

Standardized protocol for ultrasound diagnosis of the lungs with COVID-19

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Conflict of interest: none

BACKGROUND. The era of coronavirus disease (COVID-19) set the such task for lung ultrasound (LUS): to identify the presence of COVID-pneumonia, its differential diagnosis with other conditions which characterized by interstitial edema, determining the severity of lung damage and its location, the dynamics of pulmonary changes tissue, the development of complications, as well as to assess the effectiveness of personalized therapy.

OBJECTIVE. To develop a national LUS protocol for COVID-19 based on a balance of completeness of information with the optimal minimum of time and effort for medical staff, who often do not specialize in ultrasound using, with ultrasound equipment of basic and middle classes.

MATERIALS AND METHODS. A total of 1576 patients with COVID-19 were examined. There were 810 women (51.4 %) and 766 men (48.6 %). The age of the examined patients was in the range of 18-83 years, the average age was 52.3 ± 14.6 years. 4710 LUS were performed, of which 1572 were repeated and 3144 – in the dynamics. Polysystemic ultrasound was performed in 275 patients. Ultrasound devices of both domestic and foreign production were used: Soneus P7 (Ultrasine, Ukraine), Handy-Usound (Ukraine), Xario, USAP-770A (Toshiba, Japan), GE Venue (General Electric, USA) and TE7 COVID (Mindray, China) with ultrasound probes of convex, linear and microconvex formats.

RESULTS. Summarizing our own experience with patients with COVID-19 in 2020-2021, we have developed a version of the LUS-protocol, which has a convenient form of recording all stages of ultrasound with maximum coverage of the entire volume of both lungs according to a clear algorithm, a graphical form, clear ultrasound semiotics and diagnostic scoring criteria for the severity of lung damage.

CONCLUSIONS. 1. Clinical data indicate the feasibility and effectiveness of using LUS for dynamic monitoring of patients with pneumonia caused by SARS-CoV-2, especially in oxygen-dependent patients at their bedside (POCUS principle). 2. Optimization of the use of radiological diagnostic methods due to ultrasound makes it possible to reduce the radiation dose of the patient. 3. The use of LUS allows more adequate decision-making on the need for intensive and interventional therapy, leads to faster diagnosis, improved medical care, reduced length of stay of patients in ICU, as well as reducing the total cost of treatment. 4. Ability to reduce the impact of SARS-CoV-2 on healthcare professionals by limiting physical contact with the patient. 5. The standardized Ukrainian protocol of LUS provides availability, efficiency and clear interpretation of the received data at its use by different doctors in different medical institutions. The integration of the protocol in to the ultrasound machine provides optimization of the workflow process.

KEY WORDS: ultrasound diagnostics of lungs, pulmonary ultrasound protocol, COVID-pneumonia, LUS, BLUE-protocol, POCUS.