ADDITIONAL FILE 3: Variable selection and modeling.

An overview showing the 3-step variable selection procedure used in order to derive two parsimonious models designed for predicting mortality in patients with severe lung failure before and one day after ECMO implementation, respectively. The table shows the variables retained at each step.

Clinical characteristics	Laboratory parameters		Respiratory parameters/blood gas	
Pre-ECMO	Pre-ECMO	Day 1	Pre-ECMO	Day 1
Step 1: Liberal variable selection based on clinical evaluation and literature review				
Age	Lactate	ASAT	Norepinephrine dosage	Pmax
Gender	Haemoglobin	Bilirubin	Mean arterial pressure	Blood flow
BMI	Bilirubin	Creatinine	Minute ventilation	Tidal volume
Primary diagnosis (group 1-4)[1]	ASAT	LDH	Tidal volume	FiO_2
Immunocompromised state[2]	Creatinine	CRP	Pmax	PaO_2/FiO_2
SOFA score	CrCl	D-dimer	PaO_2/FiO_2	Norepinephrine dosage
MV pre-ECMO (days)	LDH	Fibrinogen	Arterial pCO_2	Venous saturation
Hospitalization pre-ECMO (days)	CRP	INR	Arterial pH	Arterial pH
CVVHF pre-ECMO			Oxygen saturation	Arterial $PaCO_2$
Kidney dysfunction pre-ECMO[3]				Arterial base excess
				Arterial standard bicarbonate
Step 2: Variables from Step 1 reduced to the following by random forest analysis and variable importance ranking				
Age	Lactate	Bilirubin	Minute ventilation	FiO_2
Immunocompromised state	Haemoglobin	CRP		Norepinephrine
SOFA score	ASAT	Fibrinogen		
MV pre-ECMO (days)		INR		
Hospitalization pre-ECMO (days)				
CVVHF pre-ECMO				
Step 3: Variables from Step 2 reduced to the following by multivariate logistic regression modeling with limited backwards stepdown				
Age[4,5]	Lactate[4]	CRP[5]	Minute ventilation[4,5]	FiO_2[5]
Immunocompromised state[4,5]	Haemoglobin[4,5]	Fibrinogen[5]		Norepinephrine dosage[5]

ASAT: aspartate-aminotransferase; BMI: body mass index; CrCl: estimated creatinine clearance; CRP: C-reactive protein; CVVHF: continuous veno-venous haemofiltration; ECMO: extracorporeal membrane oxygenation; FiO_2: fraction of inspired oxygen; INR: international normalized ratio; LDH: lactate dehydrogenase; MV: mechanical ventilation; Pmax: maximum inspiratory pressure on mechanical ventilation; SOFA: sequential organ failure assessment; $PaCO_2$: partial pressure of carbon dioxide; PaO_2/FiO_2: ratio of arterial oxygen pressure/fraction of inspired oxygen

[1]Group 1: primary lung failure, including bacterial, viral, fungal or aspiration pneumonia; Group 2: extra-pulmonary sepsis with secondary lung injury; Group 3: multiple trauma with ARDS; Group 4: other pathologies, including near drowning, chronic lung diseases such as lung fibrosis and lung transplantation.

[2]Immunocompromised state included haematological malignancies, solid tumours, solid organ transplantation, high-dose or long-term corticosteroid or other immunosuppressive therapy, or human immunodeficiency virus infection

[3]Kidney dysfunction defined as continuous veno-venous haemofiltration pre-ECMO or creatinine clearance <90mL/min.

[4]Final variables in Model 1 (pre-ECMO).

[5]Final variables in Model 2 (day 1). Model 2 was built as an extension of Model 1. In this model, pre-ECMO lactate concentration was no longer a significant predictor of mortality in the last step.