AO004 | Baseline small airway function correlates with lung function decline following hematopoietic stem cell transplant

Hau F[1], Wallis R[1], Greenwood M[2], King G[1,3,4], Chapman D[1,3,5]
[1]RNSH Respiratory Investigation Unit, St Leonards, Australia, [2]Department of Hematology and Transfusion Services, RNSH, St Leonards, Australia, [3]Woolcock Institute of Medical Research, Sydney, Australia, [4]Northern Clinical School, Sydney, Australia, [5]School of Life Sciences, Sydney, Australia

Introduction/Aim: Following allogeneic haematopoietic stem cell transplantation (allo-HSCT), up to 20% of patients develop pulmonary graft versus host disease. We aimed to determine whether small airway function pre allo-HSCT, measured by oscillometry and multiple breath nitrogen washout (MBNW), correlates with changes in spirometry, lung volumes and DLCO following allo-HSCT.
Method: In 39 patients, oscillometric respiratory system resistance (R5) and reactance (X5), and MBNW parameters Lung Clearance Index (LCI), S_{cond} and S_{acin} (global, conducting and acinar ventilation heterogeneity, respectively) were measured pre allo-HSCT. Spirometry, body plethysmography and gas transfer was measured prior to, and at 3, 6, 9 and 12 months after allo-HSCT. Correlations between baseline oscillometry and MBNW parameters, and post allo-HSCT changes in spirometry, volumes and diffusion were examined using Spearman's correlation co-efficient.
Results: Baseline FEV1, FVC and FEV1/FVC mean *z*-score ± SD were −0.08 ± 1.11, 0.1 ± 1.06 and −0.26 ± 1.07 respectively. At 1 year, FEV1 declined by 10% or more in 4/22, FVC in 3/22 and FEV1/FVC demonstrated obstruction (<−1.64 *z*-score) in 2/22. Baseline LCI was abnormal in 28/39, Scond in 22/39, Sacin in 14/39, R5 in 1/39 and X5 in 3/39 patients. Worse LCI predicted greater % fall in DLCO at 3 months ($r = -0.39$, $p = 0.027$), but not at other timepoints. Worse Scond predicted less fall in FEV1 at 3 and 6 months post-HSCT ($r = 0.37$, $p = 0.036$ and $r = 0.43$, $p = 0.014$, respectively), but not at 9 and 12 months. There were no significant correlations between Sacin, R5 or X5 and lung function changes, post-HSCT.
Conclusion: Prior to HSCT the majority of patients had abnormal small airway function measured by MBNW. Worse global ventilation heterogeneity predicted greater decline in gas transfer, whereas worse conducting airway heterogeneity predicted less decline in FEV1.
Nomination for New Investigator Award
Key Words: Multiple Breath Nitrogen Washout, Oscillometry, Graft Versus Host

AO005 | Variability in cardiopulmonary exercise testing protocols in NSW and ACT

Drury K[1,2], Cavaleri R[2,3,4], Cochrane B[5,6], Anderson C[1], Seeto J[1], Green S[2,7]
[1]School of Health Sciences, University of New South Wales, Australia, [2]School of Health Sciences, Western Sydney University, Australia, [3]Brain Stimulation and Rehabilitation (BrainStAR) Lab, School of Health Sciences, Western Sydney University, Australia, [4]Translational Health Research Institute (THRI), Western Sydney University, Australia, [5]Department of Respiratory and Sleep Medicine, Campbelltown Hospital, Australia, [6]School of Medicine, Western Sydney University, Australia, [7]Department of Cardiology, Campbelltown Hospital, Australia

Introduction/Aim: Cardiopulmonary exercise testing (CPET) is considered the gold standard of assessing functional capacity under stress. However, little is known about CPET accessibility, protocols used, or barriers to testing in NSW and ACT. This study aimed to understand clinical CPET practices and identify possible areas of protocol variability.
Method: In 40 hospitals were contacted: 28 in metropolitan Sydney, 9 in regional / remote NSW, and 3 in metropolitan Canberra. Hospitals confirming that they had a CPET service were asked to complete a 28-question survey of CPET practices via Qualtrics. The survey explored testing personnel, medical supervision, protocol design, data reporting, and barriers to CPET.
Results: Most hospitals ($n = 28$) did not have a CPET service. Of the 11 sites that performed CPET, respondents were split evenly between adult ($n = 6$) and paediatric ($n = 5$) testing capacity. Cycle ergometry ($n = 10$) was the dominant exercise modality. Most sites reported using ramp ($n = 8$) rather than stepwise ($n = 3$) protocols. 73% of sites adapted the test work-rate to facilitate a test duration of 8–12 min. 27% used a standard work-rate, regardless of patient presentation or test indication. Free-text responses suggest that individualised work-rate targets were largely based on pre-test spirometry, patient reported dyspnoea, and predictive formulae. All sites reported AT-related variables, ECG-related measurements, and Borg scores. CPET endpoints were typically in line with American College of Sports Medicine guidelines (73%). Barriers to CPET included lack of suitable staffing ($n = 10$), lack of medical availability ($n = 4$), and space ($n = 3$).
Conclusion: Despite its value, CPET appears to be underused in NSW/ACT. While consistency in CPET reporting and endpoints was identified, there was variability in protocols across testing sites. This variation has potential to impact consistency and comparability of test results, affecting clinical decision-making.
Key Words: CPET, exercise test*, hospital survey, practice variation.
Grant Support: Nil