Complete Summary

GUIDELINE TITLE

Clinical policy: critical issues in the evaluation and management of adult patients presenting to the emergency department with acute heart failure syndromes.

BIBLIOGRAPHIC SOURCE(S)

Silvers SM, Howell JM, Kosowsky JM, Rokos IC, Jagoda AS, American College of Emergency Physicians Clinical Policies Subcommittee. 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 May;49(5):627-69. [84 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Acute heart failure syndromes

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Cardiology
Emergency Medicine
Pulmonary Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To focus on critical issues in the evaluation and management of adult patients presenting to the emergency department with suspected heart failure
- To address the following critical questions:
    1. Does a B-type natriuretic polypeptide (BNP) or N-terminal (NT)-ProBNP measurement improve the diagnostic accuracy over standard clinical judgment in the assessment of possible acute heart failure syndromes in the emergency department (ED)?
    2. Is there a role for noninvasive positive-pressure ventilatory support in the ED management of patients with acute heart failure syndromes and respiratory distress?
    3. Should vasodilator therapy (e.g., nitrates, nesiritide, and angiotensin-converting enzyme [ACE] inhibitors) be prescribed in the ED management of patients with acute heart failure syndromes?
    4. Should diuretic therapy be prescribed in the ED management of patients with acute heart failure syndromes?

TARGET POPULATION

This guideline is intended for adult patients presenting to the emergency department (ED) with symptoms or signs suggestive of acute heart failure.

Note: This guideline is not intended to address the care of those patients presenting with acute ST-elevation myocardial infarction, high-output heart failure, cardiogenic shock, renal failure, valvular emergencies, or the care of pediatric patients.

INTERVENTIONS AND PRACTICES CONSIDERED

1. B-type natriuretic polypeptide (BNP) or N-terminal (NT)-ProBNP measurement
2. Noninvasive positive-pressure ventilatory support
3. Vasodilator therapy (e.g., nitrates, nesiritide, and angiotensin-converting enzyme [ACE] inhibitors)
4. Diuretic therapy

MAJOR OUTCOMES CONSIDERED

- Sensitivity and specificity of testing
- Treatment costs
- Time to discharge
- Pulmonary and hemodynamic function
- Intubation rate

- Length of hospital stay
- Mortality
- Incidence of acute myocardial infarction
- Symptoms of heart failure
- Renal function

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

This clinical policy was created after careful review and critical analysis of the medical literature. MEDLINE searches for articles published between January 1995 and December 2005 were performed using a combination of key words, including "heart failure," "natriuretic peptide," "vasodilator," "nitroglycerin," "nesiritide," "diuretic," "furosemide," "noninvasive ventilation," "continuous positive airway pressure (CPAP)," and "bi-level positive airway pressure (BiPAP)." Searches were limited to English-language sources. Additional articles were reviewed from the bibliographies of studies cited. Subcommittee members also supplied articles from their own knowledge and files.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Literature Classification Schema^

Design/ Class	Therapy*	Diagnosis **	Prognosis***
1	Randomized, controlled trial or meta-analyses of randomized trials	Prospective cohort using a criterion standard	Population prospective cohort
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g.,	Case series Case report Other (e.g.,

Design/ Class	Therapy*	Diagnosis **	Prognosis***
		consensus, review)	consensus, review)

^ Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

*Objective is to measure therapeutic efficacy comparing ≥2 interventions.

**Objective is to determine the sensitivity and specificity of diagnostic tests.

*** Objective is to predict outcome including mortality and morbidity.

Approach to Downgrading Strength of Evidence*

	Design/Class		
Downgrading	**1**	**2**	**3**
None	I	II	III
1 level	II	III	X
2 levels	III	X	X
Fatally flawed	X	X	X

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

All articles used in the formulation of this clinical policy were graded by at least 2 subcommittee members for strength of evidence and classified by the subcommittee members into 3 classes of evidence on the basis of the design of the study, with design 1 representing the strongest evidence and design 3 representing the weakest evidence for therapeutic, diagnostic, and prognostic clinical reports, respectively (Appendix A in the original guideline document and the "Rating Scheme for the Strength of the Evidence" field). Articles were then graded on 6 dimensions thought to be most relevant to the development of a clinical guideline: blinded versus nonblinded outcome assessment, blinded or randomized allocation, direct or indirect outcome measures (reliability and validity), biases (e.g., selection, detection, transfer), external validity (i.e., generalizability), and sufficient sample size. Articles received a final grade (Class I, II, III) on the basis of a predetermined formula taking into account design and quality of study (Appendix B in the original guideline document and the "Rating Scheme for the Strength of the Evidence" field). Articles with fatal flaws were given an "X" grade and not used in the creation of this policy. Evidence grading was done with respect to the specific data being extracted, and the specific critical question being reviewed. Thus, the level of evidence for any one study may vary according to the question, and it is possible for a single article to receive different levels of grading as different critical questions are answered. Question-specific

level of evidence grading may be found in the Evidentiary Table included at the end of the original guideline document.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

This policy is a product of the American College of Emergency Physicians (ACEP) clinical policy development process, including expert review, and is based on the existing literature; where literature was not available, consensus of emergency physicians was used.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

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

Strength of Recommendations

Level A recommendations. Generally accepted principles for patient management that reflect a high degree of clinical certainty (i.e., based on strength of evidence Class I or overwhelming evidence from strength of evidence Class II studies that directly address all of the issues)

Level B recommendations. Recommendations for patient management that may identify a particular strategy or range of management strategies that reflect moderate clinical certainty (i.e., based on strength of evidence Class II studies that directly address the issue, decision analysis that directly addresses the issue, or strong consensus of strength of evidence Class III studies)

Level C recommendations. Other strategies for patient management that are based on preliminary, inconclusive, or conflicting evidence, or, in the absence of any published literature, based on panel consensus

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, strength of prior beliefs, and publication bias, among others, might lead to such a downgrading of recommendations.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Expert review comments were received from individual emergency physicians and from individual members of the American College of Cardiology, American Heart Association, and American College of Chest Physicians. Their responses were used to further refine and enhance this policy.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the strength of evidence (Class I-III) and strength of recommendations (Level A-C) are repeated at the end of the Major Recommendations.

Does a B-type natriuretic polypeptide (BNP) or N-terminal (NT)-ProBNP measurement improve the diagnostic accuracy over standard clinical judgment in the assessment of possible acute heart failure syndromes in the emergency department (ED)?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. The addition of a single BNP or NT-proBNP measurement can improve the diagnostic accuracy compared to standard clinical judgment alone in the diagnosis of acute heart failure syndrome among patients presenting to the emergency department (ED) with acute dyspnea.

Use the following guidelines:

- BNP
- BNP >500 pg/dL or NT-proBNP >1,000 pg/dL acute heart failure syndrome likely (Approximate positive likelihood ratio [LR+] =6)

Level C recommendations. None specified.

*BNP conversion: 100 pg/mL=22 pmol/L; NT-proBNP conversion: 300 pg/mL=35 pmol/L

Is there a role for noninvasive positive-pressure ventilatory support in the ED management of patients with acute heart failure syndromes and respiratory distress?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. Use 5 to 10 mm Hg continuous positive airway pressure (CPAP) by nasal or face mask as therapy for dyspneic patients with acute heart failure syndrome without hypotension or the need for emergent intubation to improve heart rate, respiratory rate, blood pressure, and reduce the need for intubation, and possibly reduce inhospital mortality.

Level C recommendations. Consider using bi-level positive airway pressure (BiPAP) as an alternative to CPAP for dyspneic patients with acute heart failure syndrome; however, data about the possible association between BiPAP and myocardial infarction remain unclear.

Should vasodilator therapy (e.g., nitrates, nesiritide, and angiotensin-converting enzyme [ACE] inhibitors) be prescribed in the ED management of patients with acute heart failure syndromes?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. Administer intravenous nitrate therapy to patients with acute heart failure syndromes and associated dyspnea.

Level C recommendations.

1. Because of the lack of clear superiority of nesiritide over nitrates in acute heart failure syndrome and the current uncertainty regarding its safety, nesiritide generally should not be considered first line therapy for acute heart failure syndromes.
2. ACE inhibitors may be used in the initial management of acute heart failure syndromes, although patients must be monitored for first dose hypotension.

Should diuretic therapy be prescribed in the ED management of patients with acute heart failure syndromes?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. Treat patients with moderate-to-severe pulmonary edema resulting from acute heart failure with furosemide in combination with nitrate therapy.

Level C recommendations.

1. Aggressive diuretic monotherapy is unlikely to prevent the need for endotracheal intubation compared with aggressive nitrate monotherapy.
2. Diuretics should be administered judiciously, given the potential association between diuretics, worsening renal function, and the known association between worsening renal function at index hospitalization and long-term mortality.

Definitions:

Strength of Evidence

Literature Classification Schema^

Design/ Class	Therapy*	Diagnosis **	Prognosis***
1	Randomized, controlled trial or meta-analyses of randomized trials	Prospective cohort using a criterion standard	Population prospective cohort
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
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^ Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

*Objective is to measure therapeutic efficacy comparing ≥2 interventions.

**Objective is to determine the sensitivity and specificity of diagnostic tests.

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Approach to Downgrading Strength of Evidence*

	Design/Class		
Downgrading	**1**	**2**	**3**
None	I	II	III
1 level	II	III	X
2 levels	III	X	X
Fatally flawed	X	X	X

*See "Description of Methods Used to Analyze the Evidence" field for more information.

Strength of Recommendations

Level A recommendations. Generally accepted principles for patient management that reflect a high degree of clinical certainty (i.e., based on strength of evidence Class I or overwhelming evidence from strength of evidence Class II studies that directly address all of the issues)

Level B recommendations. Recommendations for patient management that may identify a particular strategy or range of management strategies that reflect

moderate clinical certainty (i.e., based on strength of evidence Class II studies that directly address the issue, decision analysis that directly addresses the issue, or strong consensus of strength of evidence Class III studies)

Level C recommendations. Other strategies for patient management that are based on preliminary, inconclusive, or conflicting evidence, or, in the absence of any published literature, based on panel consensus

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, strength of prior beliefs, and publication bias, among others, might lead to such a downgrading of recommendations.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate evaluation and management of adult patients presenting to the emergency department with acute heart failure syndromes

POTENTIAL HARMS

- Studies have shown a greater mortality and an increased risk of worsening renal function in patients receiving nesiritide.
- Potential safety considerations regarding diuretic administration were raised in a Class III study that demonstrated an association between diuretic use and worsening renal function.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Policy statements and clinical policies are the official policies of the American College of Emergency Physicians and, as such, are not subject to the same peer review process as articles appearing in the print journal. Policy statements and clinical policies of American College of Emergency Physicians

(ACEP) do not necessarily reflect the policies and beliefs of *Annals of Emergency Medicine* and its editors.

- There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, strength of prior beliefs, and publication bias, among others, might lead to such a downgrading of recommendations.
- This policy is not intended to be a complete manual on the evaluation and management of adult patients with acute heart failure but rather a focused examination of critical issues that have particular relevance to the current practice of emergency medicine.
- It is the goal of the Clinical Policies Committee to provide an evidence-based recommendation when the medical literature provides enough quality information to answer a critical question. When the medical literature does not contain enough quality information to answer a critical question, the members of the Clinical Policies Committee believe that it is equally important to alert emergency physicians to this fact.
- Recommendations offered in this policy are not intended to represent the only diagnostic and management options that the emergency physician should consider. The American College of Emergency Physicians clearly recognizes the importance of the individual physician's judgment. Rather, this guideline defines for the physician those strategies for which medical literature exists to provide support for answers to the crucial questions addressed in this policy.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Silvers SM, Howell JM, Kosowsky JM, Rokos IC, Jagoda AS, American College of Emergency Physicians Clinical Policies Subcommittee. 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 May;49(5):627-69. [84 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2007 May

GUIDELINE DEVELOPER(S)

American College of Emergency Physicians - Medical Specialty Society

SOURCE(S) OF FUNDING

American College of Emergency Physicians

GUIDELINE COMMITTEE

American College of Emergency Physicians (ACEP) Clinical Policies Subcommittee (Writing Committee) on Acute Heart Failure Syndromes

ACEP Clinical Policies Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Relevant industry relationships are those relationships with companies associated with products that significantly impact the specific aspect of disease addressed in the critical questions.

Relevant industry relationships for the following Acute Heart Failure Syndromes Subcommittee members are as follows: Dr. Kosowsky received a research grant from Biosite, Inc. for work separate from this clinical policy.

ENDORSER(S)

American College of Chest Physicians - Medical Specialty Society
Emergency Nurses Association - Medical Specialty Society

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Emergency Physicians Web site.

Print copies: Available from the American College of Emergency Physicians, P.O. Box 619911, Dallas, TX 75261-9911, or call toll free: (800) 798-1822.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on October 2, 2007. The information was verified by the guideline developer on January 8, 2008.

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