Abstract P35 Table 1 A list of the bacterial organisms that were cultured from cerebral abscesses in the 2005–2016 cohort
Bacterial organisms from cerebral abscesses in PAVM patients
Actinomycosis spp
Alpha haemolytic streptococci
Staphylococcus Intermedius
Streptococcus Milleri
Streptococcus Anginosus
Actinomycosis Israelii

Bacterial organisms from cerebral abscesses in PAVM patients			
Actinomycosis spp			
Alpha haemolytic streptococci			
Staphylococcus Intermedius			
Streptococcus Milleri			
Streptococcus Anginosus			
Actinomycosis Israelii			
Streptococcus Constellatus			
Non-haemolytic streptococci			
Non specified streptococcal spp			
Non specified anaerobic species			

REFERENCE

Shovlin C, et al. Post-NICE 2008: Antibiotic prophylaxis prior to dental procedures for patients with pulmonary arteriovenous malformations (PAVMs) and hereditary haemorrhagic telangiectasia. Br Dent J 2008; 205(10):531-3.

P36 INJECTIONS OF INTRAVENOUS CONTRAST FOR COMPUTERISED TOMOGRAPHY SCANS PRECIPITATE **MIGRAINES IN HEREDITARY HAEMORRHAGIC** TELANGIECTASIA SUBJECTS AT RISK OF PARADOXICAL **EMBOLI: IMPLICATIONS FOR RIGHT-TO-LEFT SHUNT** RISKS

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Introduction and objectives Migraine headaches commonly affect people with pulmonary arteriovenous malformations (PAVMs) that provide right-to-left shunts. The majority of PAVMs are due to underlying hereditary haemorrhagic telangiectasia (HHT). In our clinical practice, patients occasionally reported acute precipitation of migraine headaches following injection of technetiumlabelled albumin macroaggregates for nuclear medicine scans. Our goal was to evaluate if injection of intravenous particles may provoke migraines in the cohort.

Methods Self-reported migraine features and exacerbations were examined in HHT subjects with and without pulmonary AVMs, for a series of noninvasive and invasive investigations, using an unbiased online survey. With ethical approval, the study recruited between August 2013-April 2015. Data were downloaded in December 2015 for analysis using STATA IC v12 and GraphPad Prism. Two group comparisons were performed using Mann Whitney or Fisher's exact test (for proportions). Multiple groups

were compared using Kruskal Wallis with Dunn's multiple comparison test.

Results 166 subjects were classified as having both HHT and migraines. HHT subjects with migraines were more likely to have pulmonary AVMs (p < 0.0001). Pulse oximetry, x-rays, ultrasound and computerised tomography (CT) scans without intravenous contrast medium rarely, if ever, provoked migraines, but unenhanced magnetic resonance imaging (MRI) was reported to exacerbate migraines by 14/124 (11.2%) subjects. 114 had both enhanced and unenhanced CT examinations: studies with contrast media were more commonly reported to start (9/114 [7.8%]), and/or worsen migraines (18/114 [15.7%]) compared to those undertaken without contrast medium (p < 0.01), or after simple blood tests (p < 0.05). Additionally, migraine exacerbation was reported by 9/90 (10%) after contrast echocardiography, 2/44 (4.5%) after nuclear medicine scans, and 10/154 (6.5%) after blood tests.

Conclusions In this population, MRI studies, blood tests, contrast echocardiograms, and intravenous injection of iodinated contrast medium associated with CT examinations were reported to provoke or exacerbate migraines. Since air emboli are recognised to complicate intravenous injections, particularly following pressurised pump injections of CT scan contrast, evaluation of migraines as a potential read-out for paradoxical emboli is recommended. In the meantime, for people with HHT and migraines, pre-test counselling may helpfully include advice to bring migraine preventers or treatments to help alleviate symptoms promptly.

Imaginative Imaging in Lung Disease

P37 PRELIMINARY NORMAL VALUES FOR STRUCTURED LIGHT PLETHYSMOGRAPHY TIDAL BREATHING PARAMETERS AND AGE AND GENDER DIFFERENCES

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Introduction This is the first report from an ongoing study to define normal values for Structured Light Plethysmography (SLP) tidal breathing parameters in adults. Structured Light Plethysmography (SLP) is a non-contact, non-invasive respiratory measurement technology that utilises the movement of thoracoabdominal (TA) wall to measure a range of tidal breathing parameters. Various studies have been using SLP but lack of normative values can make any clinical judgement difficult.

Abstract P37 Table 1	SLP Tidal Breathing Parameters for adult male and female	normals aged 18-69 years
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Parameter	Males 18–39 yrs (n = 32) Mean±SD	Males 40–69 yrs (n = 25) Mean ± SD	Young vs older males, t (p)	Females 18–39 (n = 21) Mean ± SD	Females 40–69 yrs $(n = 29)$ Mean ± SD	Young vs older Females, t (p)	Males vs. Females (all ages), t (p)
TAA	5.7 ± 23.3	4.75 ± 2.69	1.18 (0.24)	4.85 ± 2.45	4.8 ± 1.83	0.08 (0.94)	0.92 (0.36)
LRHTA	2.24 ± 2.13	2.39 ± 1.64	-0.298 (0.77)	1.58 ± 0.69	2.04 ± 1.43	-1.36 (0.18)	1.47 (0.14)
%RC	45.87 ± 13.07	56.29 ± 11.03	-3.2(<0.01)	60.23 ± 8.55	61.31 ± 10.33	-0.39 (0.70)	-4.62(<0.001)
IE50	1.34 ± 0.27	1.25 ± 0.18	1.48 (0.14)	1.37 ± 0.2	1.42 ± 0.29	-0.64 (0.52)	-1.94 (0.06)
tPTEF/tE	0.34 ± 0.09	0.26 ± 0.07	3.67(<0.001)	0.32 ± 0.09	0.26 ± 0.06	2.62(<0.05)	0.91 (0.36)
tPTIF/tl	0.49 ± 0.09	0.55 ± 0.09	-2.69(<0.01)	0.5 ± 0.08	0.52 ± 0.07	0.88 (0.38)	-1.13 (0.26)

TAA: Thoraco-abdominal asynchrony (TAA), LRHTA:left vs Right Hemi-thoracic asynchrony, IE50:Inspiratory to expiratory flow at 50% of tidal volume calculated from thoraco-abdominal wall displacement, tPTEF/tE: normalised time to reach peak tidal expiratory flow, tPTIF/tI: normalised time to reach peak tidal inspiratory flow

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.

P38 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 \pm 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 < \pm 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 $< \pm 2$ 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.

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P39 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 Activity Score (CTAS) was then validated against FVC response to treatment.

Results and discussion CT extent scores for nodularity, groundglass 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.

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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