

COVID-19: Long-term consequences for the kidneys can be expected

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The kidneys are a target organ of COVID-19 and are affected very early in the course. However, this is precisely where there is strong prognostic potential: As early as last spring, COVID-19-associated nephritis was identified as an early warning signal for severe courses of the infectious disease and studies to that effect were published. In that regard, the research group led by Professor Oliver Gross, Department of

Nephrology and Rheumatology at Göttingen University Medical Center (UMG), screened 223 patients in a study and included 145 of them as a predictive cohort. Study endpoints were ICU admission or mortality. As a result, early urinary changes that are easily detectable using test strips indicated a more severe COVID-19 course. When combined as a predictive system (urine and serum markers), it was possible to predict outcomes. "This means that kidney values are a seismograph for the course of COVID-19 disease," explained Prof. Gross, the head of the study, at the Opening Press Conference of the 2021 ERA-EDTA Congress.

The S3 guideline provides general recommendations for inpatient therapy of patients with COVID-19 recommendations and states, *inter alia*, that "in the case of proven SARSCoV-2 infection and hospitalization, urinalysis (repeated where necessary) including determination of albuminuria, hematuria, and leukocyturia should be performed."

Kidney involvement is more than just a predictive marker for the course of the disease, however, but also a very important risk factor for mortality. Several studies [3, 4] have shown that in patients with COVID-19, [kidney](#) involvement, i.e., albuminuria (and/or hematuria), often occurs early on in the course of the disease. A Chinese study concluded that kidney involvement in COVID-19 patients dramatically worsened the outcome of the novel viral disease and increased mortality by a factor of ten (1.25% of patients without kidney involvement died vs. 11.2% of patients with kidney involvement). Until now, the occurrence of [acute kidney injury](#) (AKI) was the only known independent predictor of mortality, but it seems that early signs of kidney involvement, such as proteinuria, hypoproteinemia and antithrombin III deficiency have predictive importance. This raises the question of whether and what specific long-term impacts on the kidneys can be expected after COVID-19.

The data on acute kidney injury (AKI) are relatively clear-cut: In cases of AKI, kidney function recovers after seven days, as distinguished from AKD ('acute kidney disease'), in which recovery of kidney function takes longer, namely up to 90 days. However, there are also many patients in whom kidney function does not recover at all, but gradually deteriorates over the further course of disease, i.e., who develop chronic kidney disease. Kellum et al. showed that there was no recovery of kidney function in a total of 41.2% of patients with stage 2 and stage 3 AKI. Relapses and long-term restriction of kidney function occurred in as many as 14.7% of those who initially recovered. The same working group also showed that these patients had a significantly worse outcome (mortality, need for dialysis) one year after acquiring the AKI. Similar warning signals about chronic kidney failure after COVID-19 are now reaching us from China [7]: "So we can say that just over half of the patients who acquire an AKI will subsequently develop [chronic kidney disease](#). This rate can also be expected after a COVID-19-associated AKI. It's important to bring those affected into nephrological aftercare so that the loss of kidney function is slowed down or, if possible, stopped by giving adequate therapy," explains Prof. Gross.

But what about patients who have not experienced acute kidney failure, but 'only' some initial renal dysfunction? Here too, the expert advises caution and aftercare: "There are ongoing studies with results still pending, but molecular SARS-CoV-2-associated tissue changes have already been detected in various organs in which viral replication has been detected." In that respect, long-term damage to the affected organs and post-COVID entities can be expected.

The most important conclusion drawn by the expert is that, "The kidney must be at the center of COVID-19 aftercare, in addition to the lungs, the heart and the nervous system. This is all the more important because early treatment can halt the loss of [kidney function](#), and in recent years, especially, some new, effective therapies such as SGLT-2 inhibitors

have been launched on the market to meet that need. Nowadays, the need for dialysis can often be delayed for years, even decades, if treatment is rigorously provided from the outset. Given that kidney disease does not produce symptoms until very late, we would like to make people who have had COVID-19 disease aware of the possibility of long-term consequences on the kidneys. It's important that general practitioners check their patients' kidney values (GFR, albuminuria) on a regular basis—similarly to other groups at risk of kidney [disease](#), such as patients with diabetes mellitus and high blood pressure."

- More information:** [1] Gross O, Moerer O, Weber M et al. COVID-19-associated nephritis: early warning for disease severity and complications? *Lancet* 2020; 395 (10236): e87-e88
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