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Letter to the Editor

## The Kidney and COVID-19: Pandemic Effects on the Patients

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**COVID-19** pathogens were identified as new coronaviruses by the sequencing of sample lower respiratory tracts from patients affected, which share a sequence of 79.6 percent identified as severe acute respiratory syndrome coronavirus.<sup>1</sup>

The virus has spread rapidly worldwide and was reported as a pandemic on 11 March 2020 since its detection in Wuhan, China in December 2019. The principal characteristics of COVID-19 were diffuse alveolar damage and acute respiratory failure<sup>2</sup>, involving other organs.

Although co-morbidities such as diabetes and cardiovascular disease have reported as risk factors of COVID-19<sup>3</sup>, there is still no proof of an increased vulnerability to chronic renal disease in patients with chronic kidney disease (CKDs), although there are several studies continuing worldwide. CKD is differentiated by kidney structure abnormalities or functions which last > 3 months and have an impact on patient health<sup>4</sup>.

Their staging is dependent on many factors such as the GFR category and the category albuminuria (KDIGO Level 1, Grade B). The progression of CKD as defined in the category is

considered to be a decline (based on the glomerular filtration rate plus > 25 percent decrease in the average GFR > 5 ml / min/1.73 m<sup>2</sup> / year, rapid improvement, greater confidence in the assessment of progression and higher amount of serum creatinine tests<sup>4</sup>).

Patients with various phases of CKD as specifically end-stage renal disorders are predominantly affected and, due to their old age and high prevalence of co-morbidity, such as hypertension and diabetes, are highly susceptible to severe COVID-19<sup>5, 6</sup>.

It has been observed that 6.7% of SARS-CoV-2 cases (AKI, and the mortality of those with AKI was 91.7%),<sup>7</sup> virus can enter into the blood after lung infection, build up in the kidney and destroy resident renal cells. There is a vulnerability of serious illness in patients with kidney failure (CKD with a progressively reduced kidney function, dialysis and renal transplants)<sup>8</sup>.

The precise mechanism of involvement of the kidney is unclear: the inhabited system involves the sepsis caused by cytokine storm syndrome or direct cell damage by virus. Angiotensin-converting enzyme and dipeptidyl peptidase-4, expressed on

renal tubular cells, and as SARS-CoV and MERS-CoV binding partners, respectively,<sup>9</sup>.

In the kidney tissue and urine, Viral RNA has been identified<sup>10</sup>. Zhong's Guangzhou laboratory recently SARS-CoV2 isolated successfully from an infected patient's urinary sample, which indicated that this novel coronavirus attacks the kidney<sup>11</sup>.

It is also desperately important to consider how SARS-CoV-2 affects the kidney. COVID-19 is a highly infectious infection transmitted by direct as well as indirect (fecal and droplet) human-human transmission, with a median incubation time of 1 to 14 days (normally three to seven days). All age groups have been reported of infection. Most diseases are mild and have a flu-like condition. COVID-19 is frequently diagnosed clinically with fever (98%), cough (76%), myalgia and weakness (18% each)<sup>2</sup>.

About 16% to 20% of cases were classified as critical or severe. Higher frequency of renal abnormalities has been reported recently. In a study of 59 COVID-19 patients 34% had albuminuria on the first day of admission and 63% were proteinuric during their hospital stay<sup>12</sup>. In 27% and two-thirds of patients who died, blood urea nitrogen was increased in total. The prevalence of high serum creatinine and nitrogen from the blood urea was 15.5% and 14.4%.

In patients with normal renal function as well as in patients with progressive chronic kidney failure, AKI was an independent risk factor in hospitals<sup>12, 13</sup>. There have been no studies of impacts on chronic renal disease<sup>14</sup>.

Infection of COVID-19 is a particular hazard to dialysis patients. In 61 therapy centers in Wuhan

City there are 7184 dialysis patients. 37 out of 230 HD patients and 4 out of 33 workers developed COVID-19 infection from 14th January to 17th February 2020 at a single hemodialysis (HD) center in Renmin University, Wuhan University<sup>14</sup>.

However, the deaths were not specifically caused by COVID-19, but were considered systemic causes. In HD patients with COVID-19 there were decreased lymphopenia, reduced serum levels of inflammatory receptors and more severe clinical disease than patients with HD CKD. Therefore, additional precautions should be taken in CKD patients to minimize risk of the infection. Doctors can also be carefully watched to identify signs of worsening of the disease in CKD patients with confirmed COVID-19.

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