

## Supplemental material

**Table S1: Results of further patient-reported outcomes**

Group	T <sub>1</sub>		T <sub>2</sub>				
	M (Median)	SD (Range)	M (Median)	SD (Range)	Delta [95% CI]	d [95% CI]	RM-ANOVA F(df), p
Dyspnea							
NRS “How burdening or debilitating is your dyspnea at rest?” (☺ 0 – 10 ☹)							
All patients N = 81	2.01 (1.00)	2.28 (0.00 – 10.00)	0.95 (0.00)	1.59 (0.00 – 9.00)	-1.06 [-1.44; -0.68]	-0.62 [-0.86; -0.38]	F <sub>T</sub> = 24.4(1), p < 0.001  F <sub>G</sub> = 4.54(2), p = 0.013  F <sub>G·T</sub> = 0.601(2), p = 0.551
A N = 43	1.56 (1.00)	2.03 (0.00 – 8.00)	0.54 (0.00)	0.83 (0.00 – 3.00)	-1.02 [-1.54; -0.51]	-0.61 [-0.93; -0.28]	
B N = 23	2.26 (2.00)	1.89 (0.00 – 6.00)	0.91 (1.00)	1.24 (0.00 – 5.00)	-1.35 [-2.16; -0.54]	-0.72 [-1.17; -0.25]	
C N = 15	2.93 (2.00)	3.17 (0.00 – 10.00)	2.20 (2.00)	2.78 (0.00 – 9.00)	-0.73 [-1.61; 0.14]	-0.46 [-0.99; 0.08]	
NRS “How burdening or debilitating is your dyspnea on exertion?” (☺ 0 – 10 ☹)							
All patients N = 81	6.03 (6.00)	2.72 (0.00 – 10.00)	3.91 (4.00)	2.93 (0.00 – 10.00)	-2.11 [-2.70; -1.52]	-0.75 [-1.04; -0.54]	F <sub>T</sub> = 33.3(1), p < 0.001  F <sub>G</sub> = 1.39(2), p = 0.254  F <sub>G·T</sub> = 1.92(2), p = 0.152
A N = 43	5.79 (6.00)	2.77 (0.00 – 10.00)	3.42 (3.00)	2.58 (0.00 – 10.00)	-2.37 [-3.18; -1.57]	-0.90 [-1.25; -0.54]	
B N = 23	6.29 (6.00)	2.44 (1.00 – 10.00)	3.92 (3.00)	3.06 (0.00 – 10.00)	-2.38 [-3.59; -1.16]	-0.83 [-1.29; -0.36]	
C N = 15	6.29 (6.50)	3.17 (0.00 – 10.00)	5.43 (6.00)	3.37 (0.00 – 10.00)	-0.86 [-2.07; 0.36]	-0.41 [-0.95; 0.15]	
Cough, sputum, and pain							
NRS “How intense is your cough?” (☺ 0 – 10 ☹)							
All patients N = 82	1.92 (1.00)	2.37 (0.00 – 10.00)	1.05 (0.00)	1.89 (0.00 – 10.00)	-0.87 [-1.31; -0.43]	-0.43 [-0.66; -0.21]	F <sub>T</sub> = 12.2(1), p < 0.001  F <sub>G</sub> = 3.4(2), p = 0.040
A N = 43	1.81 (1.00)	2.09 (0.00 – 7.00)	0.70 (0.00)	0.89 (0.00 – 3.00)	-1.12 [-1.65; -0.58]	-0.64 [-0.96; 0.31]	
B N = 25	1.36 (0.00)	1.98 (0.00 – 8.00)	1.08 (0.00)	2.12 (0.00 – 7.00)	-0.28 [-0.58; 0.21]	-0.19 [-0.58; 0.21]	

C N = 14	3.21 (2.50)	3.36 (0.00 – 10.00)	2.07 (1.00)	3.15 (0.00 – 10.00)	-1.14 [-2.97; 0.68]	-0.36 [-0.90; 0.19]	$F_{G^*T} = 1.57(2)$ , $p = 0.214$
NRS “How big is the amount of phlegm that you expectorate?” (☹ 0 – 10 ☺)							
All patients N = 81	1.11 (0.00)	1.80 (0.00 – 7.00)	0.58 (0.00)	1.17 (0.00 – 5.00)	-0.53 [-0.83; -0.23]	-0.40 [-0.62; -0.17]	$F_T = 12.6(1)$ , $p < 0.001$  $F_G = 1.4(2)$ , $p = 0.253$  $F_{G^*T} = 0.3(2)$ , $p = 0.738$
A N = 42	0.91 (0.00)	1.53 (0.00 – 5.00)	0.48 (0.00)	0.86 (0.00 – 4.00)	-0.43 [-0.86; 0.002]	-0.29 [-0.62; 0.001]	
B N = 24	1.08 (0.00)	1.64 (0.00 – 6.00)	0.50 (0.00)	1.18 (0.00 – 5.00)	-0.58 [-0.11; -0.07]	-0.48 [-0.90; -0.05]	
C N = 15	1.73 (0.00)	2.60 (0.00 – 7.00)	1.00 (0.00)	1.77 (0.00 – 5.00)	-0.73 [-1.56; 0.38]	-0.49 [-1.02; 0.05]	
NRS “How strong is the pain that you experience?” (☹ 0 – 10 ☺)							
All patients N = 83	3.46 (3.00)	2.91 (0.00 – 10.00)	2.70 (2.00)	2.68 (0.00 – 9.00)	-0.76 [-1.33; -0.19]	-0.27 [-0.51; -0.07]	$F_T = 6.27(1)$ , $p = 0.014$  $F_G = 8.64(2)$ , $p < 0.001$  $F_{G^*T} = 0.3(2)$ , $p = 0.733$
A N = 44	2.55 (2.00)	2.58 (0.00 – 10.00)	1.75 (1.00)	2.11 (0.00 – 8.00)	-0.80 [-1.62; 0.03]	-0.29 [-0.59; 0.01]	
B N = 24	4.00 (4.0)	2.83 (0.00 – 10.00)	3.54 (4.00)	2.75 (0.00 – 9.00)	-0.46 [-1.49; 0.58]	-0.19 [-0.59; -0.22]	
C N = 15	5.27 (6.00)	3.06 (0.00 – 9.00)	4.13 (4.00)	3.09 (0.00 – 9.00)	-1.13 [-2.61; 0.34]	-0.43 [-0.95; 0.11]	

Notes: NRS: Numeric Rating Scale; T<sub>1</sub>: start of rehabilitation; T<sub>2</sub>: end of rehabilitation; M: mean; SD: standard deviation; Delta: difference M<sub>T2</sub> – M<sub>T1</sub>; 95% CI: 95%

confidence interval; d: Cohen’s d; RM-ANOVA: repeated-measures analysis of variance; F<sub>T</sub>: F-value for factor “Time” (T<sub>1</sub> versus T<sub>2</sub>); F<sub>G</sub>: F value for factor “Group”

(A versus B versus C); F<sub>G^\*T</sub>: F value for interaction of “Time” and “Group”

**Table S2: Additional results of pulmonary function, and laboratory blood tests**

Group	T <sub>1</sub>		T <sub>2</sub>				
	M (Median)	SD (Range)	M (Median)	SD (Range)	Delta [95% CI]	d [95% CI]	RM-ANOVA F(df), p
Lung function parameters							
FEV1/VC [%]							
All patients N = 103	81.5 (82.6)	10.4 (45.4 – 123.9)	81.3 (82.8)	8.2 (39.4 – 107.6)	-0.2 [-2.4; 2.1]	-0.01 [-0.2; 1.7]	F <sub>T</sub> = 0.2(1), p = 0.689  F <sub>G</sub> = 0.3(2), p = 0.721
A N = 54	82.3 (83.2)	12.2 (45.4 – 123.9)	81.3 (83.1)	8.99 (39.4 – 107.6)	-1.0 [-5.0; 2.9]	-0.07 [-0.33; 0.19]	
B N = 32	80.6 (82.1)	8.7 (56.9 – 98.1)	80.4 (81.1)	7.8 (62.4 – 93.8)	-0.3 [-2.6; 2.1]	-0.04 [0.39; -0.31]	
C N = 17	80.4 (81.4)	6.0 (66.9 – 88.1)	83.1 (84.2)	6.0 (71.9 – 94.7)	2.8 [0.06; 5.5]	0.53 [0.01; 1.03]	F <sub>G+T</sub> = 0.7(2), p = 0.481
Specific airway resistance (sRtot) [%pred.]							
All patients N=103	89.70 (76.7)	60.0 (39.6 – 600.9)	81.0 (76.7)	29.2 (44.2 – 249.1)	-8.7 [-6.3; 3.7]	-0.14 [-0.33; 0.06]	F <sub>T</sub> = 1.2(1), p = 0.267  F <sub>G</sub> = 0.6(2), p = 0.528
A N=54	89.1 (74.9)	78.7 (39.7 – 600.9)	74.8 (70.8)	30.7 (44.2 – 249.1)	-14.2 [-37.0; 8.6]	-0.17 [-0.43; 0.10]	
B N=32	89.9 (84.0)	30.7 (46.9 – 171.5)	91.7 (85.9)	26.3 (54.7 – 148.3)	1.77 [-9.4; 13.0]	0.06 [-0.29; 0.40]	
C N=17	91.3 (90.5)	25.6 (39.6 – 139.2)	80.3 (82.8)	24.8 (50.5 – 131.1)	-11.0 [-21.2; -0.7]	-0.55 [-1.05; -0.03]	F <sub>G+T</sub> = 0.6(2), p = 0.526
Residual volume (RV) [%pred.]							
All patients N = 103	103.3 (102.8)	27.4 (29.5 – 185.2)	103.0 (102.0)	25.4 (44.5 – 176.6)	-0.28 [-5.8; 5.2]	-0.01 [-0.20; 0.18]	F <sub>T</sub> < 0.001(1), p = 0.9999  F <sub>G</sub> = 6.3(2), p = 0.002
A N = 54	97.2 (97.3)	27.1 (55.6 – 185.2)	95.0 (96.4)	23.4 (44.5 – 143.5)	-2.2 [-10.5; 6.1]	-0.07 [-0.34; 0.19]	
B N = 32	109.4 (104.7)	24.1 (73.8 – 172.9)	112.8 (110.5)	26.1 (72.8 – 176.6)	3.4 [-5.6; 12.3]	0.14 [-0.21; 0.48]	
C N = 17	111.4 (111.5)	30.9 (29.5 – 182.6)	110.2 (105.0)	22.8 (62.7 – 157.1)	-1.2 [-15.8; 13.3]	0.04 [-0.52; 0.43]	F <sub>G+T</sub> = 0.4(2), p = 0.675
Partial pressure of CO2 (PaCO2) [mm Hg]							
All patients N = 100	36.2 (36.0)	3.1 (26.0 – 43.0)	36.0 (36.0)	3.2 (28.0 – 43.0)	-0.1 [-0.7; 0.4]	-0.06 [-0.25; 0.14]	F <sub>T</sub> = 0.4(1), p = 0.549

A N=51	36.2 (36.0)	3.0 (28.0 – 43.0)	36.3 (37.0)	3.3 (29.0 – 43.0)	0.1 [-0.7; 1.0]	0.05 [-0.23; 0.32]	F <sub>G</sub> = 0.67(2), p = 0.516  F <sub>G+T</sub> = 1.2(2), p = 0.313
B N = 31	36.1 (36.00)	2.4 (31.0 – 40.0)	35.3 (36.0)	2.8 (30.0 – 40.0)	-0.8 [-1.7; 0.1]	-0.32 [-0.68; 0.04]	
C N = 18	36.5 (37.5)	4.2 (26.0 – 43.0)	36.6 (36.5)	3.7 (28.0 – 43.0)	0.11 [-1.4; 1.6]	0.03 [-0.43; 0.50]	
Laboratory blood test							
Lactate dehydrogenase (LDH) [U/l] (Normal value 120 - 240 U/l)							
All patients N=56	195.8 (193.5)	45.6 (100.0 – 327.0)	191.8 (189.0)	36.3 (110.0 – 285.0)	-4.1 [-11.9; 3.8]	-0.14 [-0.40; 0.12]	F <sub>T</sub> = 0.7(1), p = 0.406
A N=30	202.2 (194.0)	51.0 (121.00 – 327.00)	198.1 (198.0)	36.5 (122.00 – 285.00)	-4.1 [-16.9; 8.7]	-0.12 [-0.48; 0.24]	F <sub>G</sub> = 1.1(2), p = 0.335  F <sub>G+T</sub> = 0.02(2), p = 0.972
B N=17	185.2 (190.0)	35.7 (100.00 – 250.00)	180.2 (178.0)	35.1 (110.0 – 247.0)	-5.0 [-17.2; 7.2]	-0.21 [-0.69; 0.27]	
Brain natriuretic peptide (BNP) [pg/ml] (Normal value <125 pg/ml)							
All N=61	203.3 (100)	411.2 (35.0 – 2940.0)	174.9 (83.0)	393.8 (35.0 – 2760.0)	-28.4 [-100.1; -43.2]	-0.10 [-0.35; -0.15]	F <sub>T</sub> = 0.23(1), p = 0.632  F <sub>G</sub> = 0.21(2), p = 0.81  F <sub>G+T</sub> = 2.46(2), p = 0.094
A N=32	314.1 (119.0)	546.9 (35.00 – 2940.0)	263.4 (114.5)	530.7 (35.0 – 2760.0)	-50.7 [-190.2; -88.8]	-0.13 [-0.48; 0.22]	
B N=18	78.7 (83.00)	31.7 (35.0 – 120.0)	73.50 (81.0)	34.8 (35.0 – 145.0)	-5.22 [-20.4; 10.0]	-0.17 [0.63; -0.30]	
C N=11	84.7 (92.0)	54.0 (35.0 – 181.0)	83.1 (82.0)	48.8 (35.0 – 183.0)	-1.6 [-22.7; 19.4]	0.05 [-0.64; 0.54]	
C N = 9	194.8 (195.0)	44.3 (137.0 – 280.0)	192.7 (184.0)	36.3 (150.0 – 269.0)	-2.11 [-18.5; 14.2]	-0.10 [-0.75; 0.55]	

Notes: T<sub>1</sub>: start of rehabilitation; T<sub>2</sub>: end of rehabilitation; M: mean; SD: standard deviation; Delta: difference M<sub>T2</sub> – M<sub>T1</sub>; 95% CI: 95% confidence interval; d: Cohen's d; RM-ANOVA: repeated-measures analysis of variance; F<sub>T</sub>: F-value for factor "Time" (T<sub>1</sub> versus T<sub>2</sub>); F<sub>G</sub>: F value for factor "Group" (A versus B versus C); F<sub>G\*T</sub>: F value for interaction of "Time" and "Group"