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Irish SARS-CoV-2 Convalescent Serological Status of Children Following Acute Pneumonia During Ireland's First Wave

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A global epidemic caused by a novel coronavirus (SARS-CoV-2) in China in December 2019 has spread worldwide[1]. We hypothesised that due to low levels of viral shedding in children's upper airways, many children with COVID-19 related respiratory illness admitted to the hospital might be negative on nasopharyngeal PCR testing. Evidence suggests that SARS-CoV-2 antibodies can be detected typically 9-14 days after onset of symptoms but may take up to 3 months[2]. Therefore, convalescent serological evidence of SARS-CoV-2, as an alternative means to determine the rate of COVID-19 infection, was assessed.

It is a multicentre case-control study in two regional hospitals in the South-West of Ireland during the first wave of Covid-19 infection. Children aged 6 weeks to 16 years presenting with acute pneumonia and age-matched controls were invited to return for convalescent serological testing within 3-4 months of presentation. The Abbott Architect SARS-Cov-2 IgG immunoassay and Anti-SARS-CoV-2 IgG-Total Fortress was performed by the National Virus Reference Laboratory (NVRL). Ethics was approved by the National Research Ethics Committee for COVID-19-related Research (20-NREC-COV-064).

Between Feb and June 2020, 222 patients met the criteria for inclusion. None had positive nasal PCR at presentation;47/222(21%) cases and 42 controls returned at 3-4 months for serological testing.25 cases presented in February ,16 in March ,4 in April and 2 in May. 34 patients were less than 10 years and 13 between 10-16 years. The median age was 6.270; the median SD age was 4.357. 26 patients were male, and 21 were female.

Serological testing was carried out on 12 patients between 12 to 16 weeks,32 patients between 16 to 20 weeks and 3 patients between 26-30 weeks. Respiratory pathogens were detected in 8 patients (Rhinovirus, Mycoplasma, Adenovirus, Bocavirus and RSV). One had a complicated admission with pleural effusion but was discharged home well. None of the cases or controls tested positive for SARS-CoV-2 in convalescent serology.

We have shown that in our centres, no children with acute pneumonia presenting between February and June 2020 were found to have convalescent serological evidence of SARS-CoV-2. Other pathogens were detected in (8/47)17% of the cohort. This has reassured us that cases of SARS-CoV-2 related pneumonia were not undetected during this first wave. The serological prevalence of SARS-CoV-2 in the general population was estimated to be 1.7% at this time[3]. Previous studies have shown low rates (<2%) confirmed compared to suspected SARS-CoV-2 in children with respiratory illness. A larger cohort may likely have detected positive cases. Equally, the timing and persistence of serological positivity was unclear when we initiated the study. We now estimate that serological positivity may be short-lived, and children may have seroconverted before the timing of our samples. Future studies should include serial measurements closer to the time of presentation[4]. This study is limited because the cohort is small, and not all cases were tested by nasal PCR. However, we have been reassured that SARS-CoV-2 remained an infrequent cause of acute pneumonia in children during Ireland's first wave.

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