

Supplementary Table 1. Levels of Inflammatory Markers after excluding patients that received any steroids or Tocilizumab or Sarilumab

Lab result - median (IQR)		All patients	BMI <18.5	BMI 18.5-24	BMI 25-29	BMI 30-34	BMI ≥35	p-value
	missing data	N=2389	n=62	n=570	n=795	n=541	n=421	
			(a)	(b)	(c)	(d)	(e)	
IL-6	1,517	32.3 (15.2-63.7)	35.9 (23.9-73.8)	36.6 (16.3-64.5)	30.4 (13.9-62.1)	29.8 (15.5-63.8)	32.2 (12.8-60.9)	0.135
CRP - initial	484	8.2 (3.8-16.3)	6.4 (2.7-16.5)	6.9 (3.3-15.4)	9.6 (4.2-16.6)	7.6 (3.6-15.5)	8.9 (4.3-17.4)	0.056
CRP - maximum	20	7.5 (0.9-17.1)	5.9 (1.6-18.3)	5.9 (0.6-15.7)	8.8 (0.9-17.6)	6.8 (1.1-16.7)	7.8 (1.3-18.5)	0.338
CRP - final	488	5.8 (2.6-12.6)	6.5 (3.5-16.5)	5.7 (2.6-12.7)	6.5 (2.5-13.3)	5.5 (2.5-12)	5.1 (2.6-11)	0.985
WBC - initial	207	7 (5.3-9.5)	7.5 (5.9-11.2)	7.2 (5.4-10.6)	7.4 (5.6-10.2)	7 (5.3-9.4)	7.3 (5.4-9.5)	0.157
Neutrophils-initial	208	5.2 (3.7-7.5)	5.2 (3.9-8.9)	5.4 (3.6-8.5) ^{de}	5.3 (3.9-7.7) ^d	5 (3.5-6.9) ^{bc}	5.1 (3.6-7) ^b	<0.001
Lymphocytes-initial	207	1 (0.7-1.4)	0.9 (0.6-1.3)	0.9 (0.6-1.3)	1 (0.7-1.4)	1.1 (0.8-1.4)	1.1 (0.8-1.4)	0.349

Notes: (1) p-Values refer to ANOVA and the letters denote the columns with which a statistically significant pairwise comparison exists (Bonferroni's method), (2) BMI in kg/m², IL-6 in pg/mL, CRP in mg/dL, WBC in 10³/μL, neutrophils 10³/μL, lymphocytes in 10³/μL

Abbreviations: BMI=body mass index, IQR=interquartile range, CRP=C-reactive protein, IL-6=interleukin, WBC=white blood cell count

Supplementary Table 2. Mortality and Inflammatory markers - AUC values and 95% CI per BMI group

	BMI <18.5	BMI 18.5-24	BMI 25-29	BMI 30-34	BMI ≥35	p-value
IL-6	0.663 (0.362-0.963)	0.761 (0.673-0.849)	0.906 (0.844-0.967)	0.911 (0.862-0.960)	0.872 (0.804-0.941)	0.023
CRP - initial	0.619 (0.454-0.783)	0.735 (0.676-0.793)	0.756 (0.706-0.806)	0.733 (0.671-0.794)	0.830 (0.766-0.894)	0.064
CRP - maximum	0.555 (0.392-0.717)	0.576 (0.511-0.641)	0.641 (0.581-0.701)	0.638 (0.559-0.716)	0.629 (0.539-0.719)	0.546
CRP - final	0.759 (0.613-0.905)	0.841 (0.795-0.887)	0.915 (0.883-0.945)	0.877 (0.831-0.923)	0.921 (0.872-0.969)	0.021
WBC - initial	0.525 (0.359-0.691)	0.579 (0.521-0.638)	0.631 (0.576-0.686)	0.654 (0.576-0.686)	0.569 (0.501-0.638)	0.208
Neutrophils-initial	0.551 (0.388-0.715)	0.598 (0.542-0.655)	0.646 (0.594-0.700)	0.672 (0.614-0.731)	0.599 (0.532-0.666)	0.262
Lymphocytes-initial	0.403 (0.242-0.564)	0.387 (0.329-0.445)	0.442 (0.386-0.497)	0.416 (0.345-0.487)	0.390 (0.319-0.461)	0.701

Notes: (1) p-Values refer to Chi-square test (2) BMI in kg/m², IL-6 in pg/mL, CRP in mg/dL, WBC in 10³/μL, neutrophils 10³/μL, lymphocytes in 10³/μL

Abbreviations: BMI=body mass index, IQR=interquartile range, CRP=C-reactive protein, IL-6=interleukin, WBC=white blood cell count

Supplementary Table 3: Multivariate Analysis for the Primary Outcome using the Charlson Comorbidity Index

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	n=3499	n=3499	n=3499	n=3499	n=1564
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Male sex	1.57 (1.33 - 1.85) p< 0.001	1.58 (1.34 - 1.86) p< 0.001	1.56 (1.32 - 1.83) p< 0.001	1.60 (1.36 - 1.89) p< 0.001	1.44 (1.10 - 1.89) p=0.007
Age per 10 years	1.43 (1.30 - 1.57) p< 0.001	1.43 (1.30 - 1.58) p< 0.001	1.42 (1.30 - 1.57) p< 0.001	1.45 (1.31 - 1.59) p< 0.001	1.47 (1.25 - 1.72) p=< 0.001
BMI ≥30	1.26 (1.07 - 1.50) p=0.007				
BMI ≥35		1.46 (1.17 - 1.82) p< 0.001			
BMI ≥40			1.68 (1.23 - 2.30) p< 0.001		
BMI <18.5⁽²⁾				1.33 (0.81 - 2.20) p=0.264	0.90 (0.35 - 2.32) p=0.824
25-29.9⁽²⁾				1.04 (0.84 - 1.29) p=0.699	1.14 (0.81 - 1.60) p=0.448
30-34.9⁽²⁾				1.16 (0.91 - 1.47) p=0.225	1.40 (0.97 - 2.03) p=0.073
35-39.9⁽²⁾				1.38 (1.02 - 1.87) p=0.039	1.23 (0.74 - 2.03) p=0.429
≥ 40⁽²⁾				1.88 (1.32 - 2.68) p< 0.001	1.71 (0.99 - 2.96) p=0.056
CCI 1-2⁽³⁾	1.25 (0.83 - 1.87) p=0.278	1.26 (0.84 - 1.89) p=0.260	1.29 (0.86 - 1.93) p=0.215	1.27 (0.85 - 1.91) p=0.239	0.98 (0.53 - 1.81) p=0.946

3-4⁽³⁾	2.11 (1.32 - 3.38) p=0.002	2.12 (1.32 - 3.38) p=0.002	2.15 (1.35 - 3.44) p<0.001	2.14 (1.34 - 3.41) p=0.002	1.66 (0.81 - 3.42) p=0.168
≥ 5⁽³⁾	3.01 (1.86 - 4.89) p< 0.001	3.03 (1.87 - 4.90) p< 0.001	3.06 (1.89 - 4.95) p< 0.001	3.05 (1.88 - 4.94) p< 0.001	2.13 (1.01 - 4.47) p=0.046
Interleukin-6 per 10pg/ml					1.06 (1.03 - 1.09) p< 0.001

Notes: (1) BMI in kg/m², (2) reference group: BMI 18.5-24.9 kg/m², (3) reference group: CCI=0, (4) age was analyzed as a continuous variable, 10 years was used as a unit of time for easier interpretation of OR (95% CI)

Abbreviations: OR=odds ratio, CI=confidence interval, BMI=body mass index, CCI= Charlson Comorbidity Index

Supplementary table 4: Multivariate Analysis for the Primary and Secondary Outcomes

PANEL A: Mortality					
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
	n=3,499	n=3,499	n=3,499	n=3,499	n=1,564
Male sex	1.57 (1.33 - 1.85) p<0.001	1.58 (1.34 - 1.87) p<0.001	1.56 (1.32 - 1.84) p<0.001	1.61 (1.36 - 1.90) p<0.001	1.43 (1.09 - 1.88) p=0.010
Age per 10 years	1.74 (1.62 - 1.87) p<0.001	1.75 (1.63 - 1.88) p<0.001	1.74 (1.62 - 1.86) p<0.001	1.77 (1.64 - 1.90) p<0.001	1.77 (1.57 - 1.99) p<0.001
BMI ≥30	1.27 (1.07 - 1.51) p=0.006				
BMI ≥35		1.49 (1.20 - 1.85) p<0.001			
BMI ≥40			1.68 (1.23 - 2.29) p=0.001		
BMI <18.5⁽²⁾				1.38 (0.82 - 2.30) p=0.221	0.86 (0.33 - 2.22) p=0.753
25-29.9⁽²⁾				1.07 (0.86 - 1.32) p=0.543	1.17 (0.83 - 1.65) p=0.363
30-34.9⁽²⁾				1.17 (0.92 - 1.49) p=0.195	1.40 (0.96 - 2.05) p=0.077
35-39.9⁽²⁾				1.44 (1.06 - 1.96) p=0.020	1.36 (0.81 - 2.26) p=0.243
≥ 40⁽²⁾				1.92 (1.35 - 2.72) p<0.001	1.81 (1.05 - 3.13) p=0.033
Congestive Heart Failure	1.33 (1.00 - 1.77) p=0.051	1.32 (0.99 - 1.75) p=0.062	1.32 (0.99 - 1.76) p=0.059	1.31 (0.98 - 1.75) p=0.064	1.02 (0.63 - 1.65) p=0.947
Coronary Artery Disease	1.11 (0.82 - 1.50) p=0.489	1.12 (0.83 - 1.52) p=0.450	1.12 (0.82 - 1.51) p=0.477	1.12 (0.83 - 1.52) p=0.454	1.66 (1.07 - 2.60) p=0.025
Diabetes	1.16 (0.98 - 1.38) p=0.091	1.16 (0.98 - 1.38) p=0.090	1.16 (0.98 - 1.38) p=0.084	1.16 (0.98 - 1.38) p=0.090	1.00 (0.75 - 1.32) p=0.994

Chronic Kidney Disease	1.51 (1.20 - 1.89) p<0.001	1.50 (1.20 - 1.88) p<0.001	1.50 (1.19 - 1.87) p<0.001	1.50 (1.20 - 1.88) p<0.001	1.60 (1.11 - 2.30) p=0.011
COPD	1.43 (0.99 - 2.06) p=0.058	1.45 (1.01 - 2.10) p=0.047	1.43 (0.99 - 2.07) p=0.056	1.44 (1.00 - 2.09) p=0.051	1.49 (0.80 - 2.80) p=0.212
Tobacco Use	1.07 (0.77 - 1.50) p=0.684	1.06 (0.76 - 1.47) p=0.747	1.06 (0.76 - 1.49) p=0.714	1.07 (0.76 - 1.49) p=0.705	0.88 (0.52 - 1.50) p=0.641
Hypertension	0.72 (0.60 - 0.87) p=0.001	0.71 (0.59 - 0.86) p<0.001	0.72 (0.60 - 0.87) p=0.001	0.71 (0.59 - 0.86) p<0.001	0.57 (0.43 - 0.76) p<0.001
Hyperlipidemia	0.82 (0.69 - 0.98) p=0.031	0.83 (0.69 - 0.99) p=0.039	0.83 (0.69 - 0.99) p=0.038	0.83 (0.69 - 0.99) p=0.039	0.97 (0.73 - 1.29) p=0.833
Cirrhosis	1.96 (0.98 - 3.91) p=0.057	1.97 (0.99 - 3.93) p=0.053	1.94 (0.97 - 3.86) p=0.060	2.02 (1.01 - 4.03) p=0.047	0.94 (0.20 - 4.38) p=0.937
Peripheral Vascular Disease	1.36 (0.93 - 2.00) p=0.114	1.37 (0.94 - 2.01) p=0.103	1.36 (0.93 - 1.99) p=0.114	1.36 (0.93 - 1.99) p=0.115	1.68 (0.88 - 3.21) p=0.113
CVA or TIA	1.34 (0.94 - 1.92) p=0.106	1.35 (0.94 - 1.94) p=0.099	1.34 (0.93 - 1.92) p=0.112	1.35 (0.94 - 1.94) p=0.103	1.03 (0.57 - 1.88) p=0.922
Interleukin-6 per 10pg/ml					1.06 (1.03 - 1.09) p<0.001
PANEL B: Severe pneumonia					
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
	n=3,499	n=3,499	n=3,499	n=3,499	n=1,564
Male sex	1.49 (1.25 - 1.78) p<0.001	1.48 (1.25 - 1.77) p<0.001	1.43 (1.21 - 1.70) p<0.001	1.52 (1.28 - 1.82) p<0.001	1.43 (1.09 - 1.89) p=0.011
Age per 10 years	1.12 (1.05 - 1.19) p<0.001	1.11 (1.05 - 1.18) p<0.001	1.09 (1.03 - 1.16) p=0.002	1.14 (1.07 - 1.21) p<0.001	1.06 (0.96 - 1.17) p=0.215
BMI ≥30	1.57 (1.31 - 1.87) p<0.001				
BMI ≥35		1.71 (1.38 - 2.11) p<0.001			

BMI ≥40			1.61 (1.21 - 2.15) p=0.001		
BMI <18.5⁽²⁾				0.71 (0.36 - 1.38) p=0.311	0.20 (0.01 - 4.88) p=0.325
25-29.9⁽²⁾				1.13 (0.89 - 1.44) p=0.312	1.21 (0.82 - 1.79) p=0.336
30-34.9⁽²⁾				1.44 (1.11 - 1.87) p=0.006	1.69 (1.13 - 2.53) p=0.011
35-39.9⁽²⁾				1.97 (1.44 - 2.69) p<0.001	1.61 (0.96 - 2.70) p=0.073
≥ 40⁽²⁾				2.10 (1.49 - 2.97) p<0.001	2.29 (1.34 - 3.92) p=0.002
Congestive Heart Failure	1.07 (0.79 - 1.43) p=0.667	1.06 (0.79 - 1.43) p=0.694	1.07 (0.80 - 1.44) p=0.657	1.06 (0.79 - 1.42) p=0.720	0.94 (0.57 - 1.56) p=0.819
Diabetes	1.23 (1.03 - 1.45) p=0.020	1.23 (1.04 - 1.46) p=0.016	1.25 (1.05 - 1.48) p=0.012	1.21 (1.02 - 1.43) p=0.033	1.10 (0.85 - 1.44) p=0.469
Chronic Kidney Disease	1.41 (1.10 - 1.81) p=0.008	1.41 (1.10 - 1.82) p=0.008	1.41 (1.09 - 1.81) p=0.008	1.41 (1.10 - 1.81) p=0.007	1.37 (0.93 - 2.00) p=0.108
ESRD	1.23 (0.80 - 1.89) p=0.340	1.20 (0.78 - 1.83) p=0.400	1.18 (0.77 - 1.81) p=0.442	1.25 (0.81 - 1.91) p=0.315	1.45 (0.74 - 2.86) p=0.283
Interleukin-6 per 10pg/ml					1.03 (1.01 - 1.05) p=0.001

Notes: (1) BMI in kg/m², (2) reference group: BMI 18.5-24.9 kg/m² (3) age was analyzed as a continuous variable, 10 years was used as a unit of time for easier interpretation of OR (95% CI)

Abbreviations: OR=odds ratio, CI=confidence interval, BMI=body mass index, CAD=coronary artery disease, CKD=chronic kidney disease, COPD=chronic obstructive pulmonary disease, PAD=peripheral artery disease, CVA=cerebrovascular disease. TIA=transient ischemic attack, ESRD=end-stage renal disease

Supplementary Table 5: Sex-based Subgroup Analysis for the Outcome of Mortality

VARIABLES	Women	Men	Women	Men
	n=1,567	n=1,932	n=683	n=881
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Age per 10 years	1.62 (1.45 - 1.81) p<0.001	1.91 (1.73 - 2.10) p<0.001	1.52 (1.27 - 1.82) p<0.001	1.98 (1.69 - 2.33) p<0.001
BMI <18.5(2)	1.92 (0.89 - 4.12) p=0.094	1.01 (0.51 - 2.00) p=0.975	1.14 (0.21 - 6.19) p=0.879	0.71 (0.23 - 2.14) p=0.539
25-29.9(2)	1.19 (0.83 - 1.69) p=0.349	1.00 (0.76 - 1.31) p=0.997	1.12 (0.65 - 1.94) p=0.685	1.18 (0.75 - 1.85) p=0.469
30-34.9(2)	1.08 (0.74 - 1.58) p=0.680	1.25 (0.91 - 1.72) p=0.161	1.02 (0.57 - 1.81) p=0.956	1.74 (1.05 - 2.89) p=0.033
35-39.9(2)	1.09 (0.69 - 1.74) p=0.712	1.99 (1.31 - 3.00) p=0.001	1.07 (0.51 - 2.25) p=0.858	1.63 (0.82 - 3.24) p=0.162
≥40(2)	1.72 (1.05 - 2.81) p=0.031	2.26 (1.33 - 3.84) p=0.002	1.35 (0.64 - 2.86) p=0.435	2.28 (0.96 - 5.42) p=0.062
Congestive Heart Failure	1.88 (1.20 - 2.96) p=0.006	0.97 (0.67 - 1.41) p=0.880	1.93 (0.96 - 3.88) p=0.066	0.55 (0.26 - 1.15) p=0.114
Coronary Artery Disease	0.94 (0.56 - 1.58) p=0.811	1.29 (0.88 - 1.88) p=0.195	1.39 (0.69 - 2.79) p=0.360	1.82 (1.00 - 3.31) p=0.048
Diabetes	1.15 (0.88 - 1.51) p=0.307	1.17 (0.93 - 1.47) p=0.186	1.02 (0.66 - 1.56) p=0.943	1.01 (0.68 - 1.48) p=0.973
Chronic Kidney Disease	1.93 (1.38 - 2.70) p<0.001	1.21 (0.90 - 1.65) p=0.211	2.18 (1.28 - 3.70) p=0.004	1.29 (0.77 - 2.17) p=0.331
COPD	1.42 (0.85 - 2.36) p=0.177	1.32 (0.78 - 2.26) p=0.303	1.20 (0.48 - 3.00) p=0.703	1.34 (0.52 - 3.43) p=0.548
Tobacco Use	1.34 (0.78 - 2.30) p=0.295	0.96 (0.63 - 1.47) p=0.861	1.14 (0.45 - 2.89) p=0.790	0.71 (0.35 - 1.44) p=0.345

Hypertension	0.72 (0.54 - 0.96) p=0.024	0.70 (0.55 - 0.90) p=0.005	0.60 (0.38 - 0.93) p=0.024	0.53 (0.36 - 0.79) p=0.002
Hyperlipidemia	0.80 (0.60 - 1.06) p=0.114	0.85 (0.67 - 1.08) p=0.188	0.83 (0.53 - 1.30) p=0.411	1.09 (0.75 - 1.59) p=0.661
Cirrhosis	2.58 (0.94 - 7.09) p=0.066	1.41 (0.54 - 3.68) p=0.479	0.63 (0.05 - 8.24) p=0.725	1.06 (0.09 - 12.52) p=0.961
Peripheral Vascular Disease	1.10 (0.60 - 2.03) p=0.750	1.49 (0.90 - 2.49) p=0.123	2.24 (0.86 - 5.82) p=0.099	0.97 (0.36 - 2.61) p=0.947
CVA or TIA	1.50 (0.87 - 2.59) p=0.148	1.31 (0.81 - 2.11) p=0.271	1.12 (0.46 - 2.75) p=0.797	1.15 (0.50 - 2.66) p=0.738
Interleukin-6 per 10pg/ml			1.04 (1.00 - 1.09) p=0.079	1.08 (1.03 - 1.12) p<0.001

Notes: (1) BMI in kg/m² , (2) reference group: BMI 18.5-24.9 kg/m² (3) age was analyzed as a continuous variable, 10 years was used as a unit of time for easier interpretation of OR (95% CI)

Abbreviations: OR=odds ratio, CI=confidence interval, BMI=body mass index, CAD=coronary artery disease, CKD=chronic kidney disease, COPD=chronic obstructive pulmonary disease, PAD=peripheral artery disease, CVA=cerebrovascular disease. TIA=transient ischemic attack.

