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The severity of COVID-19 in children on immunosuppressive medication

The number of people with coronavirus disease 2019 (COVID-19) during this ongoing pandemic is rising rapidly. It is already clear that children have considerably better outcomes than adults (particularly older adults ≥ 70 years), with a mortality of less than 1%.^{1,2} In the adult population, those with pulmonary or cardiac comorbidities have worse outcomes than those without these comorbidities.¹

We are currently managing an ongoing survey that includes children aged 0–19 years with kidney disease on immunosuppressive medication who are diagnosed with COVID-19. The study was initiated by the European Rare Kidney Disease Reference Network and is supported by the European, Asian, and international paediatric nephrology societies. The members of these societies and the members of the listserv, Pedneph, were asked at regular intervals to include any child in their care fulfilling these criteria. The information was collected in a totally anonymised manner.

Within 6 weeks after March 15, 2020, 18 children from 16 paediatric nephrology centres across 11 countries (ie, Spain, Switzerland, China, the UK, Germany, France, Sweden, Colombia, the USA, Iran, and Belgium) who met our criteria were recorded. We report on the underlying diagnoses, ongoing immunosuppressive treatment, clinical symptoms, and outcomes (table).

These data from a small number of children suggests that even children receiving immunosuppressive treatment for various indications appear to have a mild clinical course of COVID-19. Similarly, a study with eight children with inflammatory bowel disease found that all children diagnosed with COVID-19 had a mild infection, despite treatment with immunomodulators, biologics, or both.³

The low number of children thus far in our global survey is consistent with a study from Lombardy, Italy.⁴ Grasselli and colleagues⁴ described 1591 patients who needed treatment in intensive care.⁴ Of those 1591 patients, only four were younger than 20 years. At the time of publication, none of these

four young people had died, but two still needed treatment in intensive care. Three of these four individuals had some undefined comorbidity.

Although with a survey administered online there is a risk of underreporting because not all clinicians might receive it, we believe that the widespread



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	Participants with COVID-19 (n=18)
Demographics	
Median age, years	11.5 (6.0–14.0)
Sex	
Boys	11 (61%)
Girls	7 (39%)
Underlying kidney disease and reason for immunosuppression	
Kidney transplantation	11 (61%)
Nephrotic syndrome	3 (17%)
Antineutrophil cytoplasmic antibody-associated vasculitis	2 (11%)
Atypical haemolytic uraemic syndrome	1 (6%)
End-stage kidney disease with inflammatory bowel disease	1 (6%)
Immunosuppressive treatments	
Glucocorticoids	12 (67%)
Tacrolimus	12 (67%)
Mycophenolate Mofetil	9 (50%)
Rituximab	3 (17%)
Azathioprine	2 (11%)
Basiliximab	1 (6%)
Cyclophosphamide	1 (6%)
Ciclosporin	1 (6%)
Everolimus	1 (6%)
Adalimumab	1 (6%)
Eculizumab	1 (6%)
COVID-19	
Symptoms	
Fever	13 (72%)
Cough	11 (61%)
Rhinitis	5 (28%)
Diarrhoea	3 (17%)
Shortness of breath	0 (0%)
Median time since the onset of illness at the time of reporting, days	5.0 (2.0–9.5)
Maximal respiratory support required	
High-flow nasal cannula oxygen	1 (6%)
Supplemental face mask oxygen	2 (11%)
None	15 (83%)
Outcome	
Admitted to intensive care	0 (0%)
Admitted to hospital	11 (61%)
Not admitted to hospital at any point	7 (39%)

Data are n (%) or median (IQR). COVID-19=coronavirus disease 2019.

Table: Demographics, immunosuppressive treatments, and outcomes of children with kidney disease and COVID-19

dissemination of this survey across multiple international organisations would mean that most severe cases of COVID-19 in children with kidney disease would be reported. Analysis of our data across four countries where survey dissemination and case reporting is known to be high suggests that the incidence of COVID-19 in the paediatric kidney transplant population is similar to the background incidence of COVID-19 in the general population (appendix). However, we accept that this type of survey does not have a truly systematic approach to identifying cases, which limits our study.

Studies with higher numbers of children are needed to confirm these early findings and identify any long-term consequences of, and the level of immunity that might be acquired from, COVID-19. We therefore encourage readers of this Correspondence to report all children under their care who fulfil our inclusion criteria to our study.

We declare no competing interests. We thank all colleagues who filled out our survey.

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- 4 Grasselli G, Zangrillo A, Zanella A, et al. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. *JAMA* 2020; published online April 6. DOI:10.1001/jama.2020.5394.

See Online for appendix

For more on our study see
www.surveymonkey.de/r/ERKNET_COVID-19