

## KEY ADVANCES CLINICAL POLICY ALERT

# Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department with Acute Heart Failure Syndromes

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*Silvers SM, Gemme SR, Hickey S, Mattu, A, Haukoos JS, Diercks DB, Wolf SJ; American College of Emergency Physicians. Ann Emerg Med. 2022 Oct;80(4):e31-e59. doi:10.1016/j.annemergmed.2022.05.027. Erratum in: Ann Emerg Med. 2023 Mar;81(3):383. PMID: 36153055.*

### Why is this topic important?

- The prevalence of heart failure among adults in the United States has increased by nearly 10% between 2012 (5.7 million Americans) and 2016 (6.2 million Americans). It is estimated that this prevalence will increase another 46% by 2030, to more than eight million individuals.(1)
- Acute heart failure syndrome (AHFS) is the “gradual or rapid deterioration in heart failure signs and symptoms resulting in a need for urgent therapy”.(2)
- AHFS is associated with a 12% mortality rate during the in-hospital treatment period (3) and is often used interchangeably with “acute decompensated heart failure.”
- 5-year case fatality rates after hospitalization for AHFS have been reported to be up to 42%.(1)
- The Emergency Department (ED) plays a critical role in managing AHFS because approximately 80% of patients who are hospitalized for the condition are admitted through the ED.(4)

**How will this change my clinical practice?** Point-of-care lung ultrasound (LUS), high-dose nitroglycerin, and risk stratification rules should play a significant role in the diagnosis, treatment, and disposition of ED patients with AHFS.

## Synopsis Focus Points and Policy Recommendations (in bold):

### 1. In adult patients presenting to the ED with suspected AHFS, is the diagnostic accuracy of point-of-care LUS sufficient to direct clinical management?

#### Patient Management Recommendations:

- Use point-of-care LUS as an imaging modality in conjunction with medical history and physical examination to diagnose AHFS when diagnostic uncertainty exists as the accuracy of this diagnostic test is sufficient to direct clinical management (**Level B recommendation**).
  - Use of LUS requires that the equipment is available and the physician is proficient in its use.

#### Highlighted Points:

- Evidence from one Class II and eight Class III studies supports the use of point of care ultrasonography (POCUS) to improve diagnostic accuracy in patients with AHFS and help direct management.
  - Four systematic reviews and meta-analyses, which included more than 9800 patients treated or reviewed by emergency medicine physicians, showed the non-weighted diagnostic performance of LUS alone to be appropriate to guide clinical management in patients with an AHFS.
  - B-lines on bedside ultrasound is an independent predictor of AHFS.
  - When combined with historical information and physical examination findings, bedside LUS outperforms chest radiography and laboratory testing, including natriuretic peptides.

### 2. In adult patients presenting to the ED with suspected AHFS, is early administration of diuretics safe and effective?

#### Patient Management Recommendations:

- Although no specific timing of diuretic therapy can be recommended, physicians may consider earlier administration of diuretics when indicated for ED patients with acute heart failure syndrome, because it may be associated with reduced length of stay and in-hospital mortality (**Level C consensus recommendation**).
- Physicians should be confident in the diagnosis of AHFS with volume overload in a patient before the administration of diuretics because treatment with diuretics may cause harm to those with an alternative diagnosis (**Level C consensus recommendation**).

#### Highlighted Points:

- Only one weak Class III study was identified evaluating the safety and efficacy of early administration of diuretics in AHFS. Therefore, no confident recommendations about the timing of diuretics could be made.

### 3. In adult patients presenting to ED with suspected AHFS, is vasodilator therapy with high-dose nitroglycerin administration safe and effective?

#### Patient Management Recommendations:

- Consider using high-dose nitroglycerin as a safe and effective treatment option when administered to patients with AHFS and elevated blood pressure (**Level C consensus recommendation**).
  - High-dose nitroglycerin has been described as infusion rates of > 200-400 mcg/min or bolus dosing of 500-1000 mcg every three to five minutes.

**Highlighted Points:**

- Evidence from one Class III study demonstrates the safety and suggests improved clinical outcomes (i.e., reduced intubation, bilevel positive airway pressure [BIPAP] use, and intensive care unit [ICU] admissions) with high-dose nitroglycerine therapy in AHFS.

**4. In adult patients presenting to the ED with symptomatic AHFS, is there a defined group that may be safely discharged home for outpatient follow-up?**

**Patient Management Recommendations:**

- Do not rely on current AHFS risk stratification tools alone to determine which patients may be discharged directly home from the ED. (**Level B recommendation**)
- Consider using the Ottawa Heart Failure Risk Scale (OHFRS) to help determine which higher-risk patients for adverse outcome should not be discharged home. (**Level B recommendation**).
- Consider using the Emergency Heart Failure Mortality Risk Grade for 7-day mortality (EHMRG7) or the STRATIFY decision tool to help determine which higher-risk patients for adverse outcome should not be discharged home. (**Level C recommendation**)
- Use shared decision-making strategies when determining the appropriate disposition of patients with AHFS. (**Level C consensus recommendation**)

**Highlighted Points:**

- Evidence from one Class II and three Class III studies supports the use of AHFS risk tools in combination with shared decision making to assist ED providers in the disposition of patients from the ED.

**References:**

1. Benjamin EJ, Muntner P, Alonso A, Bittencourt MS, Callaway CW, Carson AP, Chamberlain AM, Chang AR, Cheng S, Das SR, Delling FN, Djousse L, Elkind MSV, Ferguson JF, Fornage M, Jordan LC, Khan SS, Kissela BM, Knutson KL, Kwan TW, Lackland DT, Lewis TT, Lichtman JH, Longenecker CT, Loop MS, Lutsey PL, Martin SS, Matsushita K, Moran AE, Mussolino ME, O'Flaherty M, Pandey A, Perak AM, Rosamond WD, Roth GA, Sampson UKA, Satou GM, Schroeder EB, Shah SH, Spartano NL, Stokes A, Tirschwell DL, Tsao CW, Turakhia MP, VanWagner LB, Wilkins JT, Wong SS, Virani SS; American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics-2019 Update: a report from the American Heart Association. *Circulation*. 2019;139(10):e56-e528. doi:10.1161/CIR.0000000000000659. Erratum in: *Circulation*. 2020 Jan 14;141(2):e33. PMID: 30700139.
2. Silvers SM, Howell JM, Kosowsky JM, Rokos IC, Jagoda AS; American College of Emergency Physicians. Clinical policy: Critical issues in the evaluation and management of adult patients

presenting to the emergency department with acute heart failure syndromes. *Ann Emerg Med.* 2007;49(5):627-669. doi:10.1016/j.annemergmed.2006.10.024. Epub 2007 Apr 3. Erratum in: *Ann Emerg Med.* 2010;55(1):16. PMID: 17408803.

3. Edoute Y, Roguin A, Behar D, Reisner SA. Prospective evaluation of pulmonary edema. *Crit Care Med.* 2000;28(2):330-5. doi:10.1097/00003246-200002000-00007. PMID: 10708162.
4. American College of Emergency Physicians Clinical Policies Subcommittee (Writing Committee) on Acute Heart Failure Syndromes. Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department With Acute Heart Failure Syndromes: Approved by ACEP Board of Directors, June 23, 2022. *Ann Emerg Med.* 2022;80(4):e31-e59. doi:10.1016/j.annemergmed.2022.05.027. Erratum in: *Ann Emerg Med.* 2023 Mar;81(3):383. PMID: 36153055.

Note: Clinical Policy Alert synopses should be based upon organizational guidelines and policies relevant to emergency medicine. The guidelines themselves should be based on valid methodology. The recommendations in the guidelines should be written exactly as they are published by the organization. Charts showing recommendation criteria or methodology are important to include when possible.

### Resources for Additional Learning:

The Pocus Atlas. POCUS for Undifferentiated Shortness of Breath.

<https://www.thepocusatlas.com/new-blog/2018/3/14/ddxof-pocus-for-undifferentiated-shortness-of-breath>

POCUS 101. Lung Ultrasound Made Easy: Step-By-Step Guide. <https://www.pocus101.com/lung-ultrasound-made-easy-step-by-step-guide/>

Ottawa Heart Failure Risk Score (OHFRS). <https://www.mdcalc.com/calc/3994/ottawa-heart-failure-risk-scale-ohfrs>

Emergency Heart Failure Mortality Risk Grade (EHMRG).

<https://www.mdcalc.com/calc/1755/emergency-heart-failure-mortality-risk-grade-ehmrq>

The STRATIFY Decision Tool. <https://pubmed.ncbi.nlm.nih.gov/26449993/>

**Clinical findings and strength of recommendations regarding patient management were made according to the following criteria:**

**Level A recommendations**

Generally accepted principles for patient care that reflect a high degree of clinical certainty (e.g., based on evidence from one or more Class of Evidence I or multiple Class of Evidence II studies).

**Level B recommendations**

Recommendations for patient care that may identify a particular strategy or range of strategies that reflect moderate clinical certainty (e.g., based on evidence from one or more Class of Evidence II studies or strong consensus of Class of Evidence III studies).

**Level C recommendations**

Recommendations for patient care that are based on evidence from Class of Evidence III studies or, in the absence of adequate published literature, based on expert consensus. In instances in which consensus recommendations are made, “consensus” is placed in parentheses at the end of the recommendation.

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