

SUPPLEMENTARY INFORMATION

TITLE: The Clinical Features, Bacteriology of Endotracheal Aspirates and Treatment

Outcomes of Patients with Chronic Obstructive Pulmonary Disease and Community-acquired Pneumonia in An Intensive Care Unit in Taiwan with An Emphasis on Eosinophilia Versus Non-eosinophilia: a retrospective case-control study.

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1 **Appendix S1- Data collection, study group classification and identification of cases and**
2 **controls**

3 For each participant, the investigators completed a detailed patient record form which
4 included age, gender, smoking history, the most recent spirometry results prior to this
5 admission as performed and interpreted based on the American Thoracic Society statement,
6 which defines a positive bronchodilator test as forced expiratory volume in one second or
7 forced vital capacity improvement from pre-dose value by $\geq 12\%$ and ≥ 200 ml.[1] In
8 addition, the type of chronic obstructive pulmonary disease pharmacological maintenance
9 medication, modified Glasgow Coma Scale with verbal score as one,[2] previous history of
10 admissions and use of antibiotics within the 3 months prior to entry to the study, pneumonia
11 severity index which classifies patients with community-acquired pneumonia into five
12 ordered risk classes,[3,4] CURB-65 scores ranging from 0 to 5 based on confusion status,
13 urea level, respiratory rate, blood pressure, and age to estimate mortality of community-
14 acquired pneumonia, chest X-ray findings, initial laboratory findings upon arrival at the
15 emergency department, ventilator settings upon initiation of invasive mechanical ventilation,
16 Acute Physiology and Chronic Health Evaluation II score, other medications, co-morbidities
17 and microbiological testing of endotracheal aspirates (EAs) were also recorded. The results of
18 microbiology of EAs, which were evaluated by the central laboratory of the study institute
19 based on standard procedures,[5,6] only included samples collected via trans-bronchial
20 aspirates upon insertion of an endotracheal tube regardless of whether or not empiric
21 antibiotic therapy had been initiated and classified into potentially pathogenic
22 microorganisms (PPMs) or non-PPMs.[7] Corresponding antimicrobial susceptibility was
23 assessed using the disk diffusion method recommended by the National Committee for
24 Clinical Standards.[8] In addition, the in-respiratory intensive care unit (RICU) hospital
25 course with validated treatment outcomes including RICU length of stay, weaning outcomes,

1 death, and readmission arising from respiratory diseases within 3 months were also
2 recorded.[9-11] All patient information was anonymized and de-identified prior to analysis.
3 All the available data were analyzed after allowing for missing information, although extreme
4 data were removed from this study.

5 The participants with a blood eosinophil level > 2% of the total leukocyte count were
6 classified into the high eosinophil percentage group, and the other participants were classified
7 into the low eosinophil percentage group. The participants with an absolute blood eosinophil
8 count > 300 cells/ μ L, calculated as the percentage of eosinophils multiplied by the white
9 blood cell count, were defined as the high absolute eosinophil count group, and the remaining
10 participants were classified as the low absolute eosinophil count group.

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16 **Appendix S2- RICU weaning process and definitions of weaning outcomes**

17 During the study period, consistent protocol-driven ventilator weaning was applied based on
18 the standards of the RICU at our institute, and implemented when the patients met all of the
19 following criteria for weaning: (1) the causes of respiratory failure had been resolved; (2) no
20 evidence of hemodynamic instability; (3) no inotropic agents were being used; (4) systolic
21 blood pressure >100 mmHg; (5) heart rate <110 and >50 beats per minute; (6) body
22 temperature <38°C; (7) fraction of inspired oxygen <40%; and (8) positive end-expiratory
23 pressure ≤8. During the weaning process, the pressure support ventilation mode was used and
24 gradually decreased (1-2 cm H2O every 1-2 hours) followed by the T-piece trial. Patients
25 were extubated when they passed the T-piece trial. Successful weaning was defined as

1 liberation from invasive mechanical ventilator support on discharge from the RICU.

2 Otherwise, failed weaning was the case.

3

4 **Appendix S3- Statistical analysis**

5 Comparisons between the high and low eosinophil percentage groups and between the high

6 and low absolute eosinophil count groups were conducted using the independent t-test for

7 continuous variables and the chi-square test for categorical variables. Multivariate logistic

8 regression models were used to analyze associated factors for various in-RICU adverse

9 outcomes if they were significant in univariate analysis. In the comparison of independent

10 variables (cases versus controls) and odds ratio, confidence interval of 95% was obtained.

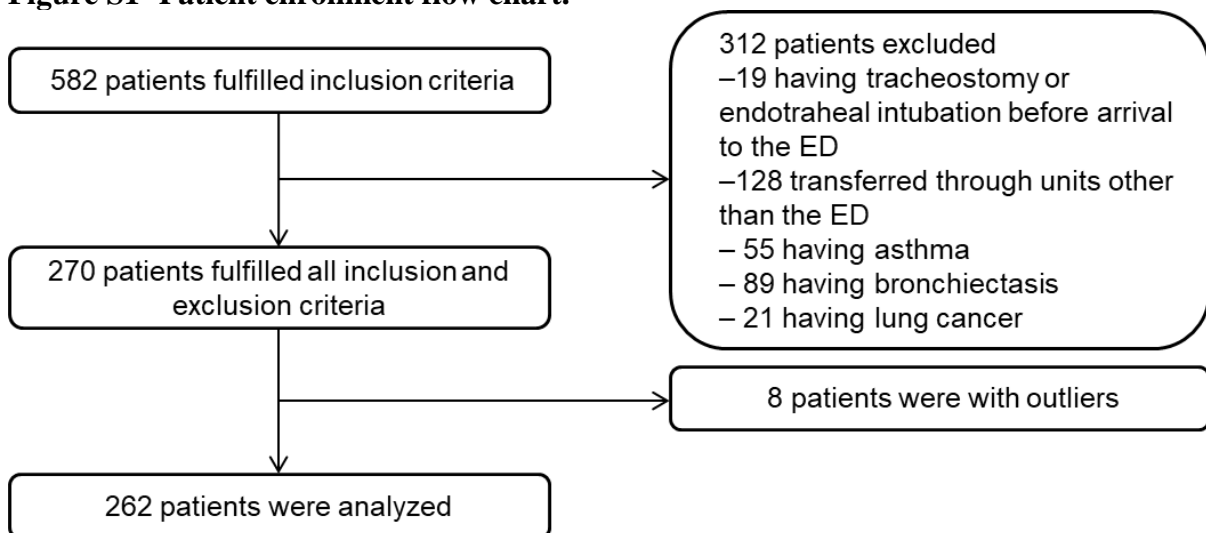
11 Statistical significance was set at $p < 0.05$. Statistical analysis was performed using SPSS

12 software version 18.0 (SPSS Inc., Chicago, IL, USA).

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15 **Figure S1- Patient enrollment flow chart.**



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19 Figure legend: Abbreviations: ED, emergency department.

Table S1- Demographic and clinical characteristics of cases and controls by respiratory intensive care unit length of stay

	RICU length of stay >14 days		p value
	Case (n=105)	Control (n=157)	
Age (years)	79.0±8.7	78.5±9.0	0.684
Male gender	96 (91.4%)	145 (92.4%)	0.819
Smoking history			0.708
Never	16 (15.2%)	30 (19.1%)	
Ex-smoker	57 (54.3%)	83 (52.9%)	
Current smoker	32 (30.5%)	44 (28.0%)	
Spirometry (post-bronchodilator test)			
FEV1/FVC (%)	51.0±12.0	52.4±10.8	0.310
FEV1 (L)	1.0±0.4	1.1±0.5	0.064
Positive bronchodilator test	8 (7.6%)	26 (16.6%)	0.054
COPD severity (GOLD spirometric classification)			0.434
I	14 (13.3%)	29 (18.5%)	
II	37 (35.2%)	62 (39.5%)	
III	42 (40.0%)	49 (31.2%)	
IV	12 (11.4%)	17 (10.8%)	
COPD pharmacological maintenance			0.434
ICS/LABA	18 (17.1%)	23 (14.6%)	
ICS/LABA + LAMA	22 (21.0%)	25 (15.9%)	
LAMA alone	9 (8.6%)	12 (7.6%)	
LABA alone	0 (0.0%)	3 (1.9%)	
LABA + LAMA	0 (0.0%)	2 (1.3%)	
None	56 (53.3%)	92 (58.6%)	
Prior antibiotic use within 3 months	27 (25.7%)	53 (33.8%)	0.212
Prior admission within 3 months	20 (19.0%)	42 (26.8%)	0.197
Co-morbidities			0.334
Cardiovascular disease [‡]	59 (56.2%)	92 (58.6%)	
Cerebrovascular accident	23 (21.9%)	26 (16.6%)	
Diabetes mellitus	13 (12.4%)	33 (21.0%)	
Hypertension	40 (38.1%)	71 (45.2%)	
Malignancy (except for lung cancer)	18 (17.1%)	34 (21.7%)	
Modified GCS	8.1±3.0	8.8±2.8	0.042*
Pneumonia severity index			0.895
I	0 (0.0%)	1 (0.6%)	
II	2 (1.9%)	5 (3.2%)	
III	16 (15.2%)	24 (15.3%)	
IV	52 (49.5%)	75 (47.8%)	
V	35 (33.3%)	52 (33.1%)	
CURB-65 scores			0.299
0-1	33 (31.4%)	55 (35.0%)	
2	48 (45.7%)	78 (49.7%)	

3-5	24 (22.9%)	24 (15.3%)	
Chest X-ray findings			0.216
Unilateral	93 (88.6%)	129 (82.2%)	
Bilateral	12 (11.4%)	28 (17.8%)	
Laboratory findings			
WBC (x1000)/ μ L	10.6 \pm 4.2	11.0 \pm 5.2	0.522
Blood eosinophil percentage > 2%	2 (1.9%)	30 (19.1%)	0.000*
Blood absolute eosinophil count > 300 cells/ μ L	61 (58.1%)	108 (68.8%)	0.101
Hemoglobin (g/dL)	12.0 \pm 2.2	11.7 \pm 2.4	0.312
High-sensitive CRP (mg/dL)			0.805
Available number	104 (99.0%)	151 (96.2%)	
Mean \pm SD	8.0 \pm 9.0	8.3 \pm 8.2	
Albumin (g/dL)			0.150
Available number	94 (89.5%)	142 (90.4%)	
Mean \pm SD	3.0 \pm 0.7	3.1 \pm 0.6	
BUN (mg/dL)			0.641
Available number	103 (98.1%)	157 (100%)	
Mean \pm SD	27.8 \pm 15.2	28.8 \pm 17.2	
Creatinine (mg/dL)	1.4 \pm 1.2	1.5 \pm 1.4	0.376
pH	7.4 \pm 0.1	7.4 \pm 0.1	0.132
PaCO ₂ (mmHg)	41.4 \pm 10.6	40.5 \pm 9.7	0.450
PaO ₂ /FiO ₂ ratio			0.495
Available number	96 (91.4%)	147 (93.6%)	
Mean \pm SD	222.7 \pm 112.7	212.6 \pm 112.7	
Lactate (mg/dL)			0.889
Available number	87 (82.9%)	124 (79.0%)	
Mean \pm SD	19.8 \pm 16.1	19.6 \pm 11.5	
APACHE II score	22.2 \pm 6.3	21.0 \pm 5.7	0.130
Medications			
Systemic corticosteroids			0.697
Available number	103 (98.1%)	156 (80.3%)	
Use	90 (87.4%)	140 (89.7%)	
Use of antibiotics	105 (100%)	157 (100%)	NA
Use of antibiotics while microbiological sampling	44 (41.9%)	72 (45.9%)	0.614
Ventilator settings			
Volume control mode	105 (100%)	157 (100%)	NA
Tidal volume (ml/kg)			0.841
Available number	83 (79.0%)	122 (77.7%)	
Mean \pm SD	9.0 \pm 2.5	9.1 \pm 2.0	
Respiratory rate (breaths per minute)	14.3 \pm 1.0	14.3 \pm 0.9	0.792
Use of NIPPV after successful liberation from IMV support during the RICU stay	16 (15.2%)	31 (19.7%)	0.876
Potentially pathogenic microorganisms			

<i>Pseudomonas aeruginosa</i>	22 (21.0%)	23 (14.6%)	0.773
<i>Acinetobacter baumannii</i> complex	11 (10.5%)	19 (12.1%)	0.353
<i>Klebsiella pneumoniae</i>	12 (11.4%)	13 (8.3%)	0.997
<i>Haemophilus influenzae</i>	7 (6.7%)	8 (5.1%)	1.000
<i>Staphylococcus aureus</i>	7 (6.7%)	8 (5.1%)	1.000
<i>Escherichia coli</i>	4 (3.8%)	6 (3.8%)	0.755
<i>Streptococcus pneumoniae</i>	5 (4.8%)	1 (0.6%)	0.095
<i>Enterobacter species</i>	3 (2.9%)	3 (1.9%)	1.000
<i>Stenotrophomonas maltophilia</i>	2 (1.9%)	3 (1.9%)	1.000
<i>Proteus species</i>	0 (0.0%)	2 (1.3%)	0.500
<i>Serratia marcescens</i>	1 (1.0%)	1 (0.6%)	1.000

*p<0.05.

‡ Cardiovascular disease included ischemic heart disease, heart failure, and atrial fibrillation. Abbreviations: FEV1, forced expiratory volume in one second; FVC, forced vital capacity; COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease; ICS, inhaled corticosteroids; LABA, long-acting β 2-agonist; LAMA, long-acting muscarinic antagonist; GCS, Glasgow Coma Scale; WBC, white blood count; CRP, C reactive protein; SD, standard deviation; BUN, blood urea nitrogen; PaCO₂, partial pressure of carbon dioxide; PaO₂, arterial oxygen partial pressure; FiO₂, fractional inspired oxygen; APACHE II score, Acute Physiology and Chronic Health Evaluation II score; NA, not applicable; NIPPV, noninvasive positive pressure ventilation; IMV, invasive mechanical ventilation; RICU, respiratory intensive care unit.

Table S2- Demographic and clinical characteristics of cases and controls by weaning**outcomes**

	Failed weaning		p value
	Case (n=125)	Control (n=137)	
Age (years)	79.0±8.5	78.4±9.2	0.584
Male gender	115 (92.0%)	126 (92.0%)	1.000
Smoking history			0.939
Never	22 (17.6%)	24 (17.5%)	
Ex-smoker	68 (54.4%)	72 (52.6%)	
Current smoker	35 (28.0%)	41 (29.9%)	
Spirometry (post-bronchodilator test)			
FEV1/FVC (%)	51.5±11.0	52.2±11.6	0.608
FEV1 (L)	1.0±0.5	1.1±0.5	0.571
Positive bronchodilator test	17 (13.6%)	17 (12.4%)	0.918
COPD severity (GOLD spirometric classification)			0.269
I	17 (13.6%)	26 (19.0%)	
II	49 (39.2%)	50 (36.5%)	
III	41 (32.8%)	50 (36.5%)	
IV	18 (14.4%)	11 (8.0%)	
COPD pharmacological maintenance			0.546
ICS/LABA	18 (14.4%)	23 (16.8%)	
ICS/LABA + LAMA	22 (17.6%)	25 (18.2%)	
LAMA alone	13 (10.4%)	8 (5.8%)	
LABA alone	1 (0.8%)	2 (1.5%)	
LABA + LAMA	0 (0.0%)	2 (1.5%)	
None	71 (56.8%)	77 (56.2%)	
Prior antibiotic use within 3 months	45 (36.0%)	35 (25.5%)	0.089
Prior admission within 3 months	35 (28.0%)	27 (19.7%)	0.152
Co-morbidities			0.871
Cardiovascular disease [‡]	61 (48.8%)	90 (65.7%)	
Cerebrovascular accident	19 (15.2%)	30 (21.9%)	
Diabetes mellitus	20 (16.0%)	26 (19.0%)	
Hypertension	50 (40.0%)	61 (44.5%)	
Malignancy (except for lung cancer)	34 (27.2%)	18 (13.1%)	
Modified GCS	8.4±2.9	8.6±3.0	0.506
Pneumonia severity index			0.227
I	0 (0.0%)	1 (0.7%)	
II	5 (4.0%)	2 (1.5%)	
III	14 (11.2%)	26 (19.0%)	
IV	61 (48.8%)	66 (48.2%)	
V	45 (36.0%)	42 (30.7%)	
CURB-65 scores			0.966
0-1	41 (32.8%)	47 (34.3%)	
2	61 (48.8%)	65 (47.4%)	

3-5	23 (18.4%)	25 (18.2%)	
Chest X-ray findings			0.374
Unilateral	109 (87.2%)	113 (82.5%)	
Bilateral	16 (12.8%)	24 (17.5%)	
Laboratory findings			
WBC (x1000)/ μ L	10.8 \pm 5.1	10.8 \pm 4.5	0.909
Blood eosinophil percentage > 2%	10 (8.0%)	22 (16.1%)	0.072
Blood absolute eosinophil count > 300 cells/ μ L	81 (64.8%)	88 (64.2%)	1.000
Hemoglobin (g/dL)	11.8 \pm 2.3	11.9 \pm 2.3	0.598
High-sensitive CRP (mg/dL)			0.699
Available number	122 (97.6%)	133 (97.1%)	
Mean \pm SD	8.4 \pm 8.8	8.0 \pm 8.2	
Albumin (g/dL)			0.753
Available number	116 (92.8%)	120 (87.6%)	
Mean \pm SD	3.1 \pm 0.6	3.0 \pm 0.7	
BUN (mg/dL)			0.489
Available number	124 (99.2%)	136 (99.3%)	
Mean \pm SD	29.2 \pm 16.3	27.8 \pm 16.5	
Creatinine (mg/dL)	1.4 \pm 1.3	1.5 \pm 1.4	0.633
pH	7.4 \pm 0.1	7.4 \pm 0.1	0.504
PaCO ₂ (mmHg)	41.4 \pm 10.4	40.4 \pm 9.9	0.422
PaO ₂ /FiO ₂ ratio			0.461
Available number	116 (92.8%)	127 (92.7%)	
Mean \pm SD	211.0 \pm 109.4	221.7 \pm 115.7	
Lactate (mg/dL)			0.410
Available number	97 (77.6%)	114 (83.2%)	
Mean \pm SD	20.5 \pm 13.0	19.0 \pm 14.0	
APACHE II score			
Medications			0.069
Systemic corticosteroids	124 (99.2%)	135 (98.5%)	
Available number	105 (84.7%)	125 (92.6%)	
Use	125 (100%)	137 (100%)	NA
Use of antibiotics	61 (48.8%)	55 (40.1%)	0.199
Use of antibiotics while microbiological sampling			
Ventilator settings	125 (100%)	137 (100%)	NA
Volume control mode			0.111
Tidal volume (ml/kg)			
Available number	93 (74.4%)	112 (81.8%)	
Mean \pm SD	9.3 \pm 2.3	8.9 \pm 2.1	
Respiratory rate (breaths per minute)	14.4 \pm 1.0	14.3 \pm 0.8	0.442
Use of NIPPV after successful liberation from IMV support during the RICU stay	-	47 (34.3%)	NA
Potentially pathogenic microorganisms			

<i>Pseudomonas aeruginosa</i>	28 (22.4%)	17 (12.4%)	0.526
<i>Acinetobacter baumannii</i> complex	14 (11.2%)	16 (11.7%)	0.280
<i>Klebsiella pneumoniae</i>	14 (11.2%)	11 (8.0%)	1.000
<i>Haemophilus influenzae</i>	5 (4.0%)	10 (7.3%)	0.092
<i>Staphylococcus aureus</i>	9 (7.2%)	6 (4.4%)	1.000
<i>Escherichia coli</i>	7 (5.6%)	3 (2.2%)	0.518
<i>Streptococcus pneumoniae</i>	5 (4.0%)	1 (0.7%)	0.239
<i>Enterobacter species</i>	4 (3.2%)	2 (1.5%)	0.701
<i>Stenotrophomonas maltophilia</i>	3 (2.4%)	2 (1.5%)	1.000
<i>Proteus species</i>	1 (0.8%)	1 (0.7%)	1.000
<i>Serratia marcescens</i>	2 (1.6%)	0 (0.0%)	0.507

*p<0.05.

‡ Cardiovascular disease included ischemic heart disease, heart failure, and atrial fibrillation.

Abbreviations: see Table S1.

Table S3- Demographic and clinical characteristics of cases and controls by death

	Death		P value
	Case (n=40)	Control (n=222)	
Age (years)	81.6±7.7	78.2±9.0	0.026*
Male gender	36 (90.0%)	205 (92.3%)	0.539
Smoking history			0.026*
Never	13 (32.5%)	33 (14.9%)	
Ex-smoker	18 (45.0%)	122 (55.0%)	
Current smoker	9 (22.5%)	67 (30.2%)	
Spirometry (post-bronchodilator test)			
FEV1/FVC (%)	52.7±10.5	51.7±11.4	0.602
FEV1 (L)	1.0±0.4	1.1±0.5	0.876
Positive bronchodilator test	6 (15.0%)	28 (12.6%)	0.874
COPD severity (GOLD spirometric classification)			
I	6 (5.0%)	37 (16.7%)	
II	17 (42.5%)	82 (36.9%)	
III	15 (37.5%)	76 (34.2%)	
IV	2 (5.0%)	27 (12.2%)	
COPD pharmacological maintenance			
ICS/LABA	8 (20.0%)	33 (14.9%)	
ICS/LABA + LAMA	4 (10.0%)	43 (19.4%)	
LAMA alone	3 (7.5%)	18 (8.1%)	
LABA alone	1 (2.5%)	2 (0.9%)	
LABA + LAMA	0 (0.0%)	2 (0.9%)	
None	24 (60.0%)	124 (55.9%)	
Prior antibiotic use within 3 months	16 (40.0%)	64 (28.8%)	0.220
Prior admission within 3 months	15 (37.5%)	47 (21.2%)	0.042*
Co-morbidities			0.920
Cardiovascular disease [‡]	19 (47.5%)	132 (59.5%)	
Cerebrovascular accident	5 (12.5%)	44 (19.8%)	
Diabetes mellitus	7 (17.5%)	39 (17.6%)	
Hypertension	18 (45.0%)	93 (41.9%)	
Malignancy (except for lung cancer)	16 (40.0%)	36 (16.2%)	
Modified GCS	8.6±2.6	8.5±3.0	0.819
Pneumonia severity index			0.028*
I	0 (0.0%)	1 (0.5%)	
II	1 (2.5%)	6 (2.7%)	
III	1 (2.5%)	39 (17.6%)	
IV	17 (42.5%)	110 (49.5%)	
V	21 (52.5%)	66 (29.7%)	
CURB-65 scores			0.840
0-1	14 (35.0%)	74 (33.3%)	
2	20 (50.0%)	106 (47.7%)	
3-5	6 (15.0%)	42 (18.9%)	
Chest X-ray findings			1.000

Unilateral	34 (85.0%)	188 (84.7%)	
Bilateral	6 (15.0%)	34 (15.3%)	
Laboratory findings			
WBC (x1000)/ μ L	10.5 \pm 4.7	10.9 \pm 4.8	0.700
Blood eosinophil percentage > 2%	7 (17.5%)	25 (11.3%)	0.293
Blood absolute eosinophil count > 300 cells/ μ L	29 (72.5%)	140 (63.1%)	0.333
Hemoglobin (g/dL)	11.5 \pm 2.2	11.9 \pm 2.3	0.318
High-sensitive CRP (mg/dL)			0.138
Available number	38 (95.0%)	217 (97.7%)	
Mean \pm SD	10.1 \pm 9.6	7.8 \pm 8.3	
Albumin (g/dL)			0.767
Available number	36 (90.0%)	200 (90.1%)	
Mean \pm SD	3.1 \pm 0.6	3.0 \pm 0.7	
BUN (mg/dL)			0.525
Available number	40 (100%)	220 (99.1%)	
Mean \pm SD	30.0 \pm 17.2	282.2 \pm 16.3	
Creatinine (mg/dL)	1.6 \pm 1.4	1.4 \pm 1.3	0.428
pH	7.5 \pm 0.1	7.4 \pm 0.1	0.190
PaCO ₂ (mmHg)	40.1 \pm 9.2	41.0 \pm 10.3	0.615
PaO ₂ /FiO ₂ ratio			0.029*
Available number	36 (90.0%)	207 (93.2%)	
Mean \pm SD	178.9 \pm 97.2	223.2 \pm 114.0	
Lactate (mg/dL)			0.161
Available number	29 (72.5%)	182 (82.0%)	
Mean \pm SD	23.0 \pm 14.0	19.2 \pm 13.4	
APACHE II score	24.3 \pm 5.6	21.0 \pm 5.9	0.001*
Medications			
Systemic corticosteroids			0.786
Available number	40 (100%)	219 (98.6%)	
Use	35 (87.5%)	195 (89.0%)	
Use of antibiotics	40 (100%)	222 (100%)	NA
Use of antibiotics while microbiological sampling	17 (42.5%)	99 (44.6%)	0.942
Ventilator settings			
Volume control mode	40 (100%)	222 (100%)	NA
Tidal volume (ml/kg)			0.077
Available number	29 (72.5%)	176 (79.3%)	
Mean \pm SD	9.8 \pm 2.4	9.0 \pm 2.1	
Respiratory rate (breaths per minute)	14.5 \pm 1.0	14.3 \pm 0.9	0.284
Use of NIPPV after successful liberation from IMV support during the RICU stay	-	47 (21.2%)	NA
Potentially pathogenic microorganisms			
<i>Pseudomonas aeruginosa</i>	13 (32.5%)	32 (14.4%)	0.045*
<i>Acinetobacter baumannii</i> complex	3 (7.5%)	27 (12.2%)	0.316

<i>Klebsiella pneumoniae</i>	6 (15.0%)	19 (8.6%)	0.402
<i>Haemophilus influenzae</i>	1 (2.5%)	14 (6.3%)	0.311
<i>Staphylococcus aureus</i>	3 (7.5%)	12 (5.4%)	0.735
<i>Escherichia coli</i>	2 (5.0%)	8 (3.6%)	1.000
<i>Streptococcus pneumoniae</i>	0 (0.0%)	6 (2.7%)	0.593
<i>Enterobacter species</i>	0 (0.0%)	6 (2.7%)	0.593
<i>Stenotrophomonas maltophilia</i>	1 (2.5%)	4 (1.8%)	1.000
<i>Proteus species</i>	0 (0.0%)	2 (0.9%)	1.000
<i>Serratia marcescens</i>	0 (0.0%)	2 (0.9%)	1.000

*p<0.05.

‡ Cardiovascular disease included ischemic heart disease, heart failure, and atrial fibrillation.

Abbreviations: see Table S1.

Table S4- Demographic and clinical characteristics of cases and controls by readmission arising from respiratory diseases within 3 months

	Readmission arising from respiratory diseases within 3 months		p value
	Case (n=52)	Control (n=210)	
Age (years)	77.4±10.4	79.0±8.4	0.297
Male gender	49 (94.2%)	192 (91.4%)	0.775
Smoking history			0.129
Never	8 (15.4%)	38 (18.1%)	
Ex-smoker	23 (44.2%)	117 (55.7%)	
Current smoker	21 (40.4%)	55 (26.2%)	
Spirometry (post-bronchodilator test)			
FEV1/FVC (%)	49.6±11.8	52.4±11.1	0.110
FEV1 (L)	1.0±0.4	1.1±0.5	0.128
Positive bronchodilator test	6 (11.5%)	28 (13.3%)	0.909
COPD severity (GOLD spirometric classification)			0.027*
I	9 (17.3%)	34 (16.2%)	
II	11 (21.2%)	88 (41.9%)	
III	26 (50.0%)	65 (31.0%)	
IV	6 (11.5%)	23 (11.0%)	
COPD pharmacological maintenance			
ICS/LABA	6 (11.5%)	35 (16.7%)	
ICS/LABA + LAMA	12 (23.1%)	35 (16.7%)	
LAMA alone	3 (5.8%)	18 (8.6%)	
LABA alone	2 (3.8%)	1 (0.5%)	
LABA + LAMA	1 (1.9%)	1 (0.5%)	
None	28 (53.8%)	120 (57.1%)	
Prior antibiotic use within 3 months	19 (36.5%)	61 (29.0%)	0.378
Prior admission within 3 months	16 (30.8%)	46 (21.9%)	0.244
Co-morbidities			0.751
Cardiovascular disease [‡]	32 (61.5%)	119 (56.7%)	
Cerebrovascular accident	10 (19.2%)	39 (18.6%)	
Diabetes mellitus	10 (19.2%)	36 (17.1%)	
Hypertension	25 (48.1%)	86 (41.0%)	
Malignancy (except for lung cancer)	9 (17.3%)	43 (20.5%)	
Modified GCS	8.3±3.1	8.6±2.9	0.450
Pneumonia severity index			0.280
I	1 (1.9%)	0 (0.0%)	
II	1 (1.9%)	6 (2.9%)	
III	7 (13.5%)	33 (15.7%)	
IV	28 (53.8%)	99 (47.1%)	
V	15 (28.8%)	72 (34.3%)	
CURB-65 scores			0.325
0-1	13 (25.0%)	75 (35.7%)	

2	29 (55.8%)	97 (46.2%)	
3-5	10 (19.2%)	38 (18.1%)	
Chest X-ray findings			0.809
Unilateral	43 (82.7%)	179 (85.2%)	
Bilateral	9 (17.3%)	31 (14.8%)	
Laboratory findings			
WBC (x1000)/ μ L	10.8 \pm 5.0	10.8 \pm 4.7	0.994
Blood eosinophil percentage > 2%	8 (15.4%)	24 (11.4%)	0.587
Blood absolute eosinophil count > 300 cells/ μ L	33 (63.5%)	136 (64.8%)	0.989
Hemoglobin (g/dL)	11.8 \pm 2.5	11.9 \pm 2.3	0.819
High-sensitive CRP (mg/dL)			0.471
Available number	50 (96.2%)	205 (97.6%)	
Mean \pm SD	7.4 \pm 8.2	8.4 \pm 8.6	
Albumin (g/dL)			0.769
Available number	41 (88.5%)	190 (90.5%)	
Mean \pm SD	3.1 \pm 0.6	3.0 \pm 0.7	
BUN (mg/dL)			0.635
Available number	51 (98.1%)	209 (99.5%)	
Mean \pm SD	29.4 \pm 18.8	28.2 \pm 15.8	
Creatinine (mg/dL)	1.5 \pm 1.8	1.4 \pm 1.2	0.845
pH	7.4 \pm 0.1	7.4 \pm 0.1	0.993
PaCO ₂ (mmHg)	41.6 \pm 10.4	40.7 \pm 10.0	0.548
PaO ₂ /FiO ₂ ratio			0.150
Available number	47 (90.4%)	196 (93.3%)	
Mean \pm SD	241.1 \pm 132.5	210.7 \pm 106.8	
Lactate (mg/dL)			0.732
Available number	43 (82.7%)	168 (80.0%)	
Mean \pm SD	20.5 \pm 19.3	19.5 \pm 11.7	
APACHE II score	21.9 \pm 5.0	21.4 \pm 6.2	0.480
Medications			
Systemic corticosteroids			0.515
Available number	52 (100%)	207 (98.6%)	
Use	48 (92.3%)	182 (87.9%)	
Use of antibiotics	52 (100%)	210 (100%)	NA
Use of antibiotics while microbiological sampling	21 (40.4%)	95 (45.2%)	0.635
Ventilator settings			
Volume control mode	52 (100%)	210 (100%)	NA
Tidal volume (ml/kg)			0.909
Available number	42 (80.8%)	163 (77.6%)	
Mean \pm SD	9.0 \pm 2.2	9.1 \pm 2.2	
Respiratory rate (breaths per minute)	14.4 \pm 0.8	14.3 \pm 1.0	0.723
Use of NIPPV after successful liberation from IMV support during the RICU stay	11 (21.2%)	36 (17.1%)	0.945

Potentially pathogenic microorganisms			
<i>Pseudomonas aeruginosa</i>	9 (17.3%)	36 (17.1%)	0.645
<i>Acinetobacter baumannii</i> complex	6 (11.5%)	24 (11.4%)	0.880
<i>Klebsiella pneumoniae</i>	3 (5.8%)	22 (10.5%)	0.573
<i>Haemophilus influenzae</i>	4 (7.7%)	11 (5.2%)	0.299
<i>Staphylococcus aureus</i>	2 (3.8%)	13 (6.2%)	1.000
<i>Escherichia coli</i>	1 (1.9%)	9 (4.3%)	1.000
<i>Streptococcus pneumoniae</i>	1 (1.9%)	5 (2.4%)	1.000
<i>Enterobacter species</i>	1 (1.9%)	5 (2.4%)	1.000
<i>Stenotrophomonas maltophilia</i>	0 (0.0%)	5 (2.4%)	0.588
<i>Proteus species</i>	1 (1.9%)	1 (0.5%)	0.318
<i>Serratia marcescens</i>	0 (0.0%)	2 (1.0%)	1.000

*p<0.05.

‡ Cardiovascular disease included ischemic heart disease, heart failure, and atrial fibrillation.

Abbreviations: see Table S1.