Methods : As a part of an on-going collaboration between PneumaCare Ltd. and Queen Elizabeth (QE) Hospital (Birmingham, UK), 107 healthy adult subjects between ages of 18 to 69 were measured with SLP during 4 to 5 minutes of seated tidal breathing. Parameter means and standard deviations for males and females aged 18–39 and 40–69 were calculated and gender and age related comparisons were made (t-test).

Results Tables 1 summarises the normative values for males and females older and younger than 40 years. Three parameters showed age related differences and one parameter showed a gender related difference.

Conclusion Preliminary normal values for SLP derived tidal breathing parameters are reported. Some gender and age related differences are apparent. It is interesting that tPTEF/tE was significantly lower in the older participants, possibly a sign of natural airway obstruction associated with age.

REPEATABILITY OF STRUCTURED LIGHT PLETHYSMOGRAPHY (SLP) FOR MEASUREMENT OF RESPIRATORY RATE IN NORMAL SUBJECTS

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Introduction Structured Light Plethysmography (SLP) captures movements of a light grid projected onto the thoraco-abdominal (TA) wall to produce a waveform from which a primary derived output is Respiratory Rate (RR). Assessment of repeatability is essential for clinical use, however, physiological variability can confound results. RR agrees within ± 2 breaths per minute (brpm)[1] with Respiratory Inductance Plethysmography (RIP) measured simultaneously on one occasion. We propose that if measurements are repeatable, there would be no difference in agreement between devices over a series of sessions.

Aim This study assessed repeatability of the agreement between SLP and RIP.

Methods 14 subjects (7 male, 7 female) with no respiratory diagnosis underwent 5 minutes of simultaneous measurement with SLP and RIP during quiet breathing. This was repeated on 3 occasions over 2 days, by the same operator, at the same location and using the same devices. RR were calculated for thorax (THRR), abdomen (ABRR) and the entire thoraco-abdominal (TARR) signals for both devices. Agreement between the two devices was assessed using Bland-Altman plots with LOA set at < ± 2 breaths/min.

Results For TARR and THRR, all points were within 2 SD of the mean; for ABRR, 1 of 14 points was outside of 2 SD, but the LOA were within < ± 2 breaths/min. The mean differences between the two devices were 0.476, 0.605 and 0.524 breaths/min for TARR, THRR and ABRR, respectively.

Conclusion Agreement was observed between the two devices for each set of repeated measurements. We conclude that measurement of RR are repeatable.

REFERENCE

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CTAS – A CT SCORE TO QUANTIFY DISEASE ACTIVITY IN PULMONARY SARCOIDOSIS

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Introduction A major gap in the management of sarcoidosis is the lack of accessible and objective methods to measure disease activity. Since 90% of patients have pulmonary involvement, we explored if a disease activity score based on thoracic CT scan could address this clinical issue.

Methods High resolution CT scans from 100 consecutive sarcoidosis patients at a regional sarcoidosis service were scored for extent of CT abnormalities known to relate to granuloma or lymphocytic infiltration from published CT-pathological studies. These individual abnormality scores were then correlated against serum ACE, sIL-2R and change in forced vital capacity (FVC) to identify CT abnormalities that reflect contemporaneous disease activity. The sum of these scores, or **CT A**ctivity **S**core (CTAS) was then validated against FVC response to treatment.

Results and discussion CT extent scores for nodularity, ground-glass opacification, inter-lobular septal thickening and consolidation correlated significantly with at least one of the disease activity parameters and were used to form CTAS. CTAS was found to predict FVC response to treatment at one year and was highly reproducible between radiologists. An abbreviated CTAS (aCTAS), constructed from presence or absence of the four CT abnormalities also showed significant correlation with FVC response to treatment. CTAS and aCTAS also correlated with response to treatment in the fibrotic subgroup.

Conclusions CTAS provides a concept for an objective and reproducible CT scoring method to quantify disease activity in sarcoidosis. The score can potentially be used to stratify patients according to disease activity, determine response to treatment and establish if fibrotic sarcoidosis is active.

DEVELOPMENT OF 18F AND 68GA-LABELLED CYCLIC PEPTIDES FOR POSITRON EMISSION TOMOGRAPHY IMAGING OF αVβ6 IN IDIOPATHIC PULMONARY FIBROSIS

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Biomarkers, capable of identifying the stage and aggressiveness of idiopathic pulmonary fibrosis (IPF) at the time of diagnosis, would improve the accuracy of prognostication and facilitate targeting anti-fibrotic drug therapy to patients who are most likely to benefit. The integrin $\alpha_v\beta_6$ is highly expressed in injured lung epithelium and is a key activator of transforming growth factor β (TGF-β), which plays a crucial role in the initiation and maintenance of fibrosis. Positron emission tomography (PET) imaging tracers that permit visualisation of lung $\alpha_v\beta_6$ expression have potential as novel therapeutic and prognostic biomarkers in IPF.

Several $\alpha_v\beta_6$ integrin-binding cyclic peptides were synthesised using solid phase supported peptide synthesis and functionalised