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Toward a clinically based classification of disease severity for paediatric COVID-19

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See Online for appendix

In their Article, Haiyan Qiu and colleagues¹ described 36 children with coronavirus disease 2019 (COVID-19) using the Chinese classification for paediatric COVID-19 severity: asymptomatic infection, mild disease, moderate disease, severe disease, and critical illness.² Herein, we focus on the definition of moderate disease. This definition is based on clinical criteria (pneumonia with fever and cough in the absence of signs of hypoxaemia), radiological criteria (because “some cases may have no clinical signs and symptoms, but chest CT shows lung lesions, which are subclinical”), or both.² In another study of COVID-19 in children, Lu and colleagues³ also used CT scans to identify lung lesions and classify the severity of COVID-19.

Since the study by Qiu and colleagues,¹ we have evaluated 59 children with suspected COVID-19 in our paediatric emergency department. None of these 59 children had a CT scan; 14 (24%) had a chest x-ray. COVID-19 was confirmed by nasopharyngeal RT-PCR in a child aged 13 years who was exposed to a family member with COVID-19 and who later presented to our emergency department with a fever and dry cough. Blood tests, including inflammatory markers, were within normal ranges. Because the child appeared reasonably well, we did not do an x-ray or a CT scan, but did a lung ultrasound using a procedure we have previously described.⁴ The lung ultrasound showed a small, subcentimetric subpleural consolidation with vertical artefacts. The child recovered without treatment and the case of COVID-19 was classified as mild. However, we cannot know whether the CT scan would have showed subclinical lung lesions and thus allowed a classification of moderate disease.

Although chest CT scans improve diagnostic accuracy, doing these scans in children comes with disadvantages, such as high costs, the need for sedation, and radiation exposure. Therefore, a classification of severity that includes the radiological diagnosis of pneumonia is not appropriate for children. Guidelines⁵ state that medical history and examination are the determinants of pneumonia severity and appropriate levels of care, and that clinicians should reserve imaging to compromised children needing admission to hospital. Moreover, the high reported number of paediatric patients with asymptomatic and mild COVID-19 suggests that imaging should not be routinely used.^{1,3}

Therefore, we propose the definition of moderate disease in the paediatric classification of COVID-19 severity should be changed to a clinical diagnosis of pneumonia, frequent fever and cough (mostly dry cough, followed by productive cough), presence or absence of wheezing but no obvious signs of hypoxaemia (eg, shortness of breath), abnormal breath sounds on auscultation, and dry or wet snoring. The section “some cases may have no clinical signs and symptoms, but chest CT shows lung lesions, which are subclinical”² should be removed because these asymptomatic or paucisymptomatic children should not have imaging scans done and should be classified as having mild COVID-19.

Qiu and colleagues¹ and others³ should provide a new description of their patients using the clinically based classification we have suggested, showing how the mild and moderate classes would change. This description would provide a more appropriate clinical picture of the disease to paediatricians looking after children with suspected COVID-19. Reclassifying these data will also help clinicians to properly allocate resources.

We declare no competing interests. Members of the Gemelli-pediatric COVID-19 team are listed in the appendix.

*Danilo Buonsenso, Niccolò Parri, Cristina De Rose, Piero Valentini, on behalf of the Gemelli-pediatric COVID-19 team

daniilo.buonsenso@policlinicogemelli.it

Department of Woman and Child Health and Public Health, Policlinico Universitario Fondazione Agostino Gemelli IRCCS, Rome 00168, Italy (DB, PV); Department of Pediatric Emergency Medicine and Trauma Center, Meyer University Children's Hospital, Florence, Italy (NP); and Institute of Pediatrics (DB, CDR, PV) and Institute of Microbiology (DB), Università Cattolica del Sacro Cuore, Rome, Italy

- 1 Qiu H, Wu J, Hong L, Luo Y, Song Q, Chen D. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study. *Lancet Inf Dis* 2020; published online March 25. [https://doi.org/10.1016/S1473-3099\(20\)30198-5](https://doi.org/10.1016/S1473-3099(20)30198-5).
- 2 National Health and Health Commission of the People's Republic of China. Diagnosis and treatment guidelines for 2019 novel coronavirus pneumonia (draft version 5). Feb 4, 2020. <http://www.nhc.gov.cn/yzygj/57653p/202002/3b09b894ac9b4204a79db5b8912d4440.shtml> (accessed March 12, 2020).
- 3 Lu X, Zhang L, Du H, et al. SARS-CoV-2 infection in children. *N Engl J Med* 2020; **382**: 1663–65.
- 4 Buonsenso D, Pata D, Chiaretti A. COVID-19 outbreak: less stethoscope, more ultrasound. *Lancet Respir Med* 2020; published online March 20. [https://doi.org/10.1016/S2213-2600\(20\)30120-X](https://doi.org/10.1016/S2213-2600(20)30120-X).
- 5 Bradley JS, Byington CL, Shah SS, et al. The management of community-acquired pneumonia in infants and children older than 3 months of age: clinical practice guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America. *Clin Infect Dis* 2011; **53**: e25–76.

Authors' reply

We thank Danilo Buonsenso and colleagues for their excellent suggestion in response to our observational cohort study.¹ We think that defining the moderate clinical type of coronavirus disease 2019 (COVID-19) severity should be based on what the presence of pneumonia means in the progression of COVID-19 and what classifying measures are more practical for clinicians. COVID-19 was initially understood as pneumonia caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Now, after the reporting of a great number of mild and asymptomatic



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