Abstract P53 Table 1 Associations between clinical characteristics and odds of future poor clinical outcome

Clinical characteristic*	OR	p
Age		
<50 (reference)		
50-59	1.28	0.272
60-69	1.52	0.043
70-79	2.00	0.001
80-89	2.70	<0.001
90+	5.21	<0.001
Deprivation decile**	0.95	<0.001
BMI		
18-24 (reference)		
<18	1.61	0.029
25-29	0.75	<0.001
30-34	0.67	<0.001
35+	0.87	0.195
History of pneumonia	5.10	<0.001
History of raised eosinophils (≥2%)	1.18	0.011
History of Heart Failure	1.44	0.007
History of Cerebrovascular Disease	1.49	<0.001
History of Peripheral Vascular Disease	1.53	0.001
History of Anxiety Or Depression	1.20	0.007
History of Chronic Kidney Disease	1.25	0.010
History of Rhinosinusitis	0.75	0.001
Prescriptions in preceding 12 months:		
Nebulised bronchodilator	2.24	<0.001
ICS/LABA combination inhaler	1.27	<0.001
Inhaled LABA or LAMA	1.71	<0.001
Inhaled SAMA	1.44	<0.001
Inhaled SABA	1.24	0.004
Constant	0.28	<0.001

*Variables excluded from model due to statistical insignificance: gender, IHD, hypertension, osteoporosis, GORD, diabetes, total number of comorbidities.

**Decile 10 represents least deprived.

years, 2211 (44.2%) of those 5000 patients fell into the poor outcomes subgroup. As shown in Table 1, poor future outcomes were significantly associated with age, high deprivation decile, low BMI, certain comorbidities, a raised eosinophil percentage (≥2%) and the prescription (in the preceding twelve months) of nebulised bronchodilators, inhaled bronchodilators and an ICS/LABA combination inhaler. A BMI of >25 and rhinosinusitis were associated with a lower risk of poor future outcomes.

Conclusions Poor future clinical outcomes appear to be associated with certain clinical characteristics in a COPD database cohort deemed low risk by DOSE score. These findings warrant further validation in a clinical cohort and investigation into the effect of pre-emptive optimisation of these characteristics on health outcomes.

P54

CAN MULTI-MORBID PHENOTYPES BE DESCRIBED IN PATIENTS WITH ADVANCED COPD USING CLUSTER ANALYSIS?

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Introduction and objectives Comorbidities have a negative effect upon outcomes in patients with COPD, and ‘phenotypes’ of comorbidity have been described.¹ International guidelines recommend that comorbidities “*should be looked for routinely*”.² We aimed to objectively assess comorbidities, and investigate whether comorbidity phenotypes could be described using cluster analysis, in a cohort of patients with advanced COPD.

Methods Patients with advanced COPD were prospectively recruited to undergo a ‘Comprehensive Respiratory Assessment’ (CRA), as previously described.³ 13 comorbidities were objectively assessed using validated definitions and their prevalence determined. K-means cluster analysis was applied with the objective measurements, and FEV₁%predicted. The clusters formed were compared with respect to demographic features, measures of health status, self-reported exacerbation frequency, and future cardiovascular risk.

Results In our ‘low risk’ cohort of 6890 COPD patients, 5000 held sufficient data to be included in the analysis. After four

Abstract P54 Table 1 Features of multi-morbid clusters

Cluster:	1 (n = 51)	2 (n = 50)	3 (n = 36)	4 (n = 36)	5 (n = 30)
Age (years)	62.3 ± 8.5*	72.4 ± 8.0†	64.2 ± 9.1	62.0 ± 9.0*	65.4 ± 7.4
Gender (% male)	52.9%	68.0%	52.8%	72.2%	53.3%
FEV ₁ % predicted	30.4% ± 10.5%	34.0% ± 11.2%†	25.6% ± 6.5%*	30.2% ± 9.9%	34.2% ± 9.8%
Participants using home oxygen (%)	35.3%	42.0%	30.6%	25.0%	53.3%†
COPD Assessment Test (CAT) score	30 ± 5†	24 ± 7	26 ± 6	21 ± 7*	27 ± 5
Eosinophilia (>0.3) in the past 3 years	45.1%	58.0%	44.4%	55.6%	53.3%
Antibiotic courses in past year	5.0 [2.0 – 7.0]	4.0 [2.0 – 6.0]	5.0 [2.0 – 7.0]	2.0 [1.0 – 5.0]*	3.0 [2.0 – 6.0]
Steroid courses in past year	4.0 [2.0 – 7.0]	4.0 [2.0 – 6.0]	4.0 [2.0 – 7.0]	2.0 [1.0 – 5.0]*	3.0 [2.0 – 6.0]
COPD hospitalisations in past year	1.0 [0.0 – 2.0]	0.5 [0.0 – 2.0]	1.0 [0.0 – 1.0]	0.0 [0.0 – 1.0]	0.0 [0.0 – 1.0]
Total hospitalisations in past year	1.0 [1.0 – 3.0]	1.0 [0.0 – 3.0]	1.0 [1.0 – 2.0]	1.0 [0.0 – 2.0]	1.0 [0.0 – 2.0]
Framingham risk (%)	7 ± 5*	12 ± 7†	7 ± 5*	11 ± 7	10 ± 7

Data presented as mean ± standard deviation and median [interquartile range].

* p<0.05, value of cluster is significantly lower than remainder of sample.

† p<0.05, value of cluster is significantly higher than remainder of sample.

Results Between June 2013 and December 2015, 246 patients with advanced COPD underwent a CRA: 61.0% male, mean (SD) age 66.0 (9.1) yrs, FEV₁%predicted 31.1% (10.4%). 98.4% of participants were in GOLD combined assessment group D. The prevalence of the 13 comorbidities ranged from 68.8% (muscle wasting) to 7.7% (renal impairment). 93.9% of participants had at least two of the assessed comorbidities. Cluster analysis was applied to a subsample of 203 participants with sufficient data: five multimorbid clusters were identified according to a significantly higher prevalence of certain comorbidities: Cluster 1 – psychological disease, Cluster 2 – left ventricular systolic dysfunction and anaemia, Cluster 3 – features of cachexia, Cluster 5 – features of metabolic syndrome and vitamin D deficiency. Cluster 4 had a significantly lower prevalence of comorbidities. Table 1 shows the differences between the five clusters in demographics, airflow limitation, health status, hospital admissions, use of antibiotics and steroids, and future cardiovascular risk.

Conclusions In this cohort of patients with advanced COPD, five multi-morbid phenotypes were identified. The phenotypes differed significantly in comorbidity prevalence, airflow limitation, health status and future coronary heart disease risk, however the number of hospital admissions in the past year was similar.

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P55

BENEFITS OF TIOTROPIUM/OLODATEROL ON SYMPTOMS AND HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH MODERATE TO SEVERE COPD WITH CHRONIC BRONCHITIS AND/OR EMPHYSEMA

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Rationale Chronic bronchitis and emphysema are common features of chronic obstructive pulmonary disease (COPD), and are associated with adverse symptoms and poor health-related quality of life. The efficacy and safety of the combination of tiotropium (T), a long-acting muscarinic antagonist, and olodaterol (O), a long-acting β_2 -agonist, has previously been established in COPD. This *post hoc* analysis of data from two Phase III studies was conducted to assess the effects of this combination on lung function, symptoms and health-related quality of life in patients with COPD with chronic bronchitis and/or emphysema.

Methods In two replicate, double-blind, parallel-group, placebo-controlled trials (OTEMTO® 1 and 2), patients with COPD (GOLD 2–3) were randomised to receive T/O 5/5 μ g, T/O 2.5/5 μ g, T 5 μ g or placebo (P) for 12 weeks via Respimat® inhaler. Patients were classified as having chronic bronchitis, emphysema or both based on the investigator's clinical judgement. Lung-function testing was performed during the studies and forced expiratory volume in 1 second (FEV₁) area under the curve from 0–3 hours (AUC_{0–3}) and trough FEV₁ responses (i.e., change from baseline) calculated. Patients also completed the St George's

Respiratory Questionnaire (SGRQ) and the Mahler Transition Dyspnoea Index (TDI). Comparisons between T/O 5/5 μ g, T 5 μ g and P at Week 12 are reported here.

Results The numbers of patients included in the analysis were as follows: bronchitis, 506; emphysema, 476; both bronchitis and emphysema, 206. The baseline characteristics of these three groups were generally comparable. After 12 weeks of treatment, there were significant improvements in FEV₁ AUC_{0–3} and trough FEV₁ in all groups, with similar improvements across the groups. Significant improvements in SGRQ and TDI occurred in all groups at Week 12 and, again, these seemed to be similar (Table).

Conclusions T/O 5/5 μ g resulted in significant improvements in lung function, dyspnoea and health-related quality of life in patients with moderate to severe COPD with bronchitis, emphysema or both bronchitis and emphysema.

Abstract P55 Table 1

Comparison at Week 12		Bronchitis	Emphysema	Both
FEV ₁ AUC _{0–3} response	T/O – P	0.306 (0.264, 0.347) ^b	0.321 (0.277, 0.366) ^b	0.285 (0.203, 0.366) ^b
	T/O – T	0.097 (0.055, 0.138) ^b	0.121 (0.079, 0.162) ^b	0.086 (0.008, 0.165) ^a
Trough FEV ₁ response	T/O – P	0.157 (0.115, 0.199) ^b	0.178 (0.137, 0.220) ^b	0.147 (0.081, 0.212) ^b
	T/O – T	0.024 (–0.018, 0.066)	0.044 (0.004, 0.085) ^a	0.021 (–0.044, 0.087)
SGRQ	T/O – P	–6.16 (–8.19, –4.13) ^b	–6.76 (–8.87, –4.65) ^b	–6.76 (–10.06, –3.47) ^b
	T/O – T	–2.63 (–4.66, –0.61) ^a	–2.24 (–4.33, –0.16) ^a	–3.10 (–6.40, 0.20)
TDI	T/O – P	2.11 (1.52, 2.69) ^b	2.22 (1.63, 2.81) ^b	2.43 (1.47, 3.38) ^b
	T/O – T	0.61 (0.02, 1.19) ^a	0.74 (0.16, 1.32) ^a	0.53 (–0.43, 1.49)

Adjusted mean (95% confidence interval) differences

^ap<0.05; ^bp<0.001

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Please refer to page A271 for declarations of interest in relation to abstract P55.

P56

EFFICACY AND SAFETY OF LONG-ACTING BETA AGONISTS + LONG ACTING MUSCARINIC ANTAGONISTS VS. LONG-ACTING BETA AGONISTS + INHALED CORTICOSTEROIDS IN COPD: A META-ANALYSIS

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Background and significance Current Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines recommend the use of long-acting beta agonists (LABA) plus inhaled corticosteroids (ICS), or long-acting muscarinic antagonists (LAMA) for the treatment of patients with moderate to severe