# ОГЛЯД ЛІТЕРАТУРИ

DOI: 10.21802/acm.2017.1.8

## THE MODERN ASPECTS OF ACUTE HEART FAILURE MANAGEMENT

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***Abstract.*** Acute heart failure (AHF) is one the most common causes of morbidity and mortality. The prognosis of patients admitted with AHF remains dismal, with over 20% experiencing recurrent HF admission and over 20% dying during the first year after initial admission. **The purpose** of this study was to provide contemporary perspective for hospital management of AHF within the context of the most recent data and to provide guidance, based on expert opinions, to practicing physicians and other healthcare professionals. **Material and methods:** In this paper we reviewed of current updated European Cardiology Society (ESC) HF guideline (2016) and modern trials for AHF from Medscape database. **Results:** Diuretics are the main medications in the treatment of patients with AHF and signs of fluid overload and congestion. Intravenous vasodilators are the second most used agent in AHF. Their use was shown to be associated with lower mortality, and a delay in administration was associated with a higher mortality. Use of an inotropic medications (such as dopamine, dobutamine, milrinone, levosimendan, epinephrine, norepenephrine) should be reserved for patients with a severe reduction in cardiac output resulting in compromised vital organ perfusion, which occurs most often in hypotensive AHF. **Conclusion:** Acute heart failure is a life-threatening medical condition, which needs emergency management for death prevention.

***Key words: acute heart failure, management.***

**Problem statement and analysis of recent research.** It's known, that heart failure (HF) is a serious condition in which the heart is unable to pump enough blood to meet the needs of the body. Across the world, 17-45% of patients admitted to hospital with HF die within 1 year of admission and the majority die within 5 years of admission [1].

The prevalence of HF is approximately 1–2% of the adult population in developed countries, rising to ≥10% among old people [2]. The lifetime risk of HF at age 55 years is 33% for men and 28% for women [3].

Acute heart failure (AHF) is one of the most common causes of morbidity and mortality. AHF occurs as the rapid development or progression of symptoms and/or signs of heart failure requiring urgent medical evaluation and treatment. AHF may be present as a first occurrence (*de novo*) or, more frequently, as a consequence of acute decompensation of chronic HF, and may be caused by primary cardiac dysfunction or more frequently precipitated by extrinsic factors in patients with chronic heart failure [4].

The prognosis of patients admitted with AHF remains dismal, with over than 20% experiencing recurrent HF on admission and over than 20% dying during the first year after initial admission [5]. Moreover, patients with AHF recently hospitalized are at high risk for future cardiovascular events and death [6].

In contrast to the state of chronic HF treatment, advances in the management of AHF have been limited. Therapies for this condition have generally changed a little over the past decades, despite ongoing research [7]. Options are limited to drugs that relieve breathlessness and reduce fluid by increasing urine production or dilating blood vessels. Drugs that act directly on the heart muscle to increase the contraction power can have adverse effects. But none of these medications does anything to address the underlying cause of HF, leaving patients at a high risk of death after hospital discharge [1].

**The objective** of the current work is to provide contemporary perspective for hospital management of AHF within the context of the most recent data and to provide guidance, based on expert opinions, to practicing physicians and other healthcare professionals.

**Materials and methods**

In this paper we reviewed the current updated European Cardiology Society (ESC) HF guideline (2016) and modern trials for AHF from Medscape database.

**Results and Discussion**

AHF is the term used to describe the rapid onset or acute worsening of symptoms and signs of HF, associated with elevated plasma levels of natriuretic peptides. It is a life-threatening condition that requires immediate medical attention and usually leads to urgent hospital admission [9].

A large number of classifications of AHF based on different criteria have been offered. The following clinical classification may be helpful to guide therapy in the initial phase and carries prognostic information. It is based on bedside physical examination in order to detect the presence of clinical symptoms/signs of congestion ('wet' vs. 'dry', if present vs. absent) and/or peripheral hypoperfusion ('cold' vs. 'warm' if present vs. absent) [10]. The combination of these options identifies four groups: warm and wet (well perfused and congested) — most commonly present; cold and wet (hypoperfused and congested); cold and dry (hypoperfused without congestion); and warm and dry (compensated, well-perfused without congestion) [10].

Patients with AHF complicating AMI can be classified according to Killip and Kimball into class I, no clinical signs of HF; class II, HF with rales and $S_3$ gallop; class III, with frank acute pulmonary oedema; class IV, cardiogenic shock, hypotension (SBP<90 mm/Hg) and evidence of peripheral vasoconstriction such as oliguria, cyanosis and diaphoresis [11].

AHF is a life-threatening medical condition, thus rapid transfer to the nearest hospital should be pursued, preferably to a site with a cardiology department and/or a coronary care/intensive care unit [8]. It's important to make an early diagnosis of main reason of AHF. In case of acute coronary syndrome, or rapid and excessive increase in arterial blood pressure, or severe rhythm disturbances, or acute pulmonary embolism, etc. patients should be treated due to current guidelines.

All patients with AHF should be monitored for

transcutaneous arterial oxygen saturation ($SpO_2$). In case of $SpO_2$<90% oxygen therapy is recommended [8].

A management algorithm for patients with AHF is based on the clinical profile during an early phase (fig. 1).

Diuretics are the main medications in the treatment of patients with AHF and signs of fluid overload and congestion. Initially, 20–40 mg of intravenous furosemide can be considered in all AHF patients. To enhance diuresis or overcome diuretic resistance, options include dual nephron blockade by loop diuretics (i.e. furosemide or torasemide) with thiazide diuretics or natriuretic doses of MRAs [12].

Intravenous vasodilators are the second most used agent in AHF. Their use was associated with lower mortality, and a delay in administration was associated with a higher mortality [13]. Dose should be carefully controlled to avoid excessive decrease in blood pressure, which is related to poor outcome. Vasodilators should be used with caution in patients with significant mitral or aortic stenosis [8]. Vasodilators should be avoided in patients with SBP<90 mm/Hg (or with symptomatic hypotension).

Use of inotropic medications (such as *dopamine, dobutamine, milrinone, levosimendan, epinephrine, norepenephrine*) should be reserved for patients with a severe reduction in cardiac output resulting in compromised vital organ perfusion, which occurs most often in hypotensive AHF. Inotropic agents are not recommended in cases of hypotensive AHF, where the underlying cause is hypovolaemia, or other potentially correctable factors before elimination of these causes [8]. Inotropes, especially those with adrenergic mechanisms, can cause sinus tachycardia and may induce myocardial ischaemia and arrhythmias, thus ECG monitoring is required. Levosimendan is preferable over dobutamine to reverse the effect of beta-blockade if beta-blockade is thought to be contributing to hypoperfusion [14], but due to its vasodilatatory effect should be avoided in case of hypotension (SBP<85 mm/Hg) [15].

Routine use of opioids in AFH patients is not recommended and decision for its use should be individualized. In the Acute Decompensated Heart Failure National Registry (ADHFNR), morphine use was associated with higher rates of mechanical ventilation, intensive care unit admission and death [16].

In patients with HF and atrial fibrillation, intravenous administration of a cardiac glycoside should be considered for rapid control of the ventricular rate, as recommended by guidelines [9].

The conventional indications for an intra-aortic balloon pump are to support the circulation before surgical correction of specific acute mechanical problems, during severe acute myocarditis and in selected patients with acute myocardial ischaemia or infarction before, during and after percutaneous or surgical revascularization. Ventricular assist devices and other forms of mechanical circulatory support may be used as a 'bridge to decision' or longer term in selected patients [8].

Mortality and readmission rates after discharge from an admission with AHF are high [17]. In accordance of recent French prospective cohort study of patients older than 75 years who were admitted with AHF, the independent predictors of 2-year mortality were male sex (hazard ratio [HR], 1.36; 95% CI, 1.00–1.82), age>85 years (HR, 1.57; 95% CI, 1.19–2.07), higher number of impaired activities of daily living (HR, 1.11 per impaired item; 95% CI, 1.05–1.17), recent weight loss (HR, 1.61; 95% CI, 1.14–2.28), and lower systolic blood pressure (HR, 0.86 per standard deviation increase; 95% CI, 0.74–0.99). Creatinine clearance ≤30 mL/min showed a trend toward an association with 2-year mortality (HR, 1.36; 95% CI, 0.97–2.00) [18].

**Prospects of further researches** are the discovering of new kinds of medications for acute heart failure treatment.

**Conclusions.** Acute heart failure is a life-threatening medical condition, which needs emergency management for death prevention.

**Conflicts of interests:** none

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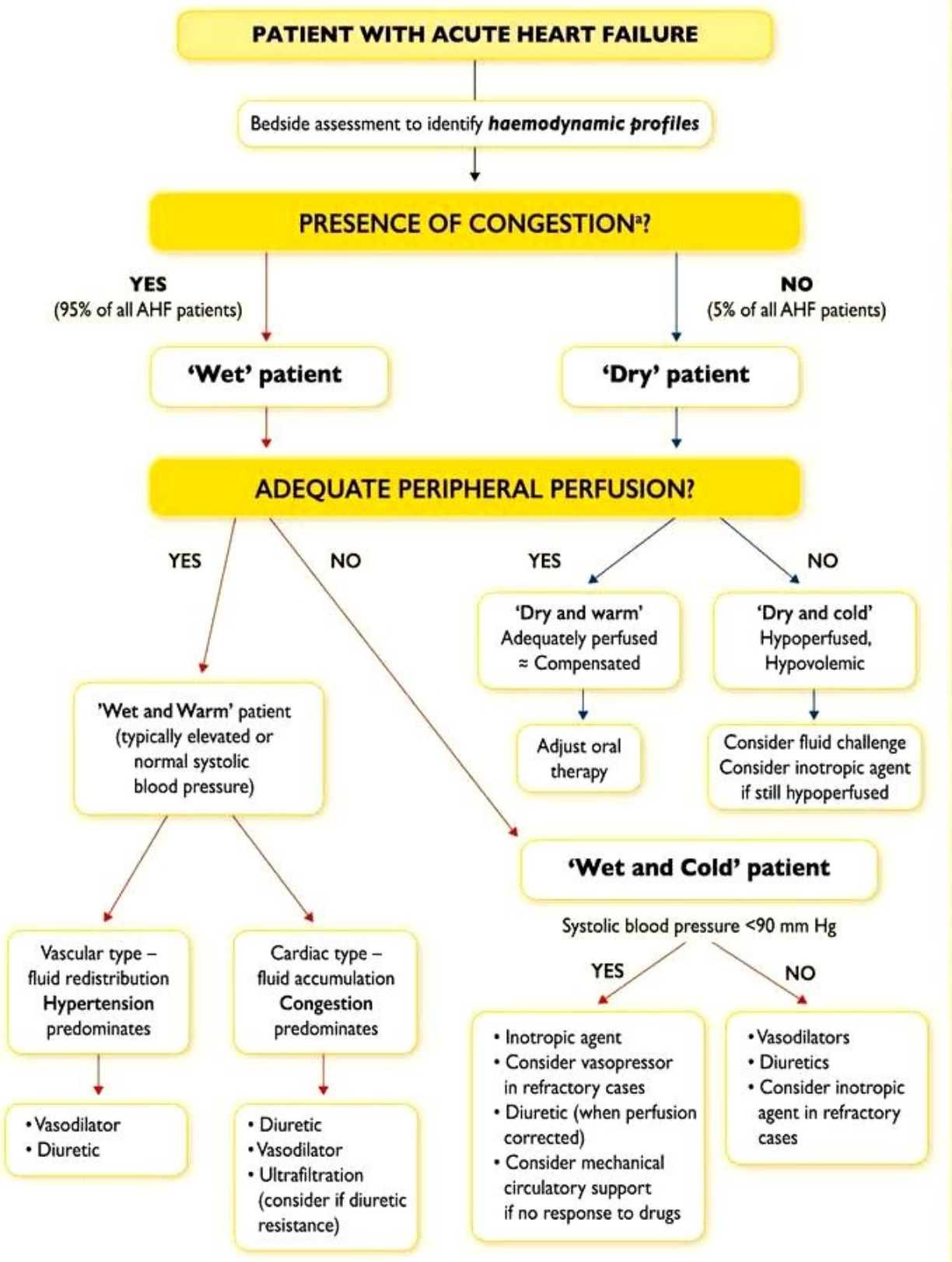


**Fig. 1. ESC (2016) Algorithm for acute heart treatment [8]**

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Date received: 28.05.2017
Date revision received: 5.06.2017
Date accepted: 6.06.2017