Abstract P45 Figure 1 ROC comparing all CMRI mPAP predictive models for making a diagnosis of PH

REFERENCES

- 1 Swift AJ, et al. Noninvasive estimation of PA Pressure, Flow, and Resistance With CMR Imaging. *JACC Cardiovasc Imaging* 2013;**6**(10):1036–47.
- 2 Moral S, et al. New index alpha improves detection of pulmonary hypertension in comparison with other cardiac magnetic resonance indices. *Int J Cardiol* 2012;**161**(1):25–30.

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ASSESSMENT OF AORTIC STIFFNESS AND CORRELATION WITH LUNG FUNCTION IN PATIENTS WITH COPD USING CARDIAC MAGNETIC RESONANCE

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Introduction: COPD has been associated with increased cardiovascular risk, although the mechanisms for this are still unclear. Proposed theories include increased systemic inflammation and accelerated ageing resulting in arterial stiffness. We aimed to evaluate aortic distensibility using cardiac MRI in patients with COPD compared to an age-matched non COPD, 'healthy' smoker control group.

Methods we recruited 49 subjects, of which 27 had diagnosis of COPD and FEV1/FVC < 70%; and 21 age-matched normal smoker controls (mean age 64 years ± 10). We acquired data including age, gender, smoking status, number of packs of cigarettes per year, and FEV1/FVC ratio. MRI images were acquired using a 3.0T scanner, and analysed using CVI42 software. Left ventricle and right ventricle function and volumes were evaluated using short axis SSFP cine. Aortic distensibility was measured using a validated method that takes in consideration aortic maximal and minimal areas from axial SSFP cine acquired perpendicular to the vessel.

Results Aortic distensibility was reduced in the COPD patients compared to control ($0.0022610 \times 10^{-3} \text{ mm Hg}^{-1}$ vs $0.004337 \times 10^{-3} \text{ mm Hg}^{-1}$, $p = 0.003$). The distensibility of descending aorta was similar in both groups ($p = 0.06$). Ejection fraction and biventricular volumes were also similar in the two groups. Univariate analysis demonstrated a significant relationship between ascending aorta distensibility and FEV1/FVC ratio. There was no difference when comparing distensibility with smoking status or number of packs per year. Linear regression demonstrated that the degree of aortic distensibility was directly proportional to FEV1/FVC ratio

Conclusion Patients with COPD have significantly increased aortic stiffness measured by cardiac magnetic resonance. This was observed in the presence of normal LV/RV systolic function in both groups. This difference was related to FEV1/FVC, and was independent of smoking. Preserved FEV1/FVC showed more elastic ascending aortas. Reduced aortic distensibility could represent the early phase changes in cardiovascular function but further research is needed.

Abstract P46 Figure 1 Contouring of ascending and descending aortic area on axial SSFP cine

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THE INFLUENCE OF MUSCLE MASS IN THE ASSESSMENT OF LOWER LIMB STRENGTH IN COPD

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Introduction and objectives Lower limb muscle strength measured by Quadriceps Maximal Voluntary Contraction (QMVC) provides valuable functional and prognostic information in people with COPD. Reference equations providing normal values for QMVC have been reported, some requiring measurement of muscle mass. It is unclear whether including muscle mass in the calculation significantly alters predicted values in COPD. We addressed this question by deriving reference equations for QMVC with and without the inclusion of whole body assessment of muscle mass in a cohort of healthy volunteers and

subsequently comparing QMVC assessment using these reference equations in two separate cohorts of patients with COPD.

Methods Prediction equations were derived through multiple linear regression in a healthy control (HC) group. Age, gender, height and weight were inputted into the first model (FFM– model) and fat-free mass (FFM) added for the other (FFM+ model). The prediction equations were then applied to a Primary Care COPD (PCC) group and Complex Care COPD (CCC) group of patients where percentage predicted values were calculated and weakness determined using a threshold of the lower limit of normal.

Results 175 HC subjects (median (IQR) age: 54 (14) years, 31% male) were recruited. The PCC group comprised 87 patients (median (IQR) age: 68 (9) years, 71% male, FEV1 62 (20)% predicted) and the CCC group 189 patients (median (IQR) 66 (12) years, 57% male, FEV1: 29 (16)% predicted).

Prediction values for the HC and PCC were similar between the FFM– and FFM+ models as shown in the table. In the CCC percentage predicted values were lower and there were 11.9% more classed as weak by the FFM– model compared to the FFM+ model.

Abstract P47 Table 1 QMVC values expressed as percent predicted values and number classed as weak using the FFM– and FFM+ models for the COPD cohorts

	Healthy control	Primary care COPD	Complex care COPD
	n = 175	n = 87	n = 189
FFM– Model			
%pred QMVC:	100.3 (24.1)	86.0 (22.0)	54.0 (16.4)
Number classed as weak (%):	6 (3.4%)	14 (16.3%)	101 (53.2%)
FFM+ Model			
% pred QMVC:	100.2 (24.1)	86.7 (20.6)	59.2 (17.8)
Number classed as weak (%):	8 (4.6%)	10 (11.6%)	78 (41.3%)

Mean (SD) values presented as a percentage of the values predicted (%pred) using the FFM– and FFM+ models. Abbreviations: FFM+: fat-free mass included, FFM– fat-free mass not included.

Conclusion The inclusion of fat-free mass did not significantly alter prediction of muscle weakness in the healthy cohort. In the COPD cohorts, including FFM in the model altered the proportion classified as having muscle weakness, most notably in the CCC cohort. This is likely to be due to a higher prevalence of muscle wasting in this population which resulted in an underestimate of predicted strength when muscle mass is included in the model.

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RESEARCH BAL USING SINGLE USE DISPOSABLE BRONCHOSCOPE

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Background Broncho alveolar lavage (BAL) is widely used for investigative research to study innate, cellular and humoral immune responses, and in early phase drug trials. Conventional (multiple use) flexible bronchoscopes have time and monetary costs associated with cleaning, and may also carry a small risk of cross infection. Single use bronchoscopes may provide an alternative, but have not been evaluated in this context.

Methods Healthy volunteers underwent bronchoscopy on a day-case clinical research unit using the Ambu[®] Scope single-use flexible intubation bronchoscope. The bronchoscopy protocol was identical to previous studies using multiple-use equipment: fasted volunteers had local anaesthesia to the nasopharynx, and were intubated with further sequential local anaesthetic (2% lidocaine throughout). Lavage was performed from a sub segmental bronchus within the right middle lobe. A total of 200ml of warmed normal saline divided into four aliquots. Fluid was aspirated using handheld suction. Supplemental oxygen was used to maintain saturations above 90% throughout the procedure. The lab processing of BAL was identical to earlier studies. BAL volume was recorded, mucus plugs removed by filtration through a double layered gauze swab into sterile centrifuge tubes. The cells were pelleted by centrifugation and washed by vortexing in 50 mls of cold normal saline, then re-suspended in culture medium for differential counting and viability staining with trypan blue stain.

Results Ten volunteers, (mean age 23 years, 6 male) participated. The procedure was well tolerated by all the participants and all were carried out by two operators. The results were compared to 50 (mean age 23, 14 male) procedures done using the conventional scope by the same two operators. The total volume yield was significantly higher in the disposable group mean (SD) 149 mls (24.6) compared to 123 mls (20.6) $p = 0.0007$ Mann-Whitney Test. The total cell yield and viability were similar in both groups, with no significant differences.

Conclusions BAL using single use bronchoscopes are safe with no risk of cross infection, and well tolerated, with potentially reduced side effects post procedure such as pleuritic chest pain and cough as the volume yield is better. The cell yield and viability are comparable to the conventional bronchoscopes.