

PEER-REVIEW REPORT

Name of journal: *World Journal of Critical Care Medicine*

Manuscript NO: 70812

Title: Point-of-care ultrasound for critically-ill patients: A mini-review of key diagnostic features and protocols

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 02446627

Position: Editorial Board

Academic degree: FACP, MD, MPhil

Professional title: Full Professor

Reviewer's Country/Territory: United States

Author's Country/Territory: Singapore

Manuscript submission date: 2021-09-19

Reviewer chosen by: AI Technique

Reviewer accepted review: 2021-09-20 13:37

Reviewer performed review: 2021-09-20 14:14

Review time: 1 Hour

Scientific quality	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
Language quality	<input checked="" type="checkbox"/> Grade A: Priority publishing <input type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
Conclusion	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
Re-review	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No



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Peer-reviewer statements	Peer-Review: [Y] Anonymous [] Onymous Conflicts-of-Interest: [] Yes [Y] No
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SPECIFIC COMMENTS TO AUTHORS

Dear Authors: I like to thank the authors for addressing this important and the current issue. The POCUS is now replacing the stethoscope in the ICU. This review addresses and serve as a quick review for the findings and the sensitivity and specificity of the findings. The tables are very informative and can serve as a source for quick revision. Would suggest following edits Add the references to certain place as marked in the manuscript Add a separate column in the table and on the side of the findings put and image with the arrow showing that findings. That will be an excellent edition to the manuscript

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Title: Point-of-care ultrasound for critically-ill patients: A mini-review of key diagnostic features and protocols

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 03342506

Position: Peer Reviewer

Academic degree: MD, MSc

Professional title: Professor

Reviewer's Country/Territory: United States

Author's Country/Territory: Singapore

Manuscript submission date: 2021-09-19

Reviewer chosen by: AI Technique

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Review time: 9 Days and 5 Hours

Scientific quality	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
Language quality	<input type="checkbox"/> Grade A: Priority publishing <input checked="" type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
Conclusion	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
Re-review	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Peer-reviewer statements	Peer-Review: [<input checked="" type="checkbox"/>] Anonymous [<input type="checkbox"/>] Onymous
	Conflicts-of-Interest: [<input type="checkbox"/>] Yes [<input checked="" type="checkbox"/>] No

SPECIFIC COMMENTS TO AUTHORS

In this mini-review the authors review current diagnostic modalities of point of care ultrasound particularly highlighting thoracic ultrasound in the form of cardiac and lung ultrasound. They also outline multiple ultrasound protocols for evaluation of various common pathologies seen in critically ill patients. For the highlighted modalities, they review sensitivities, specificities, various other statistical considerations, utility, and limitations. Understanding the space constraints of mini-review the following suggestions should be considered prior to acceptance for publication in the journal 1)

While the thoracic (lung and heart) ultrasound is important, most emergency physicians and many critical care physicians use POCUS to examine abdomen (i.e. FAST exam) looking for free fluid, hydronephrosis, focus of infection). Its unclear why this was omitted. 2) The introduction includes a reference to point of care ultrasound filling a void in order to reduce diagnostic uncertainty. There is not but likely should be some reference to how point of care ultrasound can increase diagnostic uncertainty and potentially even harm in the wrong hands. 3) The tables nicely organize the applications of lung and cardiac ultrasound and then the associated protocols. Some of the protocols and modalities are included with statistical data (sensitivity, specificity, AUROC, etc.) while others are not. It is not clear why. Some consistency may be helpful here in addition to fulfilling the goals of the mini-review as outlined in the authors' abstract and introduction. 4) Basic critical care echocardiography: • The authors mention 4 echocardiographic views but do not outline what those 4 views are. It might be worthwhile to emphasize that the majority of findings in this category require advanced skill and image acquisition that might require all 4 of those views and even

then would require interpretation with caution. Wall motion abnormalities and hypokinesis are not mentioned in this introduction section but are mentioned and explored under certain pathologies. • Pericardial effusion – Sensitivity/specificity do not reference which view or window. The authors might also consider discussing how limited views may influence such sensitivity and specificity depending upon the amount of fluid present. • Tamponade – IVC evaluation may be limited by PPV/mechanical ventilation. This may be a worthwhile limitation to emphasize especially if the cited references do so. • RV strain – Diameter and longitudinal measurements should specify where measurements should begin and end. Moreover, RV strain is somewhat unusual term, in basic CCUS RV function and in particular RV size are more often used than the term “RV strain”. Limitations might include a mention (and appropriate reference) of the difficulty in obtaining adequate RV views in critically ill patients. • LV dysfunction – Many studies have demonstrated that even trainees with limited education regarding assessment of LV function are able to estimate mild, moderate, and severe reductions in LVEF. (example: J Am Soc Echocardiogr 2011;24:1319-24) • IVC diameter – It may be prudent to discuss that accuracy of measurement depends upon the angle of insonation (given the cylindrical nature of the structure being evaluated). 5)

Lung ultrasound: • A line – A-pattern in diagnosis and exclusion of pulmonary embolism is misleading as currently discussed. It may be worthwhile to outline this in regards to large pulmonary embolism but certainly not all pulmonary emboli. •

Pneumothorax – Given the table includes a portion outlining “during M-mode” it might be helpful to include a subheader for “during b-mode” as well. • Occult pneumothorax – It might be worthwhile to outline or clarify “absent lung sliding plus the A-line sign”. • B-profile – Currently the authors do not further clarify that false-positive “comet tails” may be present but not fully obliterate A-lines. Furthermore, there is currently no reference to false positives at all and no discussion of pathology

other than acute pulmonary edema that can contribute to a B-line pattern. •

Consolidation – The authors do not discuss atelectasis as a potential false positive.

• Pleural effusion – Similar to the section on pericardial effusion, this portion would likely benefit from further discussion of how ultrasound can characterize a pleural effusion (septations, debris, homogeneous vs. heterogeneous, etc.) It may also be worthwhile to discuss false positives and limitations given the potential procedural complications that can arise – pericardial effusion, elevated hemidiaphragm, in appropriate diaphragm visualization and mistaking effusion for subdiaphragmatic ascites, loculated effusions may be missed or misjudged with inadequate scanning. 6)

POCUS protocols • This table seems overly ambitious and the result is ultimately confusing. This information may be better evaluated and outlined if the authors chose more specific comparators and discussed why the particular protocols were chosen for review. Furthermore, there are many protocols (as referenced in Tavares et al. DOI 10.2147/OAEM.S199137 that are not included or discussed. The protocols do not seem to be listed in a particular order. • BLUE protocol is missing the year described. PLAPS acronym is used but not defined in the table description or elsewhere in manuscript. •

FALLS protocol bullet point #3 of limitations is confusing. The protocol is also listed twice in the protocols table. • SESAME – Would have the authors clarify if there are proposed or suspected limitations to the limited view of the femoral vein (as isolated lower femoral vein or “V-point” evaluation does not evaluate for VTE as extensively as other VTE protocols do. • VExUS does not have the year described outlined. It may be worthwhile to discuss the limitations or benefits in cirrhotics (given the extent of hepatic and portal vein evaluation). It may also be worth discussing that this modality involves difficult/complex image acquisition and measurements. • ASE protocol is referenced later in the manuscript but not included in this table. 7) Future directions and research: • The authors nicely outline the drawbacks of attempting to study the



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impact of POCUS on critically ill patients especially in reference to an evasive and markedly confounded outcome such as mortality. Their discussion of AI in POCUS is provocative, interesting, and limitations are outlined. They appropriately emphasize the need for comprehensive evaluation and formal confirmation of any abnormalities found during POCUS. • On POCUS utility in cardiac arrest, the authors might also discuss and possibly provide further references on the use of POCUS in elucidating the underlying etiology of shock or arrest (tamponade, RV failure, thrombus-in-transit, etc.).

- The authors may want to consider how institutions or societies might work toward protocolization of POCUS in intensive care unit while considering infrastructure and local resources in the process of choosing (especially considering the wide array of protocols and the fact that they will never see head-to-head study or standardization of included devices, etc.).
- Hand-held POCUS as an extension of physical exam (i.e. stethoscope) is becoming more popular. It would be worthwhile to have a separate paragraph discussing the role, pitfalls and future opportunities, particularly if POCUS is integrated with structured assessments such as ACLS, ATLS, CERTAIN