



## Lung ultrasound in pediatric patients with COVID 19 in the Intensive Care Unit ICU

*El ultrasonido pulmonar en pacientes pediátricos con la COVID-19 en Unidades de Cuidados Intensivos UCI*

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Dear Director:

With the advent of a new nosological entity in December of last year, as coronavirus 2019 infection (COVID-19), many studies have been carried out for its characterization, in order to achieve a satisfactory diagnosis and timely treatment. Its high rate of complications affects the increase in the number of admissions to Intensive Care Units, where the pulmonary ultrasound (PU) plays an important role in the diagnosis and monitoring of the natural history of the disease.

Ultrasound has multiple advantages over other imaging study methods: no use of ionizing radiation, low comparative cost, high accessibility, and the possibility of performing dynamic examinations anywhere. In the specific case of COVID-19, there are some additional advantages. Firstly, ultrasound equipments are easier to clean and disinfect than radiography or tomography equipments, which gives a considerable advantage in terms of effective protocols for controlling virus transmission associated with health care. In addition, those patients who develop the most severe variant of the disease, with viral pneumonitis and the requirement of invasive artificial ventilation benefit especially, from having a study modality that can be performed in the Intensive Care Units, in a cyclical pattern, avoiding the risks inherent to intrahospital transfer.<sup>(1)</sup>

Although at present, COVID-19 in pediatric patients appears to be less severe than in adult populations, children are not free from. Several case series have documented that COVID-19 can affect children of all ages, from newborns to adolescents, and asymptomatic forms have also been described.<sup>(2,3)</sup> The harmful effects of ionizing radiation and its limited use in pediatric ages are known, as a result PU emerges as an indispensable diagnostic tool in this age-bracket when studying lung diseases, even more in times of COVID-19.

In addition, in the early stages of the disease, chest radiography can be negative, while PU detects small details invisible to X-rays, showing greater sensitivity and specificity.<sup>(3)</sup>

In pulmonary ultrasound there are no findings that are specific to COVID-19, but its association and distribution are highly suggestive in a clinical-epidemiological context like the current one. It has been described that findings in PU have a posterior predominant distribution, especially posteroinferior.<sup>(2)</sup>

The signs observed in PU are similar to those described in other types of pneumonia.<sup>(4)</sup> Among them, several forms of B lines are mentioned, including the so-called "white lung" because of their confluence; an irregular or fragmented pleural line, consolidations, pleural effusions and absence of pleural sliding.<sup>(1,2,3,4,5)</sup> The "light beam sign" is also added, which corresponds to the "tarnished glass" image in CT, as a vertical artifact that moves rapidly with the pleural sliding, while creating an on-off effect as it appears and disappears on the screen.<sup>(4)</sup>

The veracity of these points of view has allowed the classification of the disease in four sonographic patterns, creating a diagnostic score as a potential mechanism to stratify COVID-19 related to lung injury.<sup>(1, 2, 3, 4, 5)</sup>

Sonographic tools for Pulmonary Ultrasound (PU) can also be used to monitor the degree of pulmonary ventilation in patients admitted to Intensive Care Units, being one more approach to assess the evolution of the patient and the possibility of weaning him/her from artificial ventilation.<sup>(4, 5)</sup>

In Cuba, due to the shortage, secondary to the cruel and genocidal economic blockade imposed by the government of United States, the PU becomes an indispensable alternative for the study of lung diseases in view of the lack of radiographic material. In addition to this simply economic issue, the popularity and generalization of this means of diagnosis in the world, especially in pediatric ages, is joined by the scientific opinion that prove its innocuousness and sensibility.

### **Conflict of interests**

The authors declare that there are no conflicts of interest.

### **Declaration of Authorship**

**MBV-** participated in the conceptualization and design of the work, collection/obtaining of results, data analysis and interpretation, contribution of patients or study material, writing and critical review of the manuscript, in the approval of the final version along with statistical advice.

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