Pediatric Nephrologists’ Battle against COVID-19
– Report from Two Designated Children’s Hospitals in China

Xiaowen Wang1, Jiangwei Luan1, Qian Shen2, Hong Xu2

1Department of Nephrology, Wuhan Children’s Hospital of Tongji Medical College, Huazhong University of Science & Technology, Wuhan 430016, China.

2Department of Nephrology, Children’s Hospital of Fudan University, Shanghai 201102, China.

Recently, coronavirus disease 2019 (COVID-19), an acute respiratory illness first discovered in Wuhan, China in December 2019, has rapidly spread not only in China, but the world. Because of its high infectivity and mortality, WHO has defined it as a global pandemic. As of March 15, 2020, there are more than 80,000 confirmed cases in China, of which more than 60% are in Wuhan. At 23:00PM on March 15th, 2020 Beijing Time (16:00PM Central European Time), the total number of global confirmed cases reached 153,648 with 5,746 death cases, and there are 146 countries and regions who has reported confirmed cases (source: CCTV News).

The pathogen of COVID-19 is SARS-CoV-2, primarily spreading through respiratory droplets from an infected individual in close contact. There are more than 900 children and adolescents infected in China (Chin J Epidemiol, 2020) and neonatal infection has also been reported (Chin J Pediatr, 2020). Case-based evidence suggests the existence of aerosol and fecal-oral transmission. Whether transmission can occur through mother-infant vertically or through breastfeeding has not yet been determined. Children who have become infected with SARS-CoV-2 tend to have a good prognosis and adult data showed patients with underlying diseases appear to be more susceptible to significant illness associated with the virus.

To contain the epidemic, in China, strong measures were put in place. On January 23, 2020, Wuhan declared a transportation shutdown. Designated hospitals for treating COVID-19 patients have been assigned in each region. Wuhan Children’s Hospital and Children’s Hospital of Fudan University are unique designated children’s hospital in Wuhan and Shanghai, respectively. So far, the strong and effective measures taken by the
Chinese government have scored phased achievements. During the epidemic, to pediatric nephrologists in China, especially in Wuhan, it is a great challenge to do a good job in their infection prevention and control, as well as continuously manage chronic kidney disease children in this emergency situation.

**Prevention and control strategy for children with chronic dialysis**

Pediatric patients with end-stage kidney disease (ESKD) who are supported by maintenance in-center hemodialysis (HD) or home peritoneal dialysis (PD), are at significant risk for experiencing infectious diseases because of their compromised immune system and their frequent exposure to the hospital setting. Therefore, we have proposed a set of recommendations for the prevention and control of SARS-CoV-2 infection in pediatric HD centers and in home PD children (Chin J of Nephrol, 2020), as well as a protocol for caring for home PD children during the COVID outbreak (Chin J Evid Based Pediatr, 2020). For children who are in-center HD, wearing a disposable general medical mask or surgical mask is required. One child should be accompanied by only one caregiver, who would be allowed to enter into dialysis area only in special situations. We carry out more strict disinfection measures for the dialysis environment, and unnecessary transfer from other dialysis centers is to be avoided.

Compared with in-center HD, home PD is a more commonly used dialysis modality for children with ESKD in China. In recent years, we have applied the automatic peritoneal dialysis (APD) and popularized it in China. In Children’s Hospital of Fudan University and Wuhan Children's Hospital, all children with chronic PD are regularly treated with APD. During the epidemic, by contacting nearby hospitals or contacting PD supply companies, all APD children are able to keep on their current dialysis modalities except one child living in Wuhan city switched from APD to CAPD due to the suspension of delivery services and thus the inaccessibility of PD cassettes, while no child with chronic dialysis interrupted the treatment. Up till now, no ESKD children infected with SARS-Cov-2 has been reported in Wuhan and Shanghai.

**Prevention and control strategy for children with other chronic kidney diseases**

In order to better guide clinicians to strengthen the management of chronic kidney disease children during the epidemic, Chinese Society of Pediatric Nephrology, Chinese Medical Doctor Association of Pediatric Nephrology and National Center for Children’s Health, took the lead respectively in writing the prevention and control strategies related to pediatric kidney diseases during the COVID 19 epidemic.
“Recommendations on the admission, infection prevention and control of pediatric patients during SARS-CoV-2 outbreak” (Chin J Evid Based Pediatr, 2020), “Recommendations for prevention and control of novel coronavirus infection in children with chronic kidney disease” (Chin J of Nephrol, 2020), and “Suggested workflow of online medical consultation for children with chronic kidney disease” (Chin J Evid Based Pediatr, 2020). In view of a number of clinical studies reporting that patients with COVID-19 infection may have acute kidney injury, based on the disease basis of children with chronic kidney disease, we suggest that strengthening the monitoring of the amount of fluid in and out and renal function is necessary, so as to early detect and diagnose acute kidney injury as well as early identify critical diseases. Meanwhile, we suggest to avoid drugs and examination of renal damage, pay more attention to the dynamic changes of the primary disease.

During this epidemic, remote interventions plays an important role in this situation to ensure their medical safety when they postponed their regular follow-up visits due to the outbreak. We combine the traditional modes of delivery of health care, such as phone and online interventions, with novel modes of delivery of health care, such as online pharmacy platforms, to respond to the needs of families while minimizing their chances of contracting COVID-19 during hospital visits. Both online and offline resources are available to provide consultation and to manage families with children with kidney diseases to prevent treatment interruptions.

2020 World Kidney Day

On March 12, 2020, the 15th World Kidney Day, “Internet Plus” Nephrology Alliance of National Center for Children’s Health, Chinese Society of Pediatric Nephrology and Chinese Medical Doctor Association of Pediatric Nephrology jointly organized an online academic activity focusing on the prevention strategy and management of children with chronic kidney disease during the epidemic period of COVID-19. Nearly 1000 pediatric nephrologists/pediatricians from more than 140 hospitals attended it. During the activity, pediatric nephrologists in Wuhan also shared their experiences and touching stories in this battle: in the isolation ward, sticking to the post and keep the line of fire; the dual identities of ‘relatives of COVID-19 patients’ and ‘doctor’ are both important; taking good care of children and meticulous treatment conscientiously. Despite the raging COVID-19, diagnosis and treatment of children with kidney disease has never stopped. After day and night’s struggle and the strict prevention and defense of all doctors and nurses, "WE HAVE SEEN THE DAWN".
When disaster struck, help came from all sides. In China, there are more than 42,000 doctors and nurses from all over the country supporting Wuhan City and Hubei Province. They show the Chinese power of unity in one purpose and joint response to challenges, meanwhile show the Chinese nation's feelings of working together and helping each other. We have received sincere wishes from pediatric nephrologists all over the world. We sincerely thank Professor Hui-Kim Yap and IPNA to active free subscription for more than 160 members from Chinese Society of Pediatric Nephrology and Chinese Medical Doctor Association of Pediatric Nephrology to the IPNA educational material for 2020 as a gesture of support in view of the COVID-19 in China. We firmly believe that, with the cooperation, we will be able to overcome the epidemic!