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Supplemental Table S1—Definitions.

Variable	Definition
Acute Respiratory Distress Syndrome	Berlin definition [48]
Acute Kidney Injury	KDIGO (Kidney Improving Global Outcomes) guidelines [49]
Major adverse cardiac events	Defined as one of the following: - Non-fatal cardiac arrest. Absence of cardiac rhythm or the presence of chaotic rhythm needing any basic or advanced life support. - Acute myocardial infarction. - Newly identified congestive cardiac failure. - New cardiac arrhythmia (atrial flutter or fibrillation) or block (grade II or III atrio-ventricular block) documented on ECG. - Angor. Diffuse retrosternal discomfort induced by effort and ameliorated by rest or nitro-glycerine.
Myocardial infarction	Defined as an increase in serum levels of cardiac injury biomarkers (preferable, the troponin levels) > 99^{th} percentile of the upper reference value associated with at least one of the following: cardiac ischemia symptoms, new or presumably new ST or T changings on ECG, or a left bundle branch block, pathological Q on ECG, imagistic or echocardiographic signs of a new loss in viable myocardium or alteration in segmentary kinetics, intracoronary artery identification of thrombi by angiography or autopsy [50]

Abbreviations: ECG—electrocardiography.

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Supplemental Table S2—Factorial analysis (2 factors).

Variables	Factor 1	Factor 2	Factor 3
Gender (male)		0.102	
SpO2 < 90% (yes)	0.160	0.548	-0.575
Dyspnoea (yes)		0.246	0.280
Mechanical Ventilation (yes)	0.842	0.129	0.128
HFNO2 (yes)	-0.627		
GCS (per 1 scale point)	-0.487	-0.154	
SOFA (per 1 scale point)	0.323	0.317	0.183
Corticotherapy (yes)		0.244	0.276
GCS—Glasgow Coma Scale; SOFA—Sequential organ failure assessment score; HFNO2—high flow nasal oxygen (meaning HFNO2 only, or the combination with non-invasive ventilation).			

The hypothesis that two factors are sufficient was tested ($p<0.001$).

Supplemental Table S3—Propensity matching

	Unmatched cohort			**Matched cohort**		
Variables	Less elderly, n=4878	Extremely elderly, n=1666	SMD	Less elderly, n=1578	Extremely elderly, n=1578	SMD
Sex (male), n (%)	2811 (57.6)	834 (50.1)	0.152	827 (52.4)	808 (51.2)	0.024
Clinical status on ICU admission						
Fever (yes), n (%)	2016 (41.3)	561 (33.7)	0.159	532 (33.7)	548 (34.7)	0.021
Dyspnoea (yes), n (%)	3751 (76.9)	1288 (77.3)	0.01	1230 (77.9)	1223 (77.5)	0.011
SpO2 (%), mean ± SD	82.9 ± 9.8	83.2 ± 9.8	0.031	83.2 ± 10	83.1 ± 10	0.009
ARDS (yes), n (%)	1917 (39.3)	595 (35.7)	0.074	563 (35.7)	567 (35.9)	0.005
GCS, mean ± SD	12 ± 5	11 ± 5	0.222	11 ± 5	11 ± 5	0.021
SOFA, mean ± SD	9 ± 6	10 ± 6	0.134	9.4 ± 6	9.3 ± 6	0.025
Past medical history						
Ischemic heart disease (yes), n (%)	2059 (42.2)	972 (58.3)	0.327	913 (57.9)	888 (56.3)	0.032
Autoimmune disease (yes), n (%)	124 (2.5)	20 (1.2)	0.099	23 (1.5)	19 (1.2)	0.022
Chronic kidney disease (yes), n (%)	961 (19.7)	448 (26.9)	0.171	414 (26.2)	396 (25.1)	0.026
Dialysis patient (yes), n (%)	190 (3.9)	43 (2.6)	0.074	42 (2.7)	43 (2.7)	0.004
Diabetes type 1 (yes), n (%)	66 (1.4)	18 (1.1)	0.025	15 (1)	18 (1)	0.019
Diabetes type 2 (yes), n (%)	1841 (37.7)	509 (30.6)	0.152	525 (33.3)	491 (31.1)	0.046
Heart failure (yes), n (%)	1390 (28.5)	764 (45.9)	0.365	678 (43)	686 (43.5)	0.01
Arterial hypertension (yes), n (%)	3777 (77.4)	1339 (80.4)	0.072	1277 (80.9)	1269 (80.4)	0.013
COPD (yes), n (%)	495 (10.1)	156 (9.4)	0.026	162 (10.3)	153 (9.7)	0.019
Neoplasia (yes), n (%)	501 (10.3)	151 (9.1)	0.041	152 (9.6)	147 (9.3)	0.011
Patient management						
NIV (yes), n (%)	2415 (49.5)	729 (43.8)	0.115	694 (44)	704 (44.6)	0.013
MV (yes), n (%)	2584 (53)	886 (53.2)	0.004	844 (53.5)	828 (52.5)	0.020
Neuromuscular blockade (yes), n (%)	715 (14.7)	162 (9.7)	0.151	166 (10.5)	156 (9.9)	0.021
Prone position (yes), n (%)	763 (15.6)	175 (10.5)	0.153	177 (11.2)	168 (10.6)	0.018
Corticotherapy (yes), n (%)	4016 (82.3)	1295 (77.7)	0.115	1226 (77.7)	1269 (78.5)	0.018
Hydroxychloroquine (yes), n (%)	1085 (22.2)	356 (21.4)	0.021	350 (22.2)	338 (21.4)	0.018
Remdesivir (yes), n (%)	1290 (26.4)	316 (19)	0.179	297 (18.8)	309 (19.6)	0.019
Tocilizumab (yes), n (%)	693 (14.2)	138 (8.3)	0.188	146 (9.3)	136 (8.6)	0.022

ARDS—acute respiratory distress syndrome; COPD—chronic obstructive pulmonary disease; GCS—Glasgow Coma Scale; ICU—intensive care unit; SOF— sequential organ failure assessment.

Supplemental Figure S1. The principal component analysis considering the factors independently associated with ICU mortality in elderly patients.

MV—mechanical ventilation; HFNO2—high-flow nasal oxygen (corresponding to HFNO2 only, or HFO2 in combination with non-invasive ventilation); GCS—Glasgow Coma Scale; SOFA—sequential organ failure assessment; SpO2bin—SpO2 < 90% (yes); Gender—Male sex (yes).

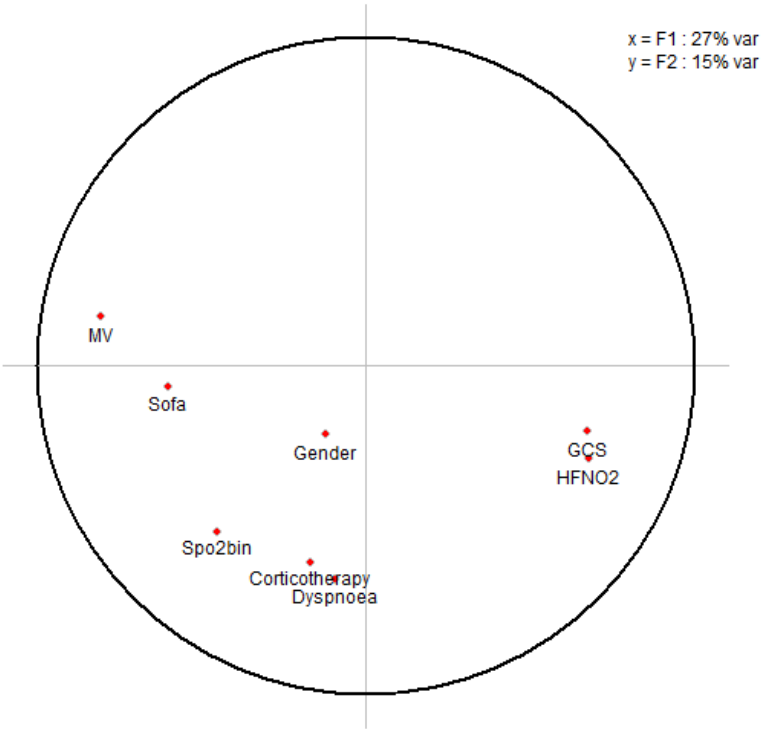
The limit of less than 10 variables in the model was respected.

Suggestions for interpretation.

The represented variables explain 27+15 = 42% of the total variance. The GCS and HFNO2 are associated with survival and are diagonally positioned, comparing with MV and SOFA, so it should be considered as only one group of variables.

The SpO2<90%, dyspnoea, and corticotherapy variables form a second group of variables. The presence of one variable in one group might suggest a connection with the other variables of the group and speculates a (partially) common mechanism.

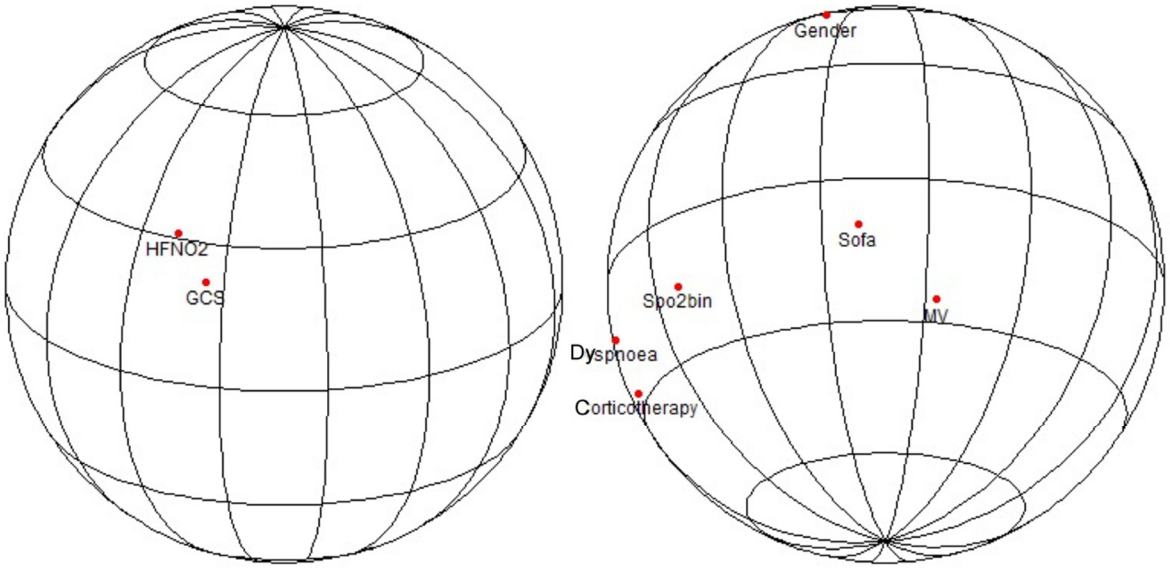
We note that the gender is very closed to the centre, meaning that it has a less accurate representation and a less significant role.



Supplemental Figure S2. The spherical principal component analysis considering the factors independently associated with ICU mortality in elderly patients.

Suggestions for interpretation.

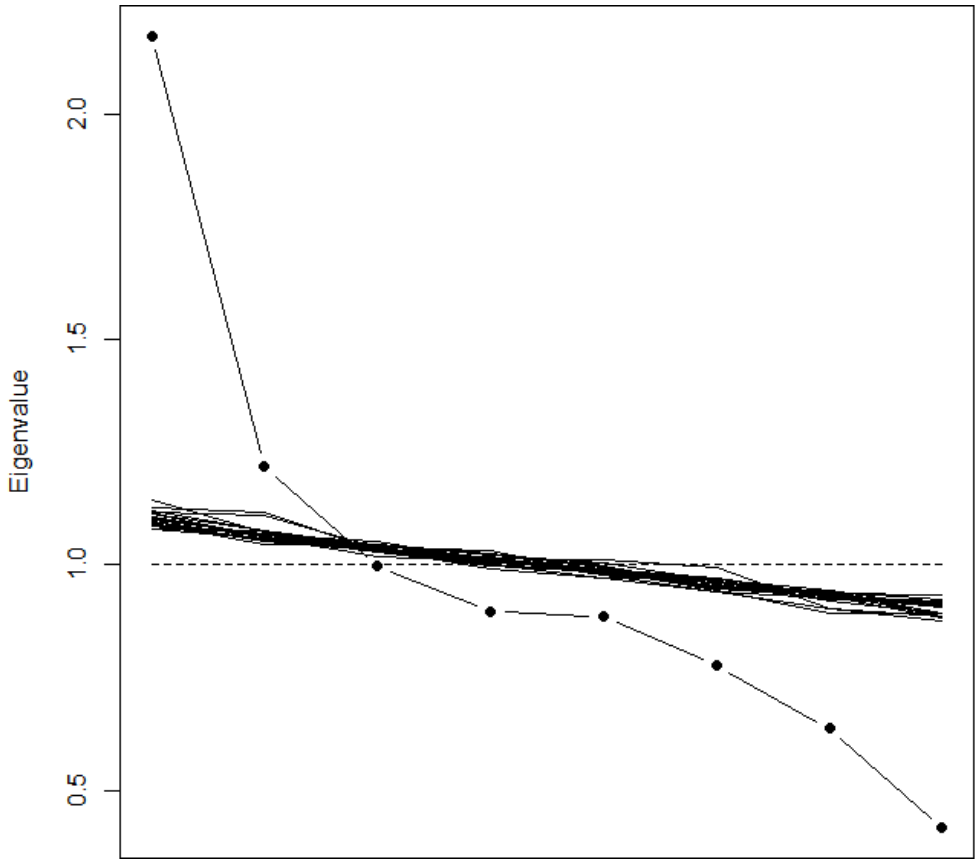
This figure is a three-dimensional representation of Supplemental Figure 1. We note the diagonal positioning of HFNO2 and GCS comparing with SOFA and MV, but it should be considered as one group. The other group seems to be represented by SpO2, dyspnoea, and corticotherapy.



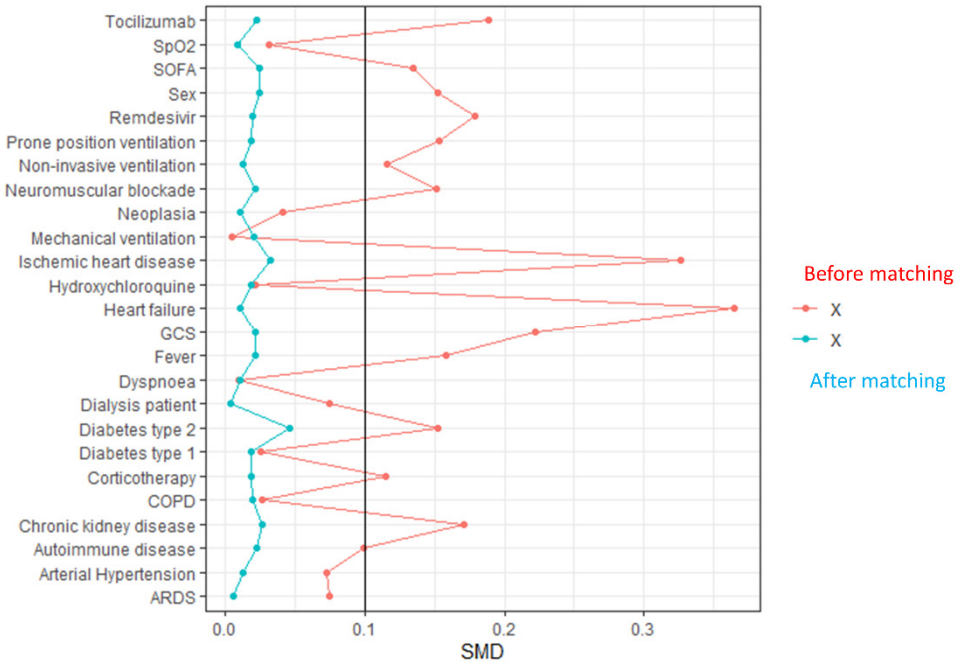
Supplemental Figure S3. The eigenvalues for factorial analysis considering the factors independently associated with ICU mortality in elderly patients.

Suggestion for interpretation

Two possible explaining factors are observed, as two points are over the noise-simulation (20 simulations) line.



Supplemental Figure S4. The standardized mean difference (SMD) before and after matching.



STROBE Statement—checklist of items that should be included in reports of observational studies.

	Item No.	Recommendation	Page No.
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract.	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found.	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported.	2
Objectives	3	State specific objectives, including any prespecified hypotheses.	2
Methods			
Study design	4	Present key elements of study design early in the paper.	2
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	2
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up.	2
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed.	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	2-3
Data sources/ measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	*3*
Bias	9	Describe any efforts to address potential sources of bias.	3
Study size	10	Explain how the study size was arrived at.	3

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why.	3
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding.	3
		(*b*) Describe any methods used to examine subgroups and interactions.	3
		(*c*) Explain how missing data were addressed.	3
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed.	Not applicable
		(*e*) Describe any sensitivity analyses.	Not applicable
Participants	13	(a) Report numbers of individuals at each stage of study, e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed.	4
		(b) Give reasons for non-participation at each stage.	4
		(c) Consider use of a flow diagram.	9
Descriptive data	14	(a) Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders.	4
		(b) Indicate number of participants with missing data for each variable of interest.	4
		(c) *Cohort study*—Summarise follow-up time (e.g., average and total amount)	Not applicable
Outcome data	15	*Cohort study*—Report numbers of outcome events or summary measures over time.	*4-8*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included.	4-8
		(*b*) Report category boundaries when continuous variables were categorized.	4-8
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.	Not applicable

Continued on next page

Other analyses	17	Report other analyses done, e.g., analyses of subgroups and interactions, and sensitivity analyses.	5-6
Key results	18	Summarise key results with reference to study objectives.	10-11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	11-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	11
Generalisability	21	Discuss the generalisability (external validity) of the study results.	11-12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	12