Clinical and laboratory characteristics of short-term mortality in Egyptian patients with acute heart failure

Ahmad Tageldien Abdellah [a,*], **Alaa Desouky Mohamed** [b], **Hamdy Ali Hendawi** [c], **Magdi Ali Omera** [c]

[a] Cardiovascular Medicine Department, Suez Canal University, Egypt
[b] Emergency Department, Suez Canal University, Egypt
[c] Anasethia and Intensive Care Department, Suez Canal University, Egypt

Abstract *Objective:* To identify the clinical and laboratory predictors of short-term mortality in patients with acute heart failure (AHF).

Subjects and methods: We conducted a prospective, single center study on 120 consecutive patients presented with acute heart failure to the emergency department. All patients had clinical, laboratory, electrocardiographic and echocardiographic evaluation. Short-term mortality was reported within 30 days of presentation.

Results: Mean age was 59.29 ± 10.1 years, 55.8% were males and 50.8% were smokers. The common AHF presentations were dyspnea (91.7%), chest tightness (62.5%) and lower limb edema (54.2%). Ischemic heart disease, diabetes and hypertension were present in 72.5%, 43.3% and 35% of patients, respectively.

Short-term mortality was reported in 29 patients (24.16%); most of them died in-hospital (19 patients, 65.52%). The following parameters were significantly associated with short-term mortality: hypoxia ($P < 0.001$), tachycardia ($P < 0.01$), raised jugular venous pressure (JVP) ($P < 0.001$), low systolic blood pressure ($P < 0.01$), prolonged PR interval ($P < 0.007$), atrial fibrillation (AF) ($P < 0.038$), left bundle branch block (LBBB) ($P < 0.04$), impaired kidney function ($P < 0.007$), anemia ($P < 0.029$), hyponatremia ($P < 0.006$), hypoalbuminemia ($P < 0.005$), dilated left ventricle (LV) ($P < 0.001$), low LV ejection fraction (LVEF) ($P < 0.001$), and dilated left atrium (LA) ($P < 0.002$).

* Corresponding author at: Department of Cardiovascular Medicine, Faculty of Medicine, Suez Canal University, Ring Road, Ismailia 41111, Egypt. Fax: +20 643229810.

E-mail address: dr.ahmedtag@gmail.com (A.T. Abdellah).

URL: http://scholar.google.co.uk/citations?user = 4CbyxvoAAAAJ&hl = en (A.T. Abdellah).

ROC curve analysis showed that low LVEF ($\leq 24\%$), dilated LV end diastolic diameter (LVESD) ≥ 66.5 mm, dilated LV end systolic diameter (LVESD) ≥ 53.5 mm, dilated LA diameter ≥ 48 mm, increased serum creatinine ≥ 1.6 mg/dl, and decreased serum albumin ≤ 3 g/dl can significantly predict short-term mortality in patients with acute heart failure.

Conclusion: Variable clinical, laboratory, electrocardiographic and echocardiographic parameters were associated with short-term mortality. Our study showed that low LVEF, dilated LV diameter, dilated LA diameter, impaired kidney function and low serum albumin can predict short-term mortality in patients with acute heart failure.

1. Introduction

Heart failure is an increasing epidemic with substantial morbidity and mortality burden. Its prognosis is still poor despite the advances in evidence-based medical treatment and device therapy.[1] Mortality varies between different studies; a large study on Egyptian HF patients has reported that all-cause mortality of HF was 5%[2] while EURO HF survey reported that AHF mortality varied from 8% to 20%.[3] The risk of mortality and re-hospitalization is greater in acute than in chronic stable HF; the prognosis is still poor even after hospital discharge.[1,4]

Clinically, blood pressure (BP) is inversely correlated with mortality; high admission systolic BP is associated with a significantly lower in-hospital and post-discharge mortality.[5] Different studies have reported that wide QRS complex was present in about 40% of patients with low LVEF hospitalized for AHF and was associated with increased early and late post-discharge mortality and hospitalization.[5,6]

Approximately, 30% of AHF patients have worsening renal function during hospitalization which is one of the most important predictors of early HF mortality.[7] Similarly, 25% of AHF patients have hyponatremia which carries a significant mortality risk after discharge.[8,9]

To our knowledge, no prospective studies were conducted to identify the clinical and laboratory predictors of short-term mortality among Egyptian patients presented with AHF.

2. Methods

2.1. Study design

This is a single center, prospective observational study. It was approved by the faculty of medicine - Suez Canal university ethical review board.

2.2. Population and data collection

Initially, we enrolled 138 consecutive patients who fulfilled the enrolment criteria, presented with AHF to the emergency department of Suez Canal University hospital from January 2012 to September 2012. AHF refers to rapid onset or worsening of symptoms and/or signs of HF. It is a life-threatening medical condition requiring urgent evaluation and treatment, typically leading to urgent hospital admission.[1] All patients have given written informed consent. Only patients with low LVEF were recruited and followed up. However, only 120 patients have completed their follow-up, while 18 patients had incomplete data or had withdrawn from the study.

Patients were excluded if they were younger than 18 years old or unable to provide informed consent. We have also excluded patients with liver failure, cancer, renal failure on hemodialysis, post-traumatic shortness of breath or presented with acute coronary syndromes.

2.3. Study protocol

Clinical, laboratory, electrocardiographic and echocardiographic evaluation was performed on all patients. The initial evaluation was conducted by the on-site emergency and cardiology physicians. Then, patients were admitted to the cardiac care unit for proper management All patients were medically managed according to our institutional guidelines for HF management. Blood samples were collected from patients at the time of admission for laboratory analysis including complete blood count, kidney and liver functions, electrolytes and serum albumin. Standard 12-lead electrocardiography (ECG) and transthoracic echocardiography were performed to all patients according to the recommendations of American Society of Echocardiography guidelines.

Ischemic etiology of HF was considered in patients with angiographically documented ischemic heart disease (IHD), i.e. at least 75% obstruction of at least one coronary artery or 50% obstruction of the left main artery. Some of these patients had history of previous percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG). Other criteria included history of myocardial infarction admission, reduced LVEF $\leq 50\%$ with evidence of regional wall motion abnormalities detected by echocardiography and the presence of ECG changes suggestive of myocardial infarction.

2.4. Short-term mortality

We defined short-term mortality as 'mortality within 30 days of AHF presentation, either during admission or after hospital discharge'. Discharged patients were followed up at the outpatient clinic and by telephone contact until 30 days from hospital presentation. Research physician who followed up mortality was blinded to all patients' initial data.

2.5. Statistical analysis

Numerical values were expressed as mean ± standard deviation (SD). Continuous variables were compared between groups using unpaired t-test (for normally distributed vari-