

<http://dx.doi.org/10.35630/2023/XIIsc4hlth/119>

COMPARISON OF SENSITIVITY AND SPECIFICITY OF RADIOLOGICAL AND ULTRASOUND DIAGNOSTIC METHODS

Girindu Hewathanthirige, Olga Zorya 

The Medical Institute, Department of Internal Diseases with the course of Cardiology and Functional Diagnostics named after Academician V.S. Moiseev, Peoples' Friendship University of Russia (RUDN University), Moscow, Russia

BACKGROUND

Diagnosis of pneumonia (PN) in patients with chronic heart failure CHF using routine radiography is difficult due to the lung congestion (LC) and age-related anatomical and physiological anomalies. Chest computed tomography (CT) is very accurate but at the same time an expensive and not always available method. It is also limited because of radiation exposure. Lung ultrasound scan (LUS) demonstrates high sensitivity and specificity in the diagnosis of PN and LC, but there is currently no data on its significance in patients with both PN and CHF.

Purpose of the Study:

To compare the sensitivity and specificity of radiological, ultrasound diagnostic methods and characterize the changes detected by ultrasound of the lungs in PN and CHF.

MATERIALS AND METHODS

The study included hospitalized adult patients with previously diagnosed CHF, from Jan. 2018 to Nov. 2019 with the presence of symptoms and signs that make it possible to suspect PN in the patient at the time of admission and during hospitalization. PN was diagnosed using multi-spiral computed tomography. On all the patients we have done chest X-ray (CXR) and LUS according to BLUE (Bedside lung ultrasound in an emergency) protocol. As the LUS profiles, in which the changes characteristic of PN were verified, we used PLAPS (postero-lateral alveolar and/or pleural syndrome) — consolidation in the postero-lateral parts of the lung, C — consolidation is localized in the anterior parts of the chest and/or in the apex area, A/B — multiple B lines are visualized on one side, over the affected area of the lung, B' — multiple B-lines there is no sign of lung sliding. LC was verified by identifying the profile B+ — multiple

B-lines visualized bilaterally and lung sliding sign is present).

RESULTS

The study included 91 hospitalized adult patients, female — 46 (50.5%) male 45 (49.5%), with previously diagnosed CHF. According to chest CT, out of them 61 (67.0%) patients were diagnosed with PN (female — 24 (39.3%) male 37 (60.7%), median age 73 (67; 82)), 30 (33.0%) without PN (female — 22 (73.4%) male 37 (71.0%), median age 83 (76; 89)). In the group with PN, signs of PN were found in 56 (92.0%) patients, the following profiles were identified: PLAPS — 7 (11.5%), B' — 2 (3.3%), PLAPS and B' — 6 (9.8%), PLAPS and B+ — 41. (67.2%). Signs of PN were not detected in 5 (8.2%), and were represented by the profile B+. In the group without PN revealed signs of LC (profile B+) — 21 (70.0%) patients and PN was excluded in 24 (80.0%) patients. The sensitivity and specificity of LUS for the detection of PN against the background of CHF were 92.0% and 80.0%, respectively. According to the CXR, in the group with PN, signs of PN were detected in 41 (67.2%) patients, in the group without PN, signs of the absence of PN were detected in 17 (56.7%) patients. Hence sensitivity and specificity were 67.2% and 56.7%, respectively.

CONCLUSIONS

The sensitivity and specificity of LUS in the verification of PN in patients with CHF exceed CXR. The most common ultrasound pattern in the PN group was a combination of postero-lateral consolidation profile (PLAPS) and multiple bilateral B-lines (B+).

Keywords

Pneumonia, Chronic Heart Failure, Diagnosing, Ultrasound

Acknowledgments

The reported study was funded by RFBR, project number 19-313-90058.