findings during forced manoeuvres on bronchoscopy and with magnetic resonance (MRI) imaging.

Method 15 healthy (40% female) individuals were recruited. Demographics, spirometry, blood pressure, and electrocardiogram were assessed. Using topical anaesthesia, the bronroscope was inserted to the mid-trachea and secured using a specialist head-mount. Video images were captured in supine, semi-supine positions and during an incremental treadmill-based test to voluntary exhaustion. Resting and forced manoeuvres were recorded, timestamped, and qualitatively analysed by two operators. At a subsequent visit, subjects performed dynamic MRI with forced expiratory measures. Tolerability and feasibility were determined using questionnaire assessment and reported adverse events.

Results All participants, median (IQR) age 29 (26–34) years, BMI 24.5 (24.1–26.2) kg/m2 and FEV1% predicted 105 (100–112%), successfully performed CBE. Thirteen (87%) participants exercised to voluntary exhaustion (end-exercise peak heart rate of >90% predicted). Exercise was stopped prematurely in two participants due to elevated blood pressure (>200mm Hg). Two individuals required supplemental oxygen for transient desaturations. Participants (60%) reported discomfort with placement of the bronroscope, but most (73%) reported no increase in scope associated discomfort during exercise. One participant reported a temporary headache and mild fever following CBE. Bronchoscopic images allowed adequate evaluation of the degree of large airway collapse in all cases with minimal secretions. MRI identified tracheal collapse >50% in eight (53%) individuals. There was a poor relationship between percentage of trachea collapse measured via forced resting manoeuvres (either on MRI or bronchoscopy) and findings during exercise (figure 1).

Conclusion Continuous bronchoscopy can be safely conducted during vigorous exercise and is tolerable in healthy subjects. In this series, there was no evidence of EDAC during exercise despite forced manoeuvres on imaging indicating excessive collapse. Further studies are now required in patient populations.