Scan, See, Decide: POCUS in the Evaluation of Dyspnea

CLINICAL QUESTION

Is point-of-care ultrasonography (POCUS) helpful for the evaluation of undifferentiated dyspnea?

BOTTOM LINE

For patients presenting to the emergency department (ED) with dyspnea, adding POCUS to conventional work-up improves the diagnostic accuracy of decompensated heart failure from ~87% to ~93%, and may improve diagnostic accuracy of other conditions. Length of ED stay is not different.

EVIDENCE

- Results statistically significant unless indicated.
- Two systematic reviews past 5 years, 5-7 randomized controlled trials (RCTs), 1483-1535 patients.[1,2] Focus on three largest RCTs due to different protocols/outcomes. Diagnostic accuracy determined by masked chart audit.
- 518 patients randomized after clinical evaluation to POCUS or chest X-ray/N-terminal pro-B-type natriuretic peptide.[3] ED physicians, accredited training and >40 scans. Focus: B-line artifact (for decompensated heart failure diagnosis, present in ~43%).
    - Diagnostic accuracy: 95% (POCUS) versus 87%.
    - Sensitivity: 94% (POCUS) versus 85% (no statistics available).
    - Specificity: 96% (POCUS) versus 89% (no statistics).

- o Time to diagnosis: 5 minutes (POCUS) versus 105 minutes.
- 442 patients randomized to conventional work-up alone (clinical evaluation, ECG, blood tests, most received CXR, with optional CT scans and formal echocardiography) or conventional workup plus POCUS.[4] ED physicians, 4 hours of training and 10 practice scans. Focus: B-line artifact (decompensated heart failure, present in ~30%).
  - o Diagnostic accuracy: 93% (POCUS) versus 87%.
  - o Sensitivity: 88% (POCUS) versus 83% (no statistics).
  - o Specificity: 95% (POCUS) versus 88% (no statistics).
  - o Length of ED stay: Not different.
- 315 patients randomized to conventional workup alone or conventional workup plus single expert physician-performed POCUS.[5] Multiple views of cardiac/lung/deep veins for identifying any relevant diagnosis (most common: chronic obstructive pulmonary disease, pneumonia or heart failure).
  - o Diagnostic accuracy: 88% (POCUS) versus 64%.
  - o Appropriate treatment at 4 hours: 78% (POCUS) versus 57%.
- Limitations: Various POCUS expertise and "diagnostic accuracy" definitions, CXR results in chart audit could bias final diagnosis determination.

CONTEXT

- POCUS: Typically 8-view anterior and anterior/lateral lung, screening for increased tissue density ("B line artifact"), pleural effusion.[3,4]
- POCUS: Positive likelihood ratio~20 (very good at ruling in heart failure), negative likelihood ratio ~0.1 (very good at ruling out heart failure).[3,4]
- Training options examples: https://cpocus.ca; https://emergdoc.com.

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AUTHORS

Émélie Braschi, MD PhD CCFP
Jennifer Young, MD CCFP-EM

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