

Lung Ultrasound in Outpatients with Heart Failure

Marco Stephan Lofrano-Alves¹ 

Universidade Federal do Paraná,¹ Curitiba, PR – Brazil

Short Editorial related to the article: Pulmonary Congestion in Heart Failure With Reduced Ejection Fraction: Comparison Between Lung Ultrasound and Remote Dielectric Sensing

Over the last decade, we have witnessed the widespread use of lung ultrasound (LU) in the assessment of pulmonary congestion. In addition to the well-known technique of auscultation of adventitious lung sounds, LU makes an important contribution by sharpening our vision to the diagnosis of pulmonary interstitial edema by quantification of B-lines. LU has emerged as a relevant and updated method, since it is a safe, low-cost, rapid and available at bedside, being an alternative to imaging methods associated with ionizing radiation, such as chest tomography and X-ray.¹

LU is a standardized tool in diagnosis and treatment monitoring today, and has been studied in different clinical scenarios of pulmonary congestion of cardiogenic origin.²⁻⁵ In outpatients with heart failure and reduced ejection fraction (HFrEF), B-line counting by LU showed an 89% accuracy with a cutoff ≥ 15 B-lines.⁶ In another study with patients hospitalized for HFrEF, the risk of an adverse in-hospital event increased with the rising number of B-lines at admission, and the risk of HF hospitalization and all-cause death was greater in patients with a higher number of B-lines at discharge.²

In the current issue of *ABC Imagem Cardiovascular*, Otto *et al.* present an interesting correlation of LU with ambulatory monitoring of pulmonary congestion using a remote dielectric sensing (ReDS) technology in 38 HFrEF patients and inappropriate control of blood volume. ReDS technology uses low-power electromagnetic signals that are emitted to the thorax to estimate lung fluid volume, which is expressed as percentage of total lung volume.⁷ By using the ReDS method and adopting a cutoff $\geq 35\%$ of net volume, the authors found that pulmonary congestion was present in 58% of HFrEF patients, mostly in older patients. Among the variables studied, the presence of B-lines on LU, the lateral tricuspid annulus peak velocity on tissue Doppler, and the presence of lower limb edema were associated with pulmonary congestion on ReDS. In

contrast, neither serum NT-proBNP levels nor the E/E' ratio was correlated with pulmonary congestion.

To the new generation of physicians, the diagnosis of pulmonary congestion depends much more on “seeing” than “hearing”. However, caution is needed in interpreting the B-lines and their association with cardiogenic edema. B-lines can be found in pulmonary diseases including interstitial pneumonia, atelectasis, and severe acute respiratory syndrome, and are a sensitive, although nonspecific sign of cardiogenic pulmonary edema. The distinguishing of B-lines for excess interstitial fluid from fibrotic B-lines, for example, may be difficult by LU. Studies comparing LU with other methods of assessing pulmonary fluid content are scarce but needed for its validation. Therefore, the study by Otto *et al.* is very welcome.

Author Contributions

Conception and design of the research and writing of the manuscript: Lofrano-Alves M

Potential Conflict of Interest

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Study Association

This study is not associated with any thesis or dissertation work.

Ethics Approval and Consent to Participate

This article does not contain any studies with human participants or animals performed by any of the authors.

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Mailing Address: Marco Stephan Lofrano-Alves •

Universidade Federal do Paraná, Clínica Médica. Rua General Carneiro, 181.

Postal Code: 82060-900. Alto da Glória, Curitiba, PR – Brazil

E-mail: mslalves@hotmail.com

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