

Clinical Presentation and Precipitating Factors for Acute Heart Failure Hospitalization

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Introduction: Acute heart failure syndromes are the most common cause of hospitalization in patients over 65 year. The number of hospitalizations for heart failure has tripled over the last three decades and it is expected to grow further.

Materials and methods: We followed 390 patients, with an average age of 69.2 yrs, admitted in the Cardiology Department of Internal Medicine Clinic IV of Târgu Mureș, from January 2009 till January 2010 for treatment of the acute heart failure. The aim of this study was the analization of the clinical presentation and the precipitating factors of the heart failure at these patients.

Results and discussions: The most common clinical presentation at this category of patients is decompensated heart failure (peripheral oedema/congestion). In this particular case over two thirds of patients have history of heart failure ($p < 0.0001$). Hypertensive heart failure is a common finding in the novo cases ($p = 0.0004$). Cardiogenic shock is relatively rare form at this group but with very high hospital mortality. The most common trigger is infection, that frequently causes acute heart failure syndromes, mostly right heart failure in patients with pulmonary cardiopathy ($p < 0.003$). It is the most frequently identified trigger, both, in worsening chronic heart failure ($p = 0.0002$) and de novo heart failure group ($p = 0.251$).

Conclusions: The prevalence of triggers varies considerably depending on the target population, but infections, arrhythmias, elevated blood pressure and non-compliance remain frequent causes of acute heart failure syndromes.

Keywords: acute heart failure, clinical presentation, trigger, precipitating factor

Introduction

Acute heart failure syndromes (AHFS) are the most frequent cause of hospitalization in patients over 65 years. The number of hospitalizations for heart failure has tripled over the last three decades and because of the ageing of the population, improved survival after myocardial infarction and the availability of therapies for prevention of sudden cardiac death and it is expected to grow further [1].

Hospitalizations for heart failure have two major meanings: on one hand they represent an important economical burden and at the other hand, being a predictive factor for rehospitalization and post discharge mortality, a crossroad for the patient [2,3].

These are the reasons why it is extremely important to identify the triggers of AHFS. Although these triggers remain unidentified in some cases, it is imperative to be defined and actively treated and to be developed an efficient strategy for preventing recurrences [1]. Not only there is a large variability of the already identified triggers, but the studies showed that 40–50% of the AHFS's do not have a known trigger and they remain unidentified even after an exhaustive investigation [4].

Materials and methods

We enrolled in the study patients with acute heart failure (AHF) admitted in the Cardiology Department of Internal Medicine Clinic IV Târgu Mureș for specific treatment, from January 2009 till January 2010. The data of these patients were recorded in a database.

The objective of the study was to analyze the clinical presentation forms and the precipitating factors of AHFS in patients admitted to hospital with this pathology.

Inclusion criteria

We enrolled 390 patients with AHF recording their demographic data, clinical presentation form, underlying cardiomyopathy and precipitants. The AHF diagnosis being based on symptoms (dyspnoea), signs (stasis rales, arterial hypotension, peripheral hypoperfusion, peripheral and visceral stasis) and the X-ray image of pulmonary congestion. Only patient with echocardiography report were included in study.

Classification of the enrolled patients

A first classification was done based on the presence or absence of a prior history of heart failure (HF). The 2008 European Society of Cardiology (ESC) guidelines emphasize the importance of history and time course of presentation. Accordingly, we categorize patients with AHFS by the following: The patients with a prior history of heart failure (HF) (diagnosis or hospitalizations for this pathology) were included in the group of worsening chronic heart failure (WCHF) and those without, in the novo HF (NHF) group [5].

The classification of the clinical presentation forms has been done according to the EuroHeart Failure Survey II (EHFSII) study, in the following groups: decompensated heart failure, hypertensive heart failure, pulmonary oedema, cardiogenic shock and right heart failure [6].

Statistical analysis of data

We described the prevalence of these characteristics (clinical presentation forms and precipitating factors) in the target group. We used for statistical analysis Graphpad InStat 3.06, Kolmogorov-Smirnov goodness-of-fit and Fisher's exact test.

Table I. Clinical presentation

Clinical presentation	%
Decompensated heart failure	56.1
Hypertensive heart failure	8.4
Pulmonary oedema	12.0
Cardiogenic shock	3.0
Right heart failure	21.5

Results and discussions

We enrolled in this study 390 patients with AHF and we applied Kolmogorov-Smirnov goodness-of-fit tests in order to evaluate the normality of distribution. The patients had an average age of 69.2 years; 64.6% of them were male and 35.3% female, with a relatively uniform urban (50.7%) and rural (49.2%), distribution. The predominant underlying cardiomyopathy was cardiac ischemia (45.3%), followed by valvular (23.1%) and pulmonary (17.7%) heart disease.

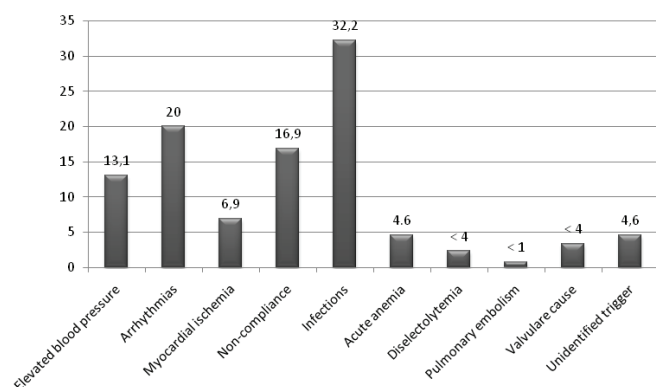
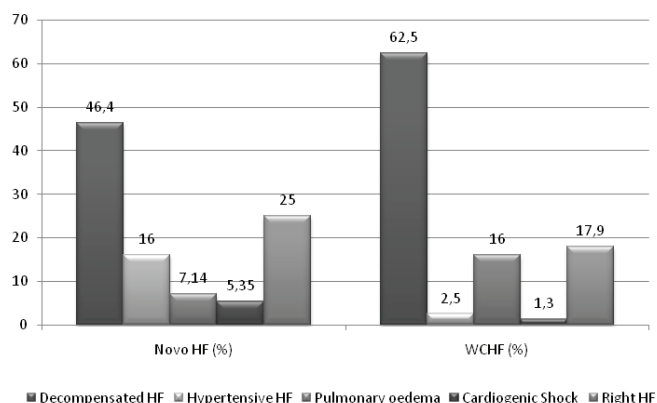
Prior history of heart failure and clinical presentation

According to the first classification the enrolled patients were divided in two groups: those with the novo heart failure (NHF) and those with worsening chronic heart failure (WCHF). We found the following distribution: 43.07% with NHF and 56.92% with WCHF.

Regarding the distribution of patients based on the clinical presentation we found the following results (Table I):

The proportion of different types of clinical presentation is similar at the two group of patients: ones with NHF and others with WCHF (Figure 2). In both cases the prevailing clinical presentation is the decompensated heart failure. In NHF group the most frequent types of clinical presentations are the decompensated heart failure ($p = 0.0715$) and hypertensive heart failure ($p = 0.0004$). In the WCHF group predominates also the decompensated heart failure ($p < 0.0001$), followed by right heart failure ($p = 0.137$) and pulmonary oedema ($p = 0.0001$).

Cardiogenic shock shows up in both groups, but with a clearly higher prevalence in the NHF group. 75% of cardiogenic shock cases are without case history of HF.

**Fig. 2. The precipitating factors of acute heart failure****Fig. 1. Clinical presentation and case history of heart failure**

Precipitating factors

The most common identified triggers were: infections (32.2%), arrhythmias (20%) and non-compliance (16.9%). Other less frequent triggers were represented by elevated blood pressure (13.1%), myocardial ischemia (6.9%), acute anemia (4.6%), dilelectrolytemia, valvular cause and pulmonary embolism. In 4.6% of cases the trigger could not be identified.

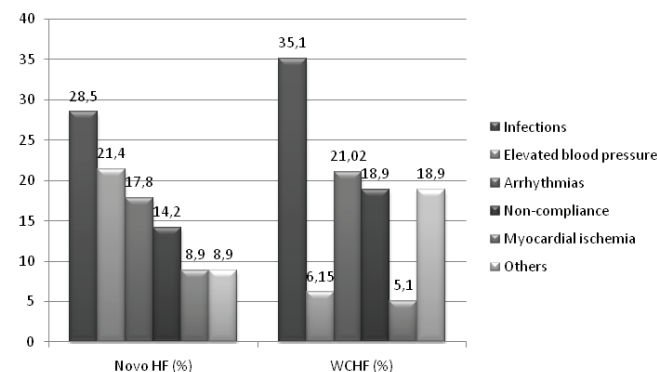
The dominant trigger was infection, mostly pulmonary (exacerbated COPD, pneumonia, viral respiratory infection and other infections). This infectious trigger can be identified mostly in patients with pulmonary cardiopathy, causing 70.83% of right heart failure ($p = 0.0001$).

Precipitating factors and clinical presentation

The decompensated heart failure is triggered in 30.14% of cases by an infection ($p = 0.019$), followed by 24.65% of therapeutic and/or dietic non-compliance ($p < 0.0001$) and arrhythmias (19.18%; $p = 0.050$). In 8.22% of cases the trigger remains unidentified.

In hypertensive heart failure, beside the evident trigger, the hypertensive crisis ($p < 0.0001$), other worsening factors can be associated, for example myocardial ischemia in 27.3%, arrhythmia in 18.2%, infection in 9%, non-compliance in 9%.

In pulmonary oedema we can identify as triggers the followings: hypertension crisis, arrhythmias, infection, myocardial ischemia and non compliance. There is a quite similar frequency in infections (37.5%) and arrhythmias

**Fig. 3. Precipitating factors and case history of heart failure**

(31.25%) and a slightly smaller frequency in myocardial ischemia (12.5%), non compliance (12.5%) and hypertensive crisis (6.5%). The associations are not statistically significant ($p > 0.05$).

The cardiogenic shock, identified in a proportion of 3.07% of cases, was triggered by ischemia, arrhythmia, infection and pulmonary embolism with or without ventricular arrhythmical/asistolical complications and with a 75% hospital mortality. In this type of clinical presentation, with severe prognosis, there is a balanced distribution of triggers, every one of them being responsible in 25% of cases and pulmonary embolism being statistically significant associated ($p = 0.029$).

Right heart failure is triggered in a proportion of 50% by infections, mostly respiratory ($p < 0.003$). Other common triggers, with 25% and 14.4% are hypertensive crisis and arrhythmias.

The graphic representation of the distribution of triggers in these two groups (NHF vs. WCHF) shows infection as a predominant trigger in both categories, but with a strong association in the case of WCHF ($p = 0.0002$). On the second place as frequency we find hypertensive crisis in the NHF group ($p = 0.0004$) and arrhythmias in the WCHF group ($p = 0.0077$). On the third place we find arrhythmia in the NHF group ($p = 0.358$) and non compliance in the WCHF group ($p = 0.008$).

Conclusions

1. The most common type of clinical presentation at our patients is decompensated heart failure.
2. In this group of decompensated heart failure over two thirds of patients have case history of acute heart failure ($p < 0.0001$).
3. Hypertensive heart failure is frequently found in de novo cases of heart failure ($p = 0.0004$).

4. Cardiogenic shock is a rare form of AHF at our patients, but with a high hospital mortality.
5. The most common trigger is infection, frequently causing acute heart failure syndromes, mostly right heart failure in patients with pulmonary cardiopathy ($p = 0.003$).
6. Infection is the most common identified trigger both in the novo heart failure (NHF) group ($p = 0.251$) and in the worsening chronic heart failure group (WCHF) ($p = 0.0002$).

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