use ionising radiation. Here we present the first single-breath demonstration of collateral ventilation, by using hyperpolarised gas MRI.

Methods Ten patients with moderate to severe COPD as defined by NICE guidelines were scanned using a 1.5T whole body MRI system. A mix of 200 ml hyperpolarised ^{3}He and 800 ml N_2 was inhaled, and ^{3}He MR images were acquired. 3D images with full lung coverage were acquired at six time-points during a single breathhold.

Results Abstract S118 figure 1 shows example sequential images in one patient, with insets highlighting an area with late ventilation. Hyperpolarised ^{3}He MR signal is non-renewable and diminishes over time. In normally ventilated regions of the lung this expected signal decay is observed. However, in the regions indicated with arrows the signal *increases* over time due to collateral ventilation, with a progressive influx of polarised gas from the edge of the defects towards the centre. The long time constants for ventilation of some areas are not compatible with their ventilation via their feeding bronchi. Instances of collateral ventilation were observed in eight of the ten patients scanned. These examples varied in defect size, number and fill-rate from the strongest case (Abstract S118 figure 1) to much more subtle effects.

Conclusions A method for direct visualisation of collateral ventilation within a single breath-hold has been demonstrated in COPD patients for the first time. The technique gives 3D full lung coverage, and is non-invasive and non-ionising. The ability to image collateral ventilation directly may help to understand pathophysiology in COPD and aid assessment for therapy.

S119 UK HOT-HMV TRIAL: ACCEPTABILITY AND TOLERABILITY OF HIGH PRESSURE DOMICILIARY NON-INVASIVE VENTILATION (NIV) IN COPD

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Introduction Domiciliary NIV in COPD remains controversial with previous randomised controlled trials showing little clinical benefit. However, these trials have been criticised for using low pressure NIV and consequently nocturnal hypoventilation occurs. In contrast, there are genuine concerns that patients may not be able to tolerate the high pressure domiciliary NIV required to manage nocturnal hypoventilation effectively.

Method Patients admitted for acute hypercapnic respiratory failure due to an exacerbation of COPD with persistent hypercapnia ($PaCO_2$>7 kPa) 2–4 weeks following resolution of acute episode were offered participation into the trial. Patients were randomised to either home oxygen therapy (HOT) or home mechanical ventilation (HMV) and followed up at 6 weeks and 3 months. Patient assessment included anthropometrics, arterial blood gases and health related quality of life measures. Sleep disruption was assessed using actigraphy (Actiwatch spectrum, Philips-Respironics, Murrysville, Pennsylvania, USA) for 7 days following the assessment.

Results 36 patients have been recruited and randomised to date. Abstract S119 table 1 show the baseline data for 20 patients that have completed follow-up to 3 months. Discharge ventilator settings were IPAP 26±3 cmH_2O, EPAP 5±1 cmH_2O and back up rate 15±1 bpm in the HMV group. Total sleep time during the first 2 weeks of HMV was significantly shorter than in those patients receiving HOT (?88 min; 95% CI 5 to 172 min, p=0.04). However, by 6 weeks there was no difference between the groups (Δ66 min; 95% CI −62 to 194 min, p=0.3). This was sustained at 3 months (Δ51 min; 95% CI −100 to 202 min, p=0.5). There were no between group differences in wake after sleep onset, sleep efficiency or sleep latency at initial assessment or subsequent follow-up. Ventilator compliance at 6 weeks was 3 h 41 min ±1 h 41 min and at 3 months was 4 h 30 min ±1 h 44 min.

Conclusion A reduction in total sleep time between patients receiving HMV compared with those receiving HOT was demonstrated during the initial period of acclimatisation to HMV. However, despite increasing ventilator usage during the follow-up period the difference in sleep duration between treatment groups reduced suggesting improved tolerability to NIV.

Abstract S119 Table 1 Baseline charateristics

	HOT (n=10)	HMV (n=10)
Age (years)	68±9	70±10
BMI (kgm^{-2})	26±6	21±3
FEV_1 (l)/(%)	0.73±0.34/31±7	0.56±0.16/22±12
FVC (l)/(%)	1.79±0.56/65±12	1.72±0.64/48±18
$PaCO_2$ (kPa)	7.94±0.73	8.22±0.71
PaO_2 (kPa)	6.88±1.01	6.54±0.81
HCO_3 (mmol/l)	35±3	37±4
MRC (/5)	4±1	5±1
SGRQ (/100)	63±12	66±14
SRI-SS (/100)	49±14	52±16
O_2 prescription (L/min)	1.2±0.7	1.0±0.4

S120 REFERENCE VALUES FOR THE INCREMENTAL SHUTTLE WALKING TEST IN A HEALTHY POPULATION

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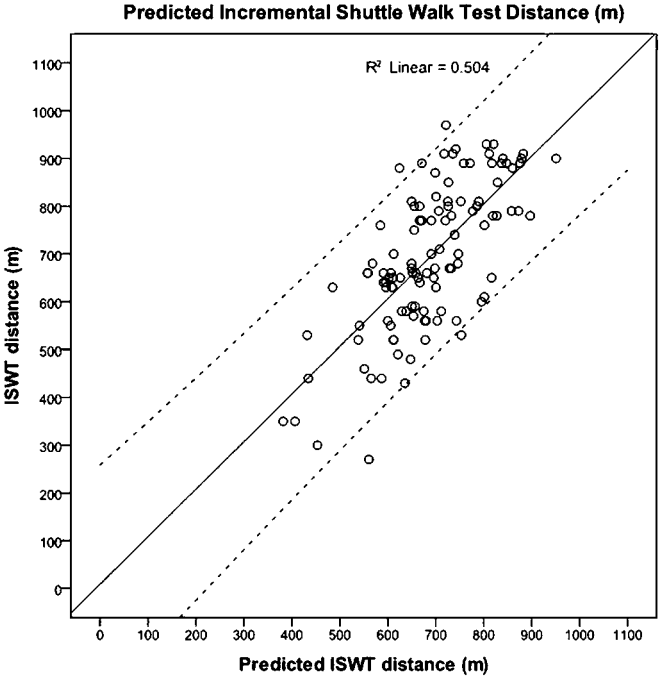
Introduction The assessment of functional exercise capacity is important in the evaluation of patients with chronic conditions and field walking tests are often used to assess functional exercise



Abstract S120 Figure 1 ISWTpred=603.345+(61.870×FEV_1)+(6.960×QMVC)+(9.183×DUKE)−(13.140×BMI)−(4.010×age).