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EDITORIAL

COVID-19 surveillance for all newborns at the NICU; conditio sine qua non?

J. Peter de Winter[1,2] · Daniele De Luca[3,4] · David G. Tingay[5,6,7]

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Previous studies have reported fewer cases of Coronavirus disease 2019 (COVID-19) in children than in adults, and to date there is limited literature about the clinical course and outcomes in neonates [1, 2]. Not inappropriately the focus of COVID-19 therapies has been in adults, especially the aged. However, it is clear that an immature immune system makes neonates, especially those in the NICU, highly vulnerable to infections generally [3, 4], and thus probably also for COVID-19. One case series has suggested that the younger the child, the higher risk of severe COVID-19 disease [5]. The first report of a neonate with COVID-19 infection was a 17 days old boy who recovered [6]. At the time of writing, complete data[1] on 35 neonates have been included in the database EPICENTRE [7]. Vertical risk was present in 33 neonates, and only two infants were reported to have community exposure. As more neonates are included in well-designed databases, the more we understand the risks, clinical spectrum, severity and complications in this patient population. Moreover, we can focus on ways to prevent COVID-19 infections in neonates born from an infected mother, or neonates that are infected in the community, whether at home, in hospital, by health care workers or families, especially during any potential new pandemic waves.

Since the start of the pandemic, there has been an exponential increase in publications describing the measures that need to be taken in specific patient groups and this has resulted in various, and often diverse, proposals for guidelines [8]. Unfortunately, at the time of writing, there is no universally applicable, evidence-based guideline for the prevention and management of COVID-19 infection in the paediatric population,. Evidence-based policies are needed on to prevention of horizontal COVID-19 clusters within the NICU, as well as many other open questions. What changes in vulnerability may occur in neonates with different pre-morbid conditions, such as prematurity or cardiac disease? Is co-horting cases better? Should we test breastmilk more often? How do we manage or avoid contact with non-parental relatives and siblings, or should they be tested before their visits? How to handle rooming in and post-discharge care?

For the time being, we have to assemble reasonable experience based guidelines to prevent COVID-19 within the NICU. In this issue of European Journal of Pediatrics, we publish an intriguing study performed in a 3rd level Italian NICU located in one of the regions most affected by the pandemic [9]. The authors present a method to care for these vulnerable neonates. Cavicchiolo et al. describe their

[1] Only neonates with a closed data entry have been included, this also does not include regions/countries submitting complete population datasets rather than via individual sites

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✉ J. Peter de Winter
ejp@spaarnegasthuis.nl

[1] Department of Pediatrics, Spaarne Gasthuis, Hoofddorp/Haarlem, The Netherlands

[2] Department of Development and Regeneration, KU Leuven, Leuven, Belgium

[3] Division of Pediatrics and Neonatal Critical Care, "A. Beclere" medical center, Paris Saclay University Hospitals, Paris, France

[4] Physiopathology and Therapeutic Innovation Unit, INSERM U999, Paris Saclay University, Paris, France

[5] Neonatal Research, Murdoch Children's Research Institute, Melbourne, VIC, Australia

[6] Department of Neonatology, Royal Children's Hospital, Melbourne, VIC, Australia

[7] Department of Pediatrics, University of Melbourne, Melbourne, VIC, Australia

experience with early heightened surveillance of all neonates during the peak two months of the initial pandemic period in their area. No positive tests in the group of 75 neonates admitted to their unit were found; however, five asymptomatic adult individuals were discovered.

Let's have a look at these vulnerable small neonates in the NICU. We know that pregnant women and their foetuses represent a high-risk group during COVID-19 outbreaks [1]. Initial reports suggest neonatal mortality was 2% [5, 6] in mothers with COVID-19 in their third trimester, and 1/3 of births were transferred to the NICU, mainly due to the need for investigations and monitoring. Now we have clear evidence that SARS-CoV-2 replicates in placental cells and that vertical intra-utero transmission can occur, although it remains a rare event. The same applies for transmission during delivery and an international classification to diagnose fetal and neonatal COVID is now available [10–12] Cavicchiolo's study was not focused on this group of potentially infected neonates, but the experience of neonates within a NICU. They followed all caregivers, caretakers and neonates during their stay at the NICU whilst standard hygiene precautions and appropriate use of protective equipment were being applied. Most neonates were already isolated in an incubator, a potentially under-appreciated barrier in the COVID-19 pandemic that is familiar to neonatal clinicians but not in other critical care settings. The five asymptomatic COVID-19 carriers had already had contact with inpatient neonates at the time of diagnosis. Several aspects have to be discussed in relation to this study. For obvious ethical reasons, this study was performed without a control ward. We never will know whether or not this surveillance would have prevented illnesses in the infants nor whether the increased COVID-19 hygiene measures had been enough without putting adults into quarantine. The psychological burden of increased hygiene measures and restricted access, in addition to the anxiety of being positive for COVID-19 might disrupt parental interaction and prevent health care worker well-being and performance.

Finally, the economic burden of this surveillance study should be investigated and compared with other measures and different NICU's. Time will tell whether the proposed, and frequently advised, measures of triage and adherence to appropriate protective equipment will decrease the burden of COVID-19 disease on the neonatal ward. or whether there exists a place for extreme measures (universal surveillance and banning family visits) have any role during sharp rises in community COVID-19 rates. Hopefully, several extreme measures will not be needed, especially if very rapid and reliable tests become available. For the time being, it seems reasonable to use the available published COVID-19 NICU protocols [13–15], and increase surveillance when case-rates rise locally; unfortunately probably a necessary condition we will continue to face for some time.

Compliance with ethical standards

Competing interests DDL and DGT are principal investigators of the European Society of Paediatric and Neonatal Intensive Care COVID19 Paediatric and Neonatal Registry (EPICENTRE Project). DGT is a deputy chair of the Australian National COVID-19 clinical evidence taskforce paediatric and adolescent panel. There are no other competing interests to declare.

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