

Urinary levels of SARS-CoV-2 nucleocapsid protein associate with risk of AKI and COVID-19 severity: A single-center observational study

Supplementary Material

Désirée Tampe¹, Samy Hakrrouch², Mark-Sebastian Bösherz², Jonas Franz³⁻⁵, Heike Hofmann-Winkler⁶, Stefan Pöhlmann^{6,7}, Stefan Kluge⁸, Onnen Moerer⁹, Christine Stadelmann³, Philipp Ströbel², Martin Sebastian Winkler^{9*}, Björn Tampe^{1*}

¹Department of Nephrology and Rheumatology, University Medical Center Göttingen, Germany

²Institute of Pathology, University Medical Center Göttingen, Germany

³Institute of Neuropathology, University Medical Center Göttingen, Germany

⁴Max Planck Institute for Experimental Medicine, Germany

⁵Campus Institute for Dynamics of Biological Networks, University of Göttingen, Germany

⁶Infection Biology Unit, German Primate Center, Leibniz Institute for Primate Research Göttingen, Germany

⁷Faculty of Biology and Psychology, University Göttingen, Germany

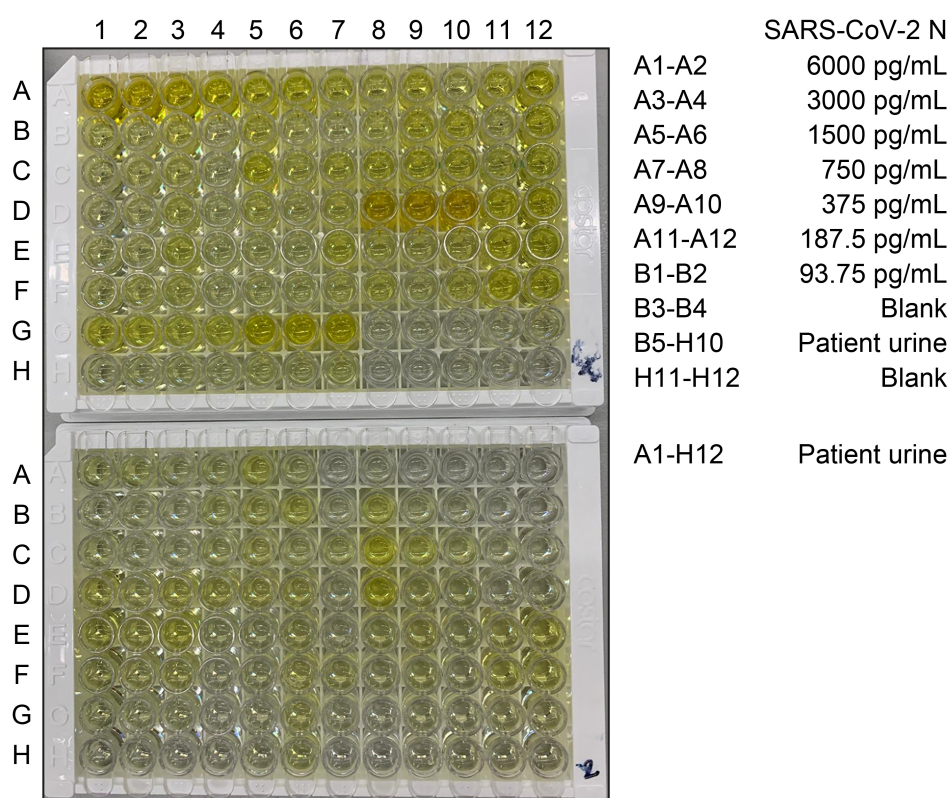
⁸Department of Intensive Care Medicine, University Medical Center Hamburg-Eppendorf, Germany

⁹Department of Anesthesiology, Emergency and Intensive Care Medicine, University Medical Center Göttingen, Germany

*Contributed equally as senior authors



Supplementary Figure 1. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) flow chart of patient disposition.



Supplementary Figure 2. Photomicrographs of urinary SARS-CoV-2 N ELISA measurements in 20 cases with confirmed SARS-CoV-2 infection. ELISA, enzyme-linked immunosorbent assay; SARS-CoV-2 N, severe acute respiratory syndrome coronavirus 2 nucleocapsid protein.

Supplementary Table 1. Clinical and laboratory findings at time of ICU admission.

	COVID-19	No COVID-19	P value
<i>General data</i>			
No. of patients (%)	20	22	
AKI– no. (%)	10 (50)	12 (54.5)	0.7683
Age (IQR) – years	71 (62.3-74.8)	65 (53.3-74)	0.0785
Female sex – no. (%)	6 (30)	9 (40.9)	0.4612
<i>Laboratory findings</i>			
Serum creatinine (IQR) – $\mu\text{mol/L}$	79.6 (60.1-107.6)	154.3 (76.9-232.7)	0.0197
BUN (IQR) – mmol/L	19.5 (15.3-29.8)	27.5 (16.5-40.3)	0.3516
<i>Urinary ELISA – ICU admission</i>			
SARS-CoV-2 N (IQR) – pg/mL	496.6 (198.4-751.7)	ND	

Median values are shown. AKI, acute kidney injury. BUN, blood urea nitrogen. ICU, intensive care unit. IQR, interquartile range. ND, not detectable. No., number. SARS-CoV-2 N, severe acute respiratory syndrome coronavirus 2 nucleocapsid protein.

Supplementary Table 2. Detection of SARS-CoV-2 RNA in post-mortem kidneys.

ID	Age	Female	AKI	Urinary SARS-CoV-2 N pg/mL	SARS-CoV-2 RNA			
					Left cortex	Right cortex	Left medulla	Right medulla
8	80	0	1	4855.2	ND	ND	ND	ND
17	67	0	1	523.4	ND	ND	ND	ND

AKI: acute kidney injury. ND: not detectable. SARS-CoV-2 N: severe acute respiratory syndrome coronavirus 2 nucleocapsid protein.