

Online Supplement

Original Research

Diagnosing Type 2 Inflammation in COPD: Comparison of Blood and Sputum Eosinophil Assessment in the University of California Los Angeles COPD Phenotyping Study

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*Supplemental Table 1: Characteristics of Eosinophilic COPD based on blood eosinophil counts
≥150cells*

Baseline:	BEC≥150 cells/uL (n = 51)	BEC<150 cells/uL (n = 55)	p Value
Age, years (mean±SD)	70.3±7	69.8	0.78
Female, N (%)	15 (29.4%)	26 (47.3%)	0.06
Race (Black)	12 (23.5%)	15 (27.3%)	0.66
BMI (mean±SD)	27.5±5.6	26.9	0.61
Smoking history, pack-years (mean±SD)	50.2±29.5	45.7	0.58
Active smoking, N (%)	11 (21.6%)	14 (25.5%)	0.64
Asthma history, N (%)	18 (35.3%)	9 (16.4%)	0.03*
Atopy, N (%)	16 (32%)	16 (29.6%)	0.79
FEV1 (L) (mean±SD)	1.7±0.7	1.7±0.7	0.58
FEV1, % (mean±SD)	60.8±22.7	64.6±24.5	0.46
FVC, % (mean±SD)	95.4±54.9	90±21	0.98
FEV1/FVC, % (mean±SD)	50.4±17.3	52.6±13.6	0.67
6MWD, m (mean±SD)	372.2±124.9	393.2±137.2	0.58
GOLD stage (1, 2, 3, 4) N (%)			0.61
Stage 0	5 (9.8%)	5 (9.1%)	
Stage 1	7 (13.7%)	12 (21.8%)	
Stage 2	20 (39.2%)	22 (40%)	
Stage 3	16 (31.4%)	11 (20%)	
Stage 4	3 (5.9%)	5 (9.1%)	
GOLD group (CAT - A, B, E) N (%)			0.16
Group A	9 (20%)	19 (38.0%)	
Group B	26 (57.8%)	22 (44.0%)	
Group E	10 (22.2%)	9 (18.0%)	
Exacerbation history in previous year, % positive	0.2±0.4	0.2±0.4	0.70
Emphysema, N (%)	43 (89.6%)	47 (88.7%)	0.88
Chronic bronchitis, N (%)	27 (52.9%)	21 (38.2%)	0.13
On inhaled steroid, N (%)	22 (51.2%)	24 (46.2%)	0.63
mMRC, score (mean±SD)	1.3±1.1	1.1±1.0	0.28
CAT, score (mean±SD)	15.4±8.1	13.1±9.1	0.08
SGRQ, score (mean±SD)	37.1±22.3	31.3±22.4	0.11
WBC, cells/uL x10 ³ (mean±SD)	7.9±6.7	6.7±2.5	0.02*
Ne/Ly ratio (mean±SD)	3.3±2.0	3.5±3.2	0.96
ESR, mm/hr (mean±SD)	21.6±16.5	23.8±20.5	0.73
CRP, mg/L (mean±SD)	0.8±1.3	0.8±1.5	0.36
Fibrinogen, mg/dL (mean±SD)	343.8±92.6	356.9±83.2	0.48
Sputum Eos, % (mean±SD)	11.6±27.3	0.9±2.0	0.25
Sputum Ne, % (mean±SD)	62.5±9.5	64.6±11.1	0.45
Serum Interleukin-5, pg/mL , (mean±SD)	4.5±3.4	3.6±3.0	0.31
Serum Interleukin-4, pg/mL , (mean±SD)	32.9±37.3	51.3±82.7	0.49
Serum IFN-gamma, pg/mL , (mean±SD)	176.9±479.0	120.7±372.4	0.42
Serum TNF-alpha, pg/mL , (mean±SD)	3.7±3.0	3.6±5.5	0.06
Serum Intereukin-6, pg/mL , (mean±SD)	3.3±6.7	5.4±10.8	0.33
Serum Interleukin-33, pg/mL , (mean±SD)	103±214	88.9±237.4	0.39
Serum Interleukin-10, pg/mL , (mean±SD)	3.4±3.8	2.7±2.3	0.59

Serum Interleukin-13RA1, pg/mL , (mean±SD)	5138.4±1608.8	4963.9±1223.6	0.66
Follow up period:			
Exacerbations during 1 year follow up, % present, n (%)	13 (25.5%)	13 (24.5%)	0.91
Number of ECOPD in follow up, N (%)	0.2±0.5	0.2±0.4	0.71
Change in SGRQ	(-2.8)±14.7	1.8±12.5	0.34
Change in CAT	(-2.0)±6.2	0.8±6.1	0.04*

Data are presented as mean±SD or No. (%). BMI: Body mass index; FEV1: Forced expiratory volume in 1 second; FVC: Forced vital capacity; 6MWD = 6-minute walk distance; GOLD: Global Initiative for Chronic Obstructive Lung Disease; CAT: COPD Assessment Test; mMRC: Medical Research Council; SGRQ: St. George's Respiratory Questionnaire; WBC: White blood cell; Ne: Neutrophil; Ly: Lymphocyte; ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein; Eos: Eosinophil; IFN: Interferon; TNF: Tumor necrosis factor; ECOPD: Exacerbation of COPD

Supplemental Table 2: Demographics and clinical characteristics of exacerbation cohort

Exacerbators Cohort (n=13)	
Age, years (mean±SD)	70.8±6.1
Male, N (%)	6 (46.2%)
Race (Black)	2 (15.4%)
BMI (mean±SD)	25.2±4.1
Smoking history, pack-years (mean±SD)	49.5±39.9
Active smoking, N (%)	7 (57.1%)
Asthma history, N (%)	5 (36.6%)
Atopy, N (%)	5 (36.4%)
Chronic bronchitis, N (%)	3 (60%)
FEV1, % (mean±SD)	57.3±11.6
FVC, % (mean±SD)	81.3±13.7
FEV1/FVC, % (mean±SD)	51.7±9.1
CAT, score (mean±SD)	18.8±11.0
SGRQ, score (mean±SD)	41.4±27.6
Sputum Eos, % (mean±SD)	7.2±10.3
Sputum Ne, % (mean±SD)	21.4±31.1

Data are presented as mean±SD or No. (%). BMI: Body mass index; FEV1: Forced expiratory volume in 1 second; FVC: Forced vital capacity; 6MWD = 6-minute walk

distance; GOLD: Global Initiative for Chronic Obstructive Lung Disease; CAT: COPD Assessment Test; mMRC: modified Medical Research Council; SGRQ: St. George's Respiratory Questionnaire; Ne: Neutrophil; Eos: Eosinophil

Supplemental Table 3: Blood biomarkers a) during and b) after COPD exacerbation. Comparison with c) the main cohort with stable COPD

Variable	a) During Exacerbation (n=13)	b) After Exacerbation (n=3)	Difference pre and post (P value)	c) Stable Cohort (N = 106)	Difference *(p value)
WBC, cells/uL x10 ³ (mean±SD)	12.4±5.0	5.9±2.0	n/a	7.3±3.7	<0.01
Neutrophil, % (mean±SD)	80.3±12.3	69.7±7.6	n/a	63.6±10.3	<0.01
Ne/Ly ratio (mean±SD)	13.4±14.6	4.5±2.4	n/a	3.4±2.7	<0.01
BEC, cells/uL, (mean±SD)	101±109	102±29.2	n/a	196.6±170.5	0.02
ESR, mm/hr (mean±SD)	33.8±34.2	37±32.4	n/a	22.7±18.6	0.30
Fibrinogen, mg/dL (mean±SD)	449.2±148.3	575.3±135.2	n/a	350.6±87.6	<0.01
CRP, mg/L (mean±SD)	5.8±9.7	4.4±2.2	n/a	0.8±1.4	<0.01

Data are presented as mean±SD. WBC: White Blood Cells; NLR: Neutrophil to Lymphocyte Ratio; BEC: Blood Eosinophil Count; ESR: Erythrocyte Sedimentation Rate; CRP: C-reactive Protein