

Growth Differentiation Factor 15 (GDF-15) Levels for Predicting Mortality in Chronic Kidney Disease Patients with Covid-19

Andrea Galassi, Paola Ciceri, Valeria Bono, Lorenza Magagnoli, Matteo Sala, Luisa Artioli, Roberta Rovito, Mohamad Hadla, Vaibhav Yellenki, Antonella d'Arminio Monforte, Camilla Tincati, Mario Cozzolino and Giulia Marchetti

Table S1. Association between all biomarkers and eGFR strata, mortality and need for ventilation.

Molecules	eGFR	Mortality	Ventilation
GDF-15	*	****	*
CD-25	****	**	*
RAGE	*	****	***
TNFα	***	**	
TNFR I	****	***	
TNFR II	****	**	
IL-7	*	*	
LIF	***	*	
FAS	***		
YKL-40	**		
IL-18		**	***
IL-6		***	**
PTX-3		****	
PDGF-AA			
IL-6R			
VEGF			
α1-AGP			
TRAIL			
Kynurenine			
Tryptophane			

Caption: Cytokines levels (as continuous variable) were compared between eGFR strata, survived and deceased patients, and between patients who were and were not treated by non-invasive ventilation. Test for comparison was performed by Mann-Whitney U test (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$).

Legend:

α 1-AGP: alpha 1-acid glycoprotein

eGFR: estimated glomerular filtration rate

GDF-15: growth and differentiation factor 15

IL-6: interleukine-6

IL-7: interleukin-7

IL-18: interleukin-18

IL-6R: interleukine-6 receptor

LIF: leukemia inhibitory factor

TNF α : tumor necrosis factor alpha

TNFR I: tumor necrosis factor receptor 1

TNFR II: tumor necrosis factor receptor 2

YKL-40PDGF-AA: platelet derived growth factor – AA

PTX-3: pentraxin-3 RAGE: receptor for advanced glycation end products

TRAIL: TNF-related apoptosis- inducing ligand kynurenine and tryptophane

VEGF: vascular endothelial growth factor

Table S2. Multivariate Cox regression model for survival predictability in all patients and in subgroups stratified according to eGFR, excluding outliers for GDF-15.

Outcome: mortality						
Variable	All patients (no outliers)		eGFR \geq 45 mL/min		eGFR < 45 mL/min	
	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>
eGFR < 45 mL/min	0,66 (0,29-1,49)	0,3196	-	-	-	-
Age \geq 75 y	2,96 (1,18-7,42)	0,0208	2,19 (0,70-6,83)	0,1769	6,02 (0,90-40,20)	0,0637
Fever	3,97 (1,36-11,62)	0,0117	2,69 (0,59-12,26)	0,2001	10,52 (1,29-85,44)	0,0277
Dyspnea	1,84 (0,79-4,27)	0,1549	2,08 (0,70-6,20)	0,1877	1,88 (0,36-9,97)	0,4575
P/F at admission < 300	1,54 (0,71-3,35)	0,2704	1,73 (0,61-4,94)	0,3027	1,39 (0,36-5,33)	0,6356
GDF-15, quartiles	2,25 (1,46-3,47)	0,0003	1,84 (1,07-3,17)	0,0281	3,68 (1,42-9,51)	0,0072

Caption:

eGFR: estimated glomerular filtration rate

GDF-15: Growth Differentiation Factor 15

P/F: PaO₂/FiO₂ ratio

Y: years

Table S3. Multivariate Cox regression model for survival predictability in all patients and in subgroups stratified according to eGFR, excluding maintenance hemodialysis patients.

Outcome: mortality						
Variable	All patients (no HD)		eGFR \geq 45 mL/min		eGFR < 45 mL/min	
	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>
eGFR < 45 mL/min	0,65 (0,31-1,34)	0,2388	-	-	-	-
Age \geq 75 y	2,31 (0,75-7,09)	0,1447	2,31 (0,75-7,09)	0,1447	1,80 (0,49-6,66)	0,3804
Fever	3,92 (1,42-10,80)	0,0083	2,83 (0,63-12,74)	0,1753	5,03 (1,14-22,27)	0,0334
Dyspnea	1,62 (0,73-3,58)	0,2328	2,22 (0,76-6,51)	0,1464	0,80 (0,24-2,67)	0,7174
P/F at admission < 300	1,70 (0,83-3,44)	0,1443	1,82 (0,65-5,09)	0,2537	1,47 (0,51-4,25)	0,4808
GDF-15, quartiles	2,28 (1,53-3,38)	4.49e-05	1,99 (1,17-3,39)	0,0114	2,87 (1,40-5,90)	0,0042

Caption:

eGFR: estimated glomerular filtration rate

GDF-15: Growth Differentiation Factor 15

P/F: PaO₂/FiO₂ ratio

Y: years