

Pediatric Critical Care and COVID-19

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Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2, disproportionately affects adults (children <5% in most reports).¹ Adult critical illness is characterized by acute hypoxemia, multiorgan failure, and high mortality.^{2,3} Reported risk factors for severe illness include age, cardiorespiratory comorbidities, obesity, and laboratory findings (lymphopenia and elevated D-dimer).^{2,4} Pediatric reports describe low infection rates and infrequent PICU admission.^{5,6} The largest PICU report consists of 48 North American children.⁷ It describes treatments and outcomes but not with adequate granularity to understand critical pediatric COVID-19. The Critical Coronavirus and Kids Epidemiology Study was designed to specifically investigate severe cases and provide detailed data. It involves >60 centers in nearly 20 countries from the Americas and Europe. In this report, we provide preliminary insights into our first 17 patients.

METHODS

The Critical Coronavirus and Kids Epidemiology is a cohort study of children <19 years old with severe or critical COVID-19. The study period runs from April through December 2020. For this report, we included patients enrolled through April 23. We defined critical COVID-19 as a positive severe acute respiratory syndrome coronavirus 2 test result and requiring ICU therapies (high-flow nasal cannula [HFNC], noninvasive ventilation [NIV], invasive mechanical

ventilation [IMV], vasoactive support, continuous renal replacement therapy). Severe COVID-19 included those receiving mask or nasal oxygen exceeding the pediatric acute respiratory distress syndrome (ARDS) “at risk” threshold.⁸

Deidentified data were collected by using a modification of the International Severe Acute Respiratory and Emerging Infection Consortium form (<https://isaric.tghn.org/COVID-19-CRF/>). Local ethics approval was obtained with a waiver of need for consent.

RESULTS

We enrolled 17 children from 10 PICUs in Chile, Colombia, Italy, Spain, and the United States. Detailed data are in the Supplemental Information. Most patients were male (65%), young (median 4 years; range 0.08–18 years), and without known COVID-19 exposure (14 of 17). Comorbidities (Table 1, Supplemental Table 3) were common (71%) but variable. Symptoms were heterogenous, with fever and cough being most frequent (Table 1, Supplemental Table 3). Most with gastrointestinal (GI) symptoms (4 of 6) were also diagnosed with myocarditis (Supplemental Table 4). All these were from Europe and without previous cardiovascular disease.

Patients had frequent laboratory testing (Table 1, Supplemental Table 5). Common findings included leukocytosis, lymphopenia, elevated inflammatory markers, D-dimer, and



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