Apart though from the management of febrile children, pediatricians and the pediatric infectious diseases specialists will also have to face challenges with the infection during the neonatal period. Undoubtedly close monitoring of at-risk neonates is essential in the neonatal wards, but there are issues where evidence-based guidance is needed. The first priority is identifying the timing of infection (antenatally, perinatally or postnatally) and confirming its presence. Two recent reports from China suggest that in utero infection could be possible based on the measurement of IgM levels in neonates shortly after birth but no further confirmation of this with a positive reverse transcriptase–polymerase chain reaction test. Therefore, although in utero transmission is possible, larger studies on infected women will bring further insight in the field. In the case of the in utero infected neonate, the timing of infection may have an impact on fetal development and possibly on long-term outcomes. We do not know as yet whether acquisition during first trimester of pregnancy is associated with birth defects and whether fetal infection is more likely in the advanced pregnancy stages following the patterns of other congenital infections. What we do know though is that antenatal infection with other coronaviruses (severe acute respiratory syndrome and Middle East respiratory syndrome) is associated with possible miscarriage, intrauterine growth retardation prematurity and low birth weight. Moreover, at present, we do not know how many molecular tests we need to perform and whether 2 tests are enough to rule out neonatal infection given that serology is not always reliable, as observed with other congenital infections. In addition to that, uncertainty exists as to whether respiratory specimens are enough or blood, stool or urine samples would offer more accurate results.

Last but not least separation of an infected mother from her offspring and feeding options are issues for further consideration. Some guidelines suggest complete separation of a COVID-19-positive mother and her baby for at least 14 days or until viral shedding clears, during which time direct breast-feeding is not recommended. On the other hand, the Centre for Disease Control and Prevention and the Royal College of Obstetricians and Gynaecologists recommend breast-feeding with strict contact precautions based on the fact that so far there is no evidence that the virus can be transferred via breast milk. For those women who are too sick to breast-feed, the recommendation is breast milk expression and avoidance of any contact with the baby.

In conclusion, the current pandemic poses several challenges to the pediatricians from the neonatal period throughout adolescence. Evidence-based recommendations are lacking at present, and future research in pediatric COVID-19 should also focus on neonates.

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COVID-19 in the Pediatric Population Admitted to a Tertiary Referral Hospital in Northern Italy: Preliminary Clinical Data

To the Editors:

At the end of December 2019, the coronavirus disease 2019 (COVID-19) epidemic started in China and then expanded worldwide. Thereafter, many clinical studies have been reported, but most of them concerned the Chinese people. Clinical data regarding the Italian pediatric population are still lacking.

In February 2020, the COVID-19 pandemic flared up across Italy, the first cluster started in South-Lombardy, which is still the most affected area.1 COVID-19 caused about 19,000 deaths, including more than 110 doctors, so far (April 11).

Based on this background, we analyzed the data concerning all pediatric patients with COVID-19 (0–18 years old) admitted to the San Matteo Hospital of Pavia until April 4. The Province of Pavia (about 550,000 residents) belongs to Lombardy Region and is the catchment-area of this hub hospital. Patients were stratified in 4 subgroups according to the severity of the disease: classified as requiring home isolation, admission to low-intensity care, sub-intensive care unit or intensive care unit (ICU). We also considered the data of all patients with COVID-19 living in Lombardy, evaluating the same classification adding the death rates.

Table 1 shows the demographic and clinical data. As of today (April 11), 17 children had COVID-19 diagnosis based on clinical data and positive swab (RT-PCR analysis). There was a slight predominance of males (58.8%), the median age was 4 years. Five children required the home isolation as the symptoms were very mild; 12 were admitted at the hospital: 3 (25%) required low-intensity care, 8 (66.7%) sub-intensive care and 1 (8.3%) ICU admission.

Analyzing the data concerning the whole Lombardy population, 29.3% of patients with COVID-19 had home isolation, 21.5% required low-medium-intensity care, 2.3% ICU admission, and 18.3% died. Therefore, there is, presently, convincing evidence that COVID-19 causes a mild-moderate disease in childhood. Consistently, no child has died so far in Italy. Indeed, disease severity, namely intensity of requested care and mortality rate, progressively increased with age. These findings could be interpreted as reassuring for the pediatric age and young adulthood. On the other hand, COVID-19 may seriously affect elderly people, requiring an outstanding care concentration.

These outcomes were consistent with the literature data.2,3 Several hypotheses were envisaged, including the different frequency of angiotensin converting enzyme 2 (ACE2) expression on pneumocytes, which is higher in the elderly and male. ACE2 is the receptor for coronavirus, thus overexpression promotes infection. Hypertension, chronic respiratory diseases, cancer and metabolic disorders were also reported frequent comorbidity, common in older subjects.4,5 However, no conclusive factors have been defined still now. On the other hand, children seem to be protected thanks to some probable mechanisms. Children have usually fewer comorbidity, ACE2 is under-expressed and do not smoke (smoking is associated with increased expression of ACE2), have a large thymic repertoire and sustained innate immunity, more T and B regulatory lymphocytes than adults, and received a wide vaccination program. As a result, children could have a more protective immune response than adults.

Therefore, the current data confirm the good prognosis in children. An ongoing study is investigating more detailed risk factors in this population.

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