

EFSUMB Journal Club – Number 3

The EFSUMB Journal Club regularly shares with EFSUMB members selected relevant ultrasound related publications, providing values and critiques of the work.

Contributors for this issue:

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Differential diagnosis of cervical lymphadenopathy: Integration of postvascular phase of contrast-enhanced ultrasound and predictive nomogram model. *Eur J Surg Oncol.* 2024 Mar; 50(3): 107981. doi: 10.1016/j.ejso.2024.107981. Epub 2024 Jan 23. PMID: 38290245.

<https://doi.org/10.1016/j.ejso.2024.107981>

Background: Distinguishing benign from malignant cervical lymph nodes is critical yet challenging. This study evaluates the postvascular phase of contrast-enhanced ultrasound (CEUS) and develops a user-friendly nomogram integrating demographic, conventional ultrasound, and CEUS features for accurate differentiation.

Methods: We retrospectively analyzed 395 cervical lymph nodes from 395 patients between January 2020 and December 2022. The cohort was divided into training and validation sets using stratified random sampling. A predictive model, based on demographic, ultrasound, and CEUS features, was created and internally validated.

Results: The training set included 280 patients (130 benign, 150 malignant nodes) and the validation set 115 patients (46 benign, 69 malignant). Relative hypoenhancement in the postvascular phase emerged as a promising indicator for MLN, with sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of 96.7%, 52.3%, 70.0%, 93.2%, and 76.1%, respectively in the training set and 95.7%, 52.2%, 75.0%, 88.9%, and 74.8% in the validation set. Age over 50 years, history of

malignancy, short-axis diameter greater than 1.00 cm, focal hyperechogenicity, ill-defined borders, and centripetal perfusion were also identified as independent MLN indicators. The nomogram prediction model showed outstanding accuracy, with an area under the curve (AUC) of 0.922 (95% CI: 0.892–0.953) in the training set and 0.914 (95% CI: 0.864–0.963) in the validation set.

Conclusion: Relative hypoenhancement in the postvascular phase of CEUS, combined with demographics and ultrasound features, is effective for identifying MLNs. The developed prediction model, with a user-friendly nomogram, can facilitate clinical decision-making.

Strength: The Chinese group from Peking evaluated the postvascular phase of CEUS perfusion in differential diagnosis of cervical lymphadenopathy, which was not in the focus of recent research. The rationale is that vascular phase CEUS pattern still shows substantial overlapping with benign disease.

The methodology of this paper is sound, and the result of statistical analysis shows promising value of postvascular relative hypoenhancement (compared to muscle) and significant improvement in differential diagnosis. The authors provide a nomogram model to be used in clinical routine. Limitations are clearly outlined.

Weaknesses

The study design is retrospective and monocentric. The collective is still heterogeneous including solid cancers from different primaries, lymphomas and a great variety of benign diseases. The definition of postvascular phase measurement and judgement of the relation of postvascular phase hypoenhancement compared to muscle perfusion needs further evaluation.

Personally thinking: Looking more closely to postvascular CEUS patterns offers new insights in perfusion characteristics of cervical lymph nodes and thus could further improve diagnostics like in other organ regions e.g. liver lesions.

Snelling PJ, Jones P, Connolly R, Jelic T, Mirsch D, Myslik F, Phillips L, Blecher G; COVID LUS Study Group. Comparison of lung ultrasound scoring systems for the prognosis of COVID-19 in the emergency department: An international prospective cohort study. *Australas J Ultrasound Med.* 2023 Oct 29; 27(2): 75–88. doi: 10.1002/ajum.12364. PMID: 38784699; PMCID: PMC11109992.

Peter J. Snelling et al., published in the Australasian Journal of Ultrasound in Medicine in 2023, aimed to evaluate the prognostic value of various lung ultrasound (LUS) scoring systems in predicting clinical outcomes for COVID-19 patients.

Methods: This international, multicenter, prospective, observational cohort study included patients presenting to the emergency department (ED) with suspected COVID-19 who were subsequently admitted with confirmed disease. LUS was performed, and patients were followed for outcomes including intubation, ICU admission, or death. Four LUS scoring systems were analyzed and applied retrospectively to the patient data:

- de Alencar score, a 12-zone protocol [1]
- CLUE score, a 12-zone protocol [2]
- Ji score, a 12-zone protocol with lung including pleural findings [3]
- Tung-Chen score, a 11-zone protocol [4]

Results: 129 patients were included in the study, with 24 (18.6%) meeting the composite primary endpoint. No significant association was found between any of the LUS scores and the primary composite outcome (intubation, ICU admission, or death). Odds ratios for the scores ranged from 1.02 to 1.04, with p-values indicating no statistical significance.

Discussion: The lack of association between lung ultrasound (LUS) severity scores and patient outcomes might be attributable to several factors related to changes in the COVID-19 pandemic scenario. These factors include variations in patient demographics, such as age and comorbidities, shifts in disease prevalence and characteristics over time, and differences in healthcare

system responses and resources. In particular, changes in virulence as well as increased vaccination rates might have influenced the predictive value of the investigated scores. Additionally, the study may have been underpowered to detect weaker associations due to a smaller sample size than initially intended, which could limit the ability to identify subtle prognostic indicators. However, subtle prognostic indicators might also be of limited clinical relevance.

Moreover, other imaging modalities like X-rays and CT scans, which are typically more detailed, also did not demonstrate prognostic value in this cohort. This suggests that the challenges in prognostication are not limited to LUS but extend to imaging techniques in general within this context. Specifically, LUS severity scores failed to effectively predict critical outcomes such as the need for invasive ventilation, ICU admission, or death among COVID-19 patients in this international cohort.

The authors emphasize that further research is crucial to establish standardized

LUS scoring systems. Such systems would need to be validated and refined to ensure accuracy and reliability. Once developed, these standardized scoring systems should be integrated into clinical management pathways for respiratory viral diseases, enhancing the ability to make informed clinical decisions based on LUS findings.

This study underscores the evolving nature of the COVID-19 pandemic and the inherent challenges in using LUS scores for prognostication in a rapidly changing clinical landscape. The variability in the disease's impact and the healthcare system's response complicates the establishment of reliable prognostic tools. Therefore, ongoing research and adaptation are essential to improve the utility of LUS and other imaging modalities in managing COVID-19 and potentially other respiratory viral diseases in the future.

Strength:

- Prospective international, multicenter, prospective, observational cohort study
- Head-to-head comparison of four different scoring systems

Weaknesses:

- Underpowered

Potential contributors to EFSUMB Journal Club are highly appreciated. Please refer to admin@efsumb.org if you are willing to participate as author for an upcoming issue.

References

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