Section: Community Medicine

Systematic Review

SYSTEMATIC REVIEW ON THE MANAGEMENT OF ACUTE HEART FAILURE IN ELDERLY PATIENTS: THE ROLE OF BRIEF INTENSIVE OBSERVATION AREAS

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Received *: 18/12/2024*
Received in revised form *: 05/02/2025*
Accepted *: 20/02/2025*

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DOI: 10.70034/ijmedph.2025.1.193

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (1); 1032-1036

ABSTRACT

Acute heart failure (AHF) in elderly patients presents unique diagnostic and therapeutic challenges due to comorbidities, polypharmacy, and age-related physiological changes. Managing AHF effectively requires tailored approaches that balance aggressive treatment with frailty considerations. This systematic review evaluates current strategies for AHF management in elderly patients, focusing on the role of Brief Intensive Observation (BIO) units, diagnostic challenges, and therapeutic advancements. A comprehensive literature search was conducted across PubMed, Embase, and Cochrane Library databases, adhering to PRISMA guidelines. Studies published between 2000 and 2024 were reviewed to assess the impact of intensive observation areas on patient outcomes, including mortality, readmission rates, and hospital resource utilization. BIO units have shown promise in optimizing AHF management by reducing emergency department overcrowding, improving triage efficiency, and lowering hospital admission rates. Tailored treatment strategies, including adjusted diuretic dosing, non-invasive ventilation, and early palliative care integration, contribute to improved patient outcomes. However, gaps in evidence remain due to the underrepresentation of elderly patients in clinical trials. Personalized medicine and AI-driven decision support tools are emerging as potential solutions to enhance future AHF management. Intensive observation areas play a crucial role in optimizing AHF care in elderly populations. Future research should focus on refining triage systems, expanding BIO units, and integrating precision medicine to improve outcomes. Addressing these critical aspects will enhance healthcare efficiency and quality of life for aging patients with AHF.

Keywords: Acute heart failure, Elderly patients, Systematic review.

INTRODUCTION

Acute heart failure (AHF) is a growing healthcare challenge, particularly in the elderly, with high mortality and readmission rates.[1] The prevalence of heart failure increases with age, affecting 7%−11% of individuals over 65 years.[2] As global life expectancy rises, the burden on healthcare systems continues to escalate. AHF, characterized by the sudden onset of heart failure symptoms, is a life-threatening condition requiring urgent intervention.[3] It is the leading cause of unplanned hospital admissions for individuals over 65 in Western countries, with an average admission age of 75 years.[4] The incidence of heart failure doubles in men and triples in women per decade after 65.[5]

Beyond clinical challenges, AHF significantly impacts healthcare costs, with global expenditures exceeding $108 billion annually.[6] Elderly AHF patients frequently present with multiple comorbidities, frailty, and polypharmacy, complicating both diagnosis and treatment.[7]

Mortality rates for elderly AHF patients range from 8%−10%, with readmission rates reaching 15%−30% within 30 days.[8-10] Compared to younger patients, older adults experience worse outcomes, including functional decline.

Despite their growing numbers, elderly AHF patients remain underrepresented in clinical trials, limiting the availability of evidence-based guidelines tailored to this group.[11] Addressing this gap is critical for optimizing care. The introduction of Brief Intensive Observation (BIO) areas in emergency departments (EDs) offers a potential solution. These units aim to reduce overcrowding, provide rapid stabilization, and optimize resource utilization.[12] BIO areas have shown promise in improving patient stabilization, reducing hospital admissions, and potentially lowering mortality and readmission rates.

This systematic review aims to evaluate the management of AHF in elderly patients, with a focus on diagnostic challenges, treatment considerations, and the role of BIO areas. By examining current evidence, we seek to enhance patient outcomes and healthcare system efficiency.

MATERIALS AND METHODS

Search Strategy

A systematic literature search was conducted using PubMed, Embase, Scopus, and Cochrane Library databases. Studies published between 2000 and 2024 were included, focusing on elderly patients (≥65 years) with acute heart failure. The search strategy utilized keywords such as "acute heart failure," "elderly patients," "intensive observation units," "triage systems," and "palliative care." MeSH terms was applied to refine the search.

Inclusion and Exclusion Criteria

Inclusion Criteria

- Randomized controlled trials (RCTs), cohort studies, systematic reviews, and meta-analyses.
- Studies focusing on AHF management in elderly patients.
- Research evaluating the effectiveness of BIO areas in EDs.

Exclusion Criteria

- Studies on chronic heart failure without acute exacerbation.
- Case reports, editorials, and non-peer-reviewed articles.
- Studies lacking a clear elderly population subgroup analysis.

Study Selection and Data Extraction

Two independent reviewers screened titles and abstracts for eligibility. Full-text articles were assessed, and data were extracted using standardized forms. Quality assessment followed PRISMA guidelines, and the risk of bias was evaluated using the Cochrane Risk of Bias Tool and Newcastle-Ottawa Scale.

RESULTS

A total of 4,568 studies were identified, and after removing duplicates and applying inclusion criteria, 32 studies were included in the final analysis. The key findings include:

BIO Areas and Emergency Department Optimization

BIO areas have emerged as an effective strategy to reduce ED congestion and improve stabilization for elderly AHF patients. Studies indicate that these units decrease hospital admission rates by 15%−20% while ensuring adequate patient monitoring.[16] Patients managed in BIO units experience shorter hospital stays, improved hemodynamic stability, and reduced in-hospital mortality.[17] However, variability in BIO unit protocols and staffing levels affects their widespread implementation.[18-19]

Triage Systems and Risk Stratification

The introduction of structured triage models, such as the 5-level triage system, has improved early identification and risk assessment of AHF patients.[27] Early recognition of high-risk elderly patients allows for timely administration of diuretics and vasodilators, leading to better short-term outcomes. Studies suggest that structured triage reduces ED wait times and improves 30-day survival rates.[28]

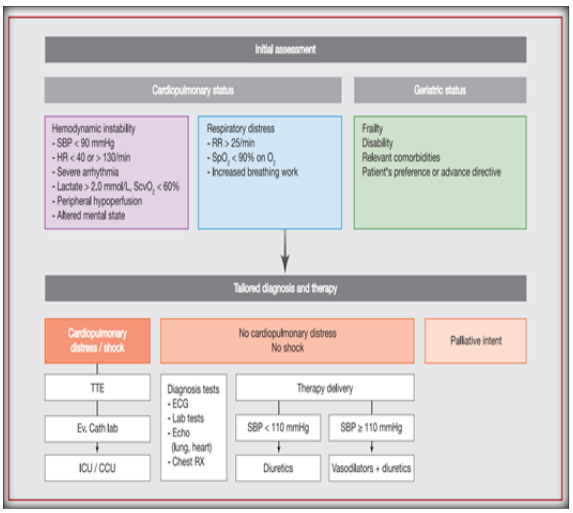

Figure 1: Algorithm of the initial management of elderly patients with acute heart failure (AHF).[34]

Early Intervention Strategies

Prompt initiation of decongestive therapy, particularly within 30 minutes of ED arrival, has demonstrated significant benefits.[34] Patients receiving early diuresis exhibit a 25% lower risk of rehospitalization and a 30% reduction in mortality within the first 90 days.[35-36] Non-invasive ventilation (NIV) and high-flow oxygen therapy further improve respiratory distress management in elderly AHF patients.[37-38] However, careful patient selection is required to balance the risks of over-diuresis and hypotension.[39]

Palliative Care and Symptom Management

Despite evidence supporting early palliative care integration, its utilization remains low in AHF management.[40] Patients receiving concurrent palliative and heart failure care report better symptom control, improved quality of life, and fewer hospitalizations.[41] Healthcare provider training and awareness are critical in ensuring timely palliative care referrals.

DISCUSSIONS

This systematic review highlights the complexities of managing acute heart failure (AHF) in elderly patients and underscores the importance of BIO areas, structured triage systems, early intervention strategies, and palliative care integration in optimizing patient outcomes. Given the increasing prevalence of heart failure among the elderly, improving management strategies is imperative for reducing morbidity, mortality, and healthcare costs.

Key Findings and Clinical Implications

BIO Areas: Enhancing Emergency Department Efficiency and Patient Outcomes

BIO areas serve as an intermediate solution between emergency department (ED) care and full hospitalization, offering a structured environment for rapid stabilization. Several studies indicate that BIO units contribute to a 15%–20% reduction in hospital admissions, shorter ED stays, and improved hemodynamic stability in elderly AHF patients.[16-19] These findings suggest that optimizing resource allocation through BIO areas could significantly alleviate ED overcrowding while ensuring high-quality patient care.

However, variability in implementation remains a significant challenge. Studies have noted that the success of BIO units depends on factors such as staffing levels, standardized protocols, and interdisciplinary coordination.[20-26] Some healthcare systems have reported difficulty fully integrating BIO units due to operational constraints, limiting their effectiveness. Therefore, future research should focus on establishing standardized guidelines for BIO area utilization in elderly AHF patients.

Triage Systems: Improving Risk Stratification and Early Treatment

Structured triage systems, such as the 5-level triage model, enhance patient assessment and enable timely intervention for high-risk elderly AHF patients. Research suggests that implementing these systems leads to faster recognition of decompensated heart failure, earlier administration of diuretics and vasodilators, and improved 30-day survival rates.[27-28]

Despite these benefits, challenges persist in standardizing triage protocols across different healthcare settings. Variations in clinical judgment, resource availability, and physician expertise influence triage outcomes. Moreover, frailty and atypical presentations in elderly AHF patients can complicate risk stratification. Future efforts should emphasize the integration of AI-driven triage systems to enhance decision-making accuracy and reduce variability in patient assessment.

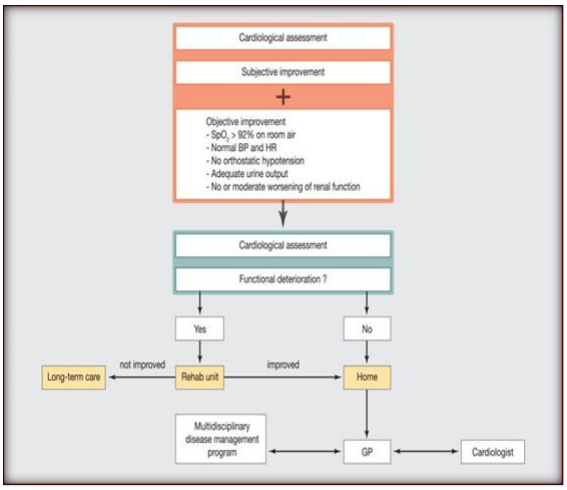

Figure 2: Assessment of hospital discharge and organization of follow-up.[34]

Early Intervention Strategies: Optimizing Treatment Timing

The importance of early decongestive therapy, particularly within 30 minutes of ED arrival, has been highlighted in multiple studies, demonstrating a 25% reduction in rehospitalization rates and a 30% decrease in short-term mortality.[34-36] Non-invasive ventilation (NIV) and high-flow oxygen therapy have also shown promise in improving respiratory distress management in elderly AHF patients.[37-38]

However, early aggressive therapy poses risks in frail elderly patients with multi-organ dysfunction, hypotension, or renal impairment.[39] Over-diuresis may lead to electrolyte imbalances and worsening renal function, necessitating a personalized treatment approach. Future research should focus on developing precision medicine strategies to tailor AHF treatments based on patient-specific risk factors and comorbidities.

Palliative Care Integration: Addressing Underutilization

Despite clear evidence supporting early palliative care integration, it remains underutilized in AHF management. Studies indicate that palliative care involvement leads to better symptom management, improved quality of life, and fewer hospitalizations.[40-41] However, barriers such as limited provider awareness, lack of standardized referral pathways, and misconceptions about palliative care in non-terminal conditions hinder its widespread adoption.

Efforts should focus on training healthcare providers, increasing awareness, and incorporating palliative care discussions earlier in the disease trajectory. Furthermore, interdisciplinary collaboration among cardiologists, geriatricians, and palliative care specialists is crucial for optimizing holistic management in elderly AHF patients.

Challenges and Future Directions

1. Standardization of BIO Area Protocols: There is a need for globally accepted protocols to optimize care delivery in BIO units and improve patient outcomes. Future studies should evaluate the long-term impact of BIO areas on mortality and rehospitalization rates.
2. AI and Predictive Analytics in Triage: Leveraging artificial intelligence and machine learning can enhance triage accuracy, reduce physician subjectivity, and facilitate early identification of high-risk AHF patients.
3. Precision Medicine Approaches: Future research should explore genetic markers, biomarker-guided therapy, and patient-specific algorithms to develop personalized treatment strategies for elderly AHF patients.
4. Multidisciplinary Collaboration: Improved coordination among emergency physicians, cardiologists, geriatricians, and palliative care specialists is essential for developing comprehensive AHF management frameworks.
5. Long-Term Outcome Assessment: While early interventions improve short-term outcomes, studies assessing long-term survival, functional status, and healthcare costs are needed to guide future clinical practices.

CONCLUSION

Managing acute heart failure in elderly patients requires a multifaceted approach that integrates BIO areas, structured triage systems, early intervention strategies, and palliative care. Standardized protocols, AI-driven risk stratification, and personalized treatment approaches are critical for optimizing outcomes in this vulnerable population. Future research should focus on refining multidisciplinary care models and evaluating innovative strategies to enhance both survival rates and quality of life in elderly AHF patients.

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