

How to Perform Pediatric Lung Ultrasound Examinations in the Time of COVID-19

 Video online at julttrasoundmed.org

To the Editor:

The recent pneumonia outbreak spreading from Wuhan, China, in December 2019 is caused by the 2019 novel coronavirus infection and defined as 2019 novel coronavirus disease (COVID-19).¹ This epidemic currently involves almost all countries in the world.

Although chest radiography is a routine tool to diagnose respiratory diseases including COVID-19 pneumonia, it lacks sensitivity and has relatively low accuracy.^{2–5} For this reason, lung ultrasound (LUS) has been increasingly used for the diagnosis of respiratory diseases in both adult and pediatric patients, including COVID-19.⁶

Children of all ages are susceptible to COVID-19, although the clinical manifestations of COVID-19 cases in children are generally less severe than those of adult patients at present.⁷ Therefore, while waiting for the result of the nasal/pharyngeal swab for COVID-19, differential diagnosis with other known viral or bacterial respiratory infections remains pivotal. It can be based on the clinical and laboratory data and LUS findings.

For this reason and in consideration of the importance of minimizing health care worker and medical device exposure to suspected or positive COVID-19 cases, we initially introduced a specific procedure based on the use of LUS by 2 pediatricians.⁸ This approach has several advantages, since the same evaluating clinician can visit the patient, perform blood tests or insert intravenous lines if required, and obtain lung images with portable devices at the same time.⁸

However, all institutions are now experiencing a shortage of personal protective devices, and all health care workers are now asked to minimize their use. Therefore, we are now performing a novel LUS method aimed at reducing both the number of operators and the use of personal protective devices.

Written informed consent was obtained from the caregivers of the child participants and from the parents of the boy presented in the videos (Videos 1–3),

illustrating the aforementioned novel LUS procedure. The study was approved by the Institutional Review Board and Ethics Committee (protocol 36173/19 ID2729).

Videos 1–3 show the novel procedure. One of the pediatricians prepares the ultrasound (US) pocket device, which comprises a wireless transducer and a tablet. The transducer is placed in single-use plastic covers or a glove sealed with plaster, as previously reported.⁸ Operator 1, wearing the standard personal protections as per World Health Organization⁹ indications according to the single situation, enters the room of the patient with the wireless transducer and performs the LUS examination. Operator 2 remains outside the room with the tablet and is responsible for freezing and storing images/videos without entering the room (Videos 1–3). This procedure can reduce the operator dependence of US, since the operators are blinded to each other. At the end of the procedure, only the transducer needs to be sterilized in a dedicated area and put into a new sterile plastic bag.

To date, 21 children with suspected COVID-19 infection were evaluated with this procedure. Of these children, only one 13-year-old boy tested positive for COVID-19 (Video 3); 5 of them had viral respiratory tract infections; and 1 adolescent had a diagnosis of bacterial pneumonia. All cases were managed with LUS, and no chest radiographic or computed tomographic scans were performed.

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