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CAEP POSITION STATEMENT & GUIDELINES

Canadian association of emergency physicians emergency ultrasound committee best practice recommendations on point-of-care ultrasound disinfection

Colin Bell[1] · Gillian Sheppard[2] · Rafiq Andani[3] · Noam Katz[3] · Daniel J. Kim[4,5]

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Introduction

Point-of-care ultrasound (POCUS) is a commonly employed diagnostic and interventional modality within emergency medicine. In the past, POCUS infection control guidelines have been adapted from other medical specialties and employed within the Emergency Department (ED).

The COVID-19 pandemic was a unique crucible that tested the limits of our healthcare system while simultaneously proving the diagnostic and interventional utility of POCUS through its use in the management of shock, sonographic lung assessment, and procedural guidance. The pandemic forced physicians to examine the infection control practices for POCUS use in the ED. At the beginning of the pandemic, many Canadian POCUS program directors were bombarded with requests for changes to long-established infection control practices predominantly based on expert opinion [1]. With a more evidence-based understanding of COVID-19, the Canadian POCUS community has identified a need for updated Canadian POCUS infection control recommendations to guide their local POCUS infection control practices. As such, the Canadian Association of Emergency Physicians (CAEP) Emergency Ultrasound Committee created this statement to outline best practice recommendations for ultrasound probe cleaning and disinfection protocols relevant to both diagnostic and interventional POCUS use in the ED.

Methods

A Medline search was conducted using the keywords "Ultrasound or Point of Care Ultrasound or Echocardiography" AND "Disinfection or Infection Control or Sterilization." Non-English language papers and publications not related to human patients were excluded, yielding 58 results. Current provincial and national guidelines for POCUS infection control, as well as guidelines from other notable POCUS organizations, were included in the review, and their bibliographies were reviewed for publications missed in the initial search.

The authors crafted recommendations based on the available evidence when the results and expert opinion identified a justifiable practice pattern. The members of the CAEP Emergency Ultrasound Committee executive reviewed and approved these recommendations. A full list of the recommendations and underlying evidence is available in the online supplement.

Key recommendations

Recommendations on ultrasound gel:

- Single use gel packets are favored over multi-use bottles [2].
- Multiuse containers should be discarded rather than refilled, never in direct contact with probes or patients, and replaced regularly [2, 3].
- Sterile gel should be used for percutaneous procedures, contact with non-intact skin, mucous membranes, or surgical sites [3–6].

✉ Colin Bell
Colinbell85@gmail.com

1 Department of Emergency Medicine, Cumming School of Medicine, University of Calgary, Calgary, AB, Canada

2 Discipline of Emergency Medicine, Memorial University, St. John's, NF, Canada

3 Department of Emergency Medicine, Max Rady College of Medicine, Winnipeg, MB, Canada

4 Department of Emergency Medicine, University of British Columbia, Vancouver, BC, Canada

5 Department of Emergency Medicine, Vancouver General Hospital, Vancouver, BC, Canada

Recommendations for POCUS-guided percutaneous procedures:

- POCUS needle-guided percutaneous procedures that are completed through intact skin with a transducer cover can be safely disinfected with LLD [5, 7–10].
- Transcutaneous transducers contaminated with blood or bodily fluids can be cleaned followed by LLD with activity against mycobacteria and blood-borne viruses [5, 9, 11]. See Table 1 in the Online Supplement full document.
- HLD is intended to be used to clean instruments that contact internal organs or mucous membranes [4, 5].

Recommendations on decontamination and disinfection:

- Transducer cleaning and disinfection should be based on the risk assessment for the transmission of pathogens at the point of care [9, 12]. See Fig. 1 in online Appendix.
    - o POCUS equipment should be cleaned and disinfected following each examination [3, 4] and or if the disinfection status is in question.
- Recommendations on LLD
    - o LLD with activity against mycobacteria and blood-borne viruses is recommended.
- Recommendations on HLD and HLD availability
    - o HLD implementation should comply with manufacturer recommendations, as well as institutional and provincial guidelines.
    - o Three types of HLD disinfection systems that may be employed in the ED: soak station, enhanced hydrogen peroxide and UV-C systems.
    - o HLD can safely be performed in the ED, though if unavailable, an expeditious reprocessing time for semi-critical POCUS equipment should be ensured.

Recommendations on staff training and workflow:

- All POCUS users should receive training on cleaning and disinfection of POCUS equipment [3, 4] and HLD workflow in EDs where it is employed [4].

Discussion

The infectious complications of both diagnostic and interventional POCUS procedures are likely relatively rare and accordingly difficult to link back to the procedure with certainty. Furthermore, many of the infection control precautions routinely undertaken have been present for decades, and therefore changing or challenging them requires acceptance from a variety of POCUS stakeholders.

At present, there is very limited high-level evidence on which strong recommendations can be based. Using the best available evidence, the CAEP Emergency Ultrasound Committee has made recommendations on ultrasound gel, percutaneously performed procedures, decontamination and disinfection, and staff training and workflow.

Currently, the area with the largest controversy surrounds the level of disinfection required after POCUS-guided percutaneous procedures. The European Society of Radiology [3] created considerable controversy in their 2017 ultrasound infection control recommendations around POCUS-guided procedures. Their ultrasound working group recommended HLD after percutaneous POCUS procedures, even when there had been no disruption of the transducer cover. This recommendation was a dramatic departure from previous and was extremely disruptive to both traditional users of ultrasound and clinician users of POCUS. Multiple professional societies subsequently published an intersocietal position statement supporting the traditional practice of LLD after percutaneous POCUS-guided procedures where the transducer cover remains intact [5], and this practice was bolstered with evidence from a randomized controlled trial from Peters et al. [10] as well as a large case series by Cervini et al. [13] The European Society of Radiology's recommendation for HLD after percutaneous procedures [3] was based on biochemical data rather than adverse patient events. Given there is evidence supporting the current practice of LLD after percutaneous procedures [10, 13], and to align with the intersocietal position statement endorsed by the American College of Emergency Physicians, American College of Radiology, and American Institute of Ultrasound in Medicine among others, we elected to affirm this practice within our best practice recommendations.

Limitations

Many of the infection control practice patterns surrounding POCUS were adapted from consultative users of ultrasound and have been in place for decades. Current practice is based on low levels of evidence and expert opinion rather than a robust evidence base. Challenging a long-established practice pattern is difficult, especially when the infectious complications of POCUS are rare and have multiple plausible sources. Therefore, the level of evidence underlying most of these recommendations is less robust than for other clinical practice guidelines.

Conclusion

The COVID-19 pandemic brought increased scrutiny to infection control practices across POCUS. Given our improved understanding of COVID-19, the CAEP Emergency Ultrasound Committee has created recommendations on infection control measures for POCUS. This is important to standardize POCUS practice and safety across Canada. Of importance, we reinforce that LLD is adequate for percutaneous POCUS-guided procedures and that HLD should be reserved for transducers that contact mucous membranes.

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Declarations

Conflict of interest CB has received honoraria from Fujifilm Sonosite inc. DJK is a paid consultant for Fujifilm Sonosite Inc. GS, RA, and NK have no conflicts of interest to declare.

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