

GENDER-ASSOCIATED DIFFERENCES IN ACUTE HEART FAILURE PATIENTS PRESENTING TO EMERGENCY DEPARTMENT

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SUMMARY – Little is known about gender-associated differences in characteristics and survival of acute heart failure patients. The increasing incidence calls for investigating the possibilities of improved management. The purpose of the study was to determine gender-associated differences among emergency department acute heart failure patients in order to improve treatment quality and survival. A prospective observational study on 22,713 patients was conducted at the University Hospital Center Emergency department during 2010 and included 726 consecutive acute heart failure patients. The most common cause of acute heart failure was worsening of chronic heart failure. Females suffered more frequently from hypertensive acute heart failure and males from acute heart failure associated with acute coronary syndrome. Females were older, with higher body mass index, atrial fibrillation, urinary tract infections, hypertension history, hypertension at admission, and SAPS II score at admission. Males had a higher frequency of ST-elevation myocardial infarction and dilated cardiomyopathy, confirmed by ultrasound as lower ejection fraction and left ventricle dilatation with reduced ejection fraction. Males were more frequently smokers with a history of chronic obstructive pulmonary disease. The importance of treating hypertension and atrial fibrillation in women and acute coronary syndrome and chronic obstructive pulmonary disease in men should be emphasized. Aggressive identification and management of all possible heart failure etiologies should be recommended in the emergency department.

Key words: *Heart failure – therapy; Acute disease – therapy; Gender; Emergency service, hospital*

Introduction

Little is known about gender-associated differences in baseline characteristics and survival in acute heart failure patients. The increasing incidence of heart failure patients calls for investigating the possibilities of their improved management. The aim of the present

study was to investigate acute heart failure gender-associated differences that might be used to improve patient treatment, quality of life and survival.

The European Society of Cardiology (ESC) guidelines 2008 for the diagnosis and treatment of acute heart failure and chronic heart failure define acute heart failure as a rapid onset or change in the signs and symptoms of heart failure resulting in the need of urgent therapy. Acute heart failure may be either new heart failure or worsening of preexisting chronic heart failure¹. The combination of aging population, improved acute myocardial infarction (AMI) survival, and better prevention of sudden cardiac death

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has entailed rapid growth in the number of patients currently living with chronic heart failure. In addition, hospitalization for acute heart failure poses a major and growing health care burden². According to the World Health Organization (WHO), cardiovascular diseases were the cause of 17.3 million deaths worldwide in 2008, and it is estimated that by 2030, almost 23.6 million people will die from cardiovascular diseases³. Heart failure is a significant and growing problem in Europe with a prevalence of 0.4%-2%, and it is a major and growing cause of in-hospital mortality in developed countries^{4,5}. According to the national database, heart failure was the third most common cause of death among women and fourth among men in 2009⁶. Patients suffering from acute heart failure frequently present to emergency department (ED) requiring a demanding management.

Since there are still gaps in evidence, the ESC considers there is a need of further evaluation of treatments in females and the elderly because they have not been adequately represented in clinical researches¹. According to some findings, there is no gender-associated difference in patient survival, and therefore there are still no recommendations for gender-associated management of acute heart failure patients. We postulate that identification and proper treatment of gender-associated concomitant diseases can improve the quality of life and survival of acute heart failure patients.

Patients and Methods

Study design and setting

This prospective observational study was designed to assess the gender-associated baseline characteristics, management, and survival in acute heart failure patients treated in ED. The investigation was performed in line with the principles outlined in the Declaration of Helsinki 1975, as revised in 2008, and was approved by the Ethics Committees of the Sestre milosrdnice University Hospital Center and School of Medicine, University of Zagreb. The study was conducted at Emergency Department of the Sestre milosrdnice UHC (UHC ED) with a 50-km catchment area and 350,000 catchment population.

Selection of study patients

All patients that presented to ED with the symptoms of acute heart failure in 2010 were included in the study, divided into two groups by gender. Acute shortness of breath was the primary complaint. Heart failure was diagnosed according to ESC guidelines 2008 and by the UHC workup¹. Patient eligibility was determined by the attending ED physician. The patients were additionally divided into six clinical groups according to the ESC guidelines 2008 for the diagnosis and treatment of acute heart failure, as follows: 1) worsening or decompensated chronic heart failure; 2) pulmonary edema; 3) hypertensive heart failure; 4) cardiogenic shock; 5) isolated right heart failure; and 6) acute coronary syndrome and heart failure¹. Patient management was based on the UHC ED protocols and in accordance with international guidelines.

Interventions

Patient identity was protected by database coding. Patients with a false-positive diagnosis were excluded from the study (Fig. 1). The exclusion criteria were age under eighteen, severe renal failure (serum creatinine >400 µmol/L), and patients requiring early transfer to another hospital. Patients that developed heart failure secondary to admission for another illness or after an interventional procedure were not included. Screening of consecutive patients provided some protection from systematic error.

Data collection, processing, and measurements

On admission, all patients underwent initial routine clinical assessment that included history, physical examination, electrocardiography (ECG), ED blood tests including arterial blood gas analysis, chest x-ray, and heart ultrasound as standard UHC diagnostic and treatment protocols. The abstractors prospectively collected data in an online database from the hospital ED electronic chart. Data were collected by the standard written protocol and monitored by a senior physician. Practice runs and regular meetings were performed to check performance of abstractors. Importance of missing data was discussed with a senior physician-monitor. ECG and imaging chest x-ray, echocardiography (n=147) (Sequoia Acuson, Ocean-side, HCA, USA), ejection fraction (EF) measured

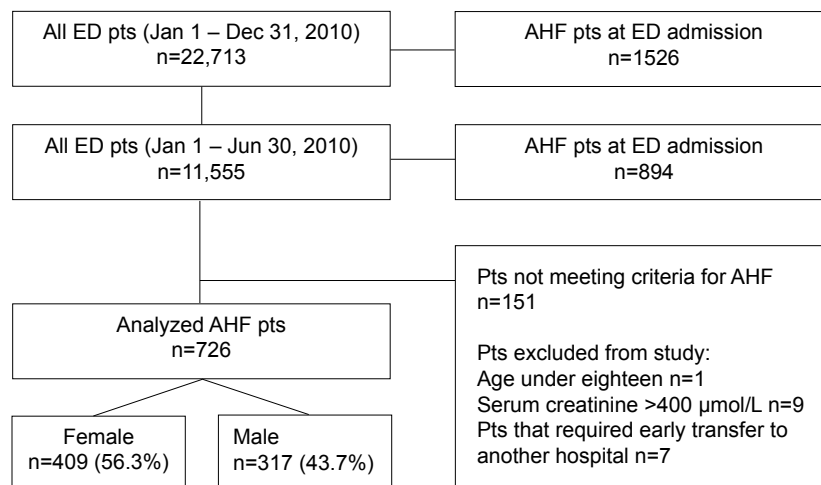


Fig. 1. Flow diagram of Emergency Department acute heart failure patients included in the survey.

AHF = acute heart failure; ED = Emergency Department; pts = patients

according to Simpson method were done as standard UHC diagnostic and treatment protocols. Body mass index (BMI) was calculated according to Quetelet's formula as the ratio of body weight to body height square (kg/m^2). Waist circumference was measured with a flexible tape placed on a horizontal plane at the level of iliac crest. Blood pressure (BP) was measured with a mercury sphygmomanometer (Riester, Jungingen, Germany) under standardized conditions in supine position. Hypertension was diagnosed according to the WHO criteria (BP $\geq 140/90$ mm Hg or current antihypertensive treatment). Diabetes was diagnosed in patients with dietary treatment, antidiabetics, or current fasting plasma glucose levels higher than 7.0 mmol/L. Hyperlipidemia was defined as the low-density lipoprotein (LDL) cholesterol level >3.5 mmol/L, or if the patient was taking a lipid-lowering drug. According to cigarette smoking, patients were classified as current smokers (smoking more than five cigarettes/day within the past 3 months), former smokers (>3 months and <10 years) or non-smokers. Blood samples for laboratory assays were obtained at ED admission. Blood samples in ethylenediaminetetraacetic acid (EDTA)-K3 containing tubes were used for hematologic assays (Coulter-Counter S plus junior, Coulter Electronics Ltd., Luton, UK). Coagulation parameters were assessed from blood samples taken in 3.8% sodium citrate containers and analyzed (Dade

Behring, Marburg, Germany). Serum creatinine, bilirubin, aspartate transaminase, alanine transaminase, blood glucose level, total plasma cholesterol, triglycerides, LDL, and high-density lipoprotein (HDL) cholesterol were measured on the automated multi-channel selective analyzers Olympus AU2700 and Olympus Fractoscan junior (Olympus Diagnostica GmbH, Hamburg, Germany). High sensitivity C-reactive protein (hsCRP) concentration was measured on the automated multichannel selective analyzer Modular (Roche Diagnostics, Mannheim, Germany) according to the manufacturer's instructions. Acute Physiology and Chronic Health Evaluation II score (APACHE II), New York Heart Association (NYHA) Functional Classification, and Simplified Acute Physiology Score II (SAPS II) were calculated with online calculators⁷⁻⁹. The final discharge diagnosis of acute heart failure made by attending physician was based on all the information available, including response to therapy and autopsy data in patients that died in the hospital.

Outcome measures

The main outcome measure was survival. Secondary outcome measures were types of acute heart failure according to the ESC Guidelines 2008¹. Good outcome was defined as discharge from the ED or hospital.

Primary data analysis

Complete data analysis was done in 726 consecutive patients examined in the ED during the first six months in 2010. All statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS) version 17.0 for Windows (SPSS, Chicago, IL, United States). The χ^2 -test and Student's t-test were used as appropriate. Continuous data (patient age, BMI, EF) were presented as mean \pm standard deviation (SD). Proportions were expressed as percentage and 95% confidence interval (95% CI). A p-value of 0.05 was considered statistically significant.

Data presentation

Data were presented in tables as groups of characteristics and variables of acute heart failure patients by gender. Characteristics and variables were organized in five groups, as follows: 1) baseline characteristics; 2) underlying and/or concomitant diseases; 3) symptoms and signs; 4) echocardiographic and ECG findings; and 5) medication before admission, on admission, and at discharge.

Results

Characteristics of study patients

In 2010, a total of 22,713 ED patients were screened, 11,555 of them recorded in the first six months. There was a total of 1526 (6.7%) patients with suspected or confirmed acute heart failure, 894 (7.7%) of them diagnosed in the first six months. Following exclusion of patients with a false-positive diagnosis (n=151) and engagement of exclusion criteria (n=17), complete statistical analysis was done on 726 patients, 409 (56.3%) of them women. Patients were admitted from home or nursing home (n=646; 89.7%), another department (n=28; 3.9%), or another hospital (n=46; 6.4%). The mean patient age was 75.7 \pm 9.7 years; women were on average five years older than men, with a mean age of 78.2 \pm 9.4 years (p<0.001; 95% CI 3.63-6.47). The mean BMI of study patients was 27.9 kg/m², which classified them as overweight. Females had by 2.6 kg/m² higher BMI (29.2 \pm 6.7 kg/m²; p=0.032; 95% CI 0.22-4.9). Almost half (n=297; 40.9%) of the patients required hospital admission and treatment,

Table 1. Gender-associated differences in patient baseline characteristics and clinical presentation of acute heart failure¹

Characteristic	Female, n (%)	Male, n (%)	N (%)
No. of patients	409 (56.3)	317 (43.7)	726 (100)
No. of hospitalizations	159 (53.5)	138 (46.5)	297 (40.9)
AHF readmission within six months	141 (58.0)	102 (42.0)	243 (33.4)
	Mean \pm SD	Mean \pm SD	Mean \pm SD
*Age (years) [§]	78.2 \pm 9.4	73.1 \pm 9.9	75.7 \pm 9.7
*BMI (kg/m ²) ^{††}	29.2 \pm 6.7	26.6 \pm 5.1	27.9 \pm 5.9
Clinical presentation of AHF	n (%)	n (%)	N (%)
Worsening or decompensation of CHF	195 (54.8)	161 (45.2)	356 (49.5)
Hypertensive HF [†]	108 (63.5)	62 (36.5)	170 (23.6)
Isolated right HF	51 (60.0)	34 (40.0)	85 (11.8)
Pulmonary edema	27 (50.0)	27 (50.0)	54 (7.5)
Cardiogenic shock	14 (51.9)	13 (48.1)	27 (3.8)
ACS and HF [†]	9 (33.3)	18 (66.7)	27 (3.8)

AHF = acute heart failure; CHF = chronic heart failure; HF = heart failure; BMI = body mass index; ACS = acute coronary syndrome; SD = standard deviation; categorical variables are expressed as numbers and percentages; p-values: Pearson χ^2 -test with Yates correction; *independent t-test; §p<0.001; †p=0.046; ††p=0.032

and one-third of them (n=243; 33.5%) had readmission for acute heart failure within the next six months (Table 1). Out of 726 patients, 398 (55%) had symptoms of acute heart failure for three or more days prior to admission to the ED. The mean length of hospital stay was 9.3 days, 1.3 days at the Intensive Care Unit and 8.3 days at the Department of Medicine. The overall mortality rate was 9.2% (n=67); autopsy was performed in 10.4% of non-survivors. There was no gender-associated difference in survival.

Main results

The patients were allocated into six groups according to the recently published ESC guidelines for the diagnosis and treatment of acute heart failure: 1) worsening or decompensation of chronic heart failure (49.5%); 2) hypertensive heart failure (23.6%); 3) isolated right heart failure (11.8%); 4) pulmonary edema (7.5%); 5) cardiogenic shock (3.8%); and 6) acute coronary syndrome and heart failure (3.8%) (Table 1)¹. Gender-associated differences were recorded in the hypertensive acute heart failure group (26.7% *vs.* 19.7%; *p*=0.046) for females, and in the acute coro-

nary syndrome with heart failure group (2.2% *vs.* 5.7%; *p*=0.046) for males. The survey highlighted the fact that most acute heart failure patients had several cardiovascular and non-cardiovascular diseases in addition to heart failure. Females and males significantly differed in underlying and concomitant diseases (Table 2). Symptoms and signs did not differ between genders. The chief complaint was dyspnea (85.4%) (Table 3). Females were more frequently adipose (17.4% *vs.* 12%; *p*=0.004) with a higher frequency of hypertension at ED presentation (86% *vs.* 75%; *p*<0.001), males had a higher frequency of ST-elevation myocardial infarction (STEMI) (n=28; 3.8% of both genders) (18.5% *vs.* 6.1%; *p*=0.034). ED heart ultrasound (n=147 of both genders) revealed a higher frequency of four-chamber dilation (18.3% *vs.* 6.3%; *p*=0.022), left ventricle dilation (53.5% *vs.* 23.8%; *p*<0.001), and lower EF (39.1 *vs.* 45.4 %; *p*=0.003; 95% CI 2.12-10.58) in males. According to the NYHA Functional Classification, the patients were distributed as follows: NYHA I 1.8%, NYHA II 45.5%, NYHA III 42%, and NYHA IV 10.7%⁸. Females had a higher SAPS II score at ED admission (28.5 *vs.* 26.6 points; *p*=0.001; 95% CI 0.76-3.11); there was no difference

Table 2. Gender-associated differences in underlying and concomitant diseases in acute heart failure patients

Characteristic	Female, n (%) ^a	Male, n (%) ^a	N (%)
Underlying diseases	409 (56.3)	317 (43.7)	726 (100)
Hypertension [§]	352 (86.7)	238 (75.6)	590 (81.8)
Heart valvular disease	175 (43.1)	141 (44.6)	316 (43.8)
Coronary artery disease	124 (30.5)	113 (35.9)	237 (32.9)
Dilated cardiomyopathy [§]	24 (5.9)	49 (15.5)	73 (10.1)
Concomitant diseases			
Atrial fibrillation [†]	194 (53.0)	130 (44.4)	324 (49.2)
Diabetes mellitus	138 (34.0)	95 (30.2)	233 (32.3)
Adiposity ^{††}	71 (36.6)	38 (22.6)	109 (30.1)
COPD [§]	86 (21.2)	101 (32.0)	187 (25.9)
Anemia	94 (23.1)	88 (27.8)	182 (25.2)
Hyperlipidemia	76 (18.8)	67 (21.3)	143 (19.9)
Cigarette smoking [§]	35 (11.5)	71 (27.1)	106 (18.7)
Urinary tract infection ^{§§}	54 (13.2)	22 (7.0)	76 (10.5)

^aPercentage is expressed within gender; COPD = chronic obstructive pulmonary disease; categorical variables are expressed as numbers and percentages; *p*-values: Pearson χ^2 -test with Yates correction [§]*p*<0.001; ^{§§}*p*=0.006; [†]*p*=0.028; ^{††}*p*=0.004

Table 3. Gender-associated differences in symptoms and signs of acute heart failure patients on admission to Emergency Department

Characteristic	Female, n (%) ^a	Male, n (%) ^a	N (%)
	409 (100)	317 (100)	726 (100)
Symptom			
Dyspnea	347 (84.8)	273 (86.4)	620 (85.5)
Fatigue	249 (61.2)	193 (61.3)	442 (61.2)
Orthopnea	226 (55.4)	158 (50.0)	384 (53.0)
Cough	123 (30.1)	104 (32.9)	227 (31.3)
Chest pain	101 (24.8)	79 (25.1)	180 (24.9)
Symptom duration >72 hours	235 (57.6)	163 (51.6)	398 (55.0)
Signs	409 (56.3)	317 (43.7)	726 (100)
Systolic blood pressure >150 mm Hg [§]	133 (32.8)	65 (20.7)	198 (27.5)
Pulse rate >100/min	129 (32.0)	110 (35.1)	239 (33.4)
Respiratory rate >30/min	37 (9.1)	24 (7.6)	61 (8.4)
Right pleural effusion ^{§§}	60 (14.7)	53 (16.8)	113 (15.6)
Bilateral pleural effusion ^{§§}	57 (14.0)	60 (19.0)	117 (16.2)
Dilated neck veins	127 (31.4)	110 (34.9)	237 (32.9)
Hepatomegaly [†]	105 (26.0)	116 (36.9)	221 (30.8)

^aPercentage is expressed within gender; categorical variables are expressed as numbers and percentages; p-values: Pearson χ^2 -test with Yates correction [§]p<0.001; ^{§§}p=0.019; [†]p=0.002

in APACHE II score (11.3 *vs.* 10.6 points)^{7,9}. The overall mortality rate was 9.2% (n=67); autopsy was performed in 10.4% of non-survivors. There was no gender-associated difference in survival.

Discussion

As a result of acute heart failure being a clinical diagnosis based on presenting symptoms and clinical findings, no investigation might be considered as the gold standard for diagnosis confirmation^{1,10,11}. The origin of heart failure symptoms is not fully understood. Symptoms and signs are important as they alert the observer to the possibility that heart failure exists¹². Confirmation and refinement of the diagnosis is provided by appropriate investigations such as patient history, physical examination, ECG, chest x-ray, echocardiography, and laboratory investigation, with blood gases and specific biomarkers¹. Heart failure is typically associated with multiple clinical signs and symptoms that can interact, thereby affecting the patient's perception of some or all of these acute symptoms^{12,13}.

Baseline characteristics

The EuroHeart Failure Survey recorded that half of the patients were female, and that a higher proportion of women (51%) compared to men (30%) were aged >75 years⁴. Female predominance recorded in our study (56.3%) confirmed an important difference from the Framingham study concerning acute heart failure, which has suggested that women not only develop heart failure less frequently than men, but may also benefit from a lower mortality rate when they do¹⁴. Despite the concept that female sex is not an independent predictor of long-term acute heart failure mortality, our results showed that women were five years older than men¹⁵. In addition, females were more adipose and had a higher BMI. Obesity is considered a major risk factor for cardiovascular diseases and heart failure. However, several studies have suggested that in the medium term, there is a paradoxical relationship between obesity and heart failure prognosis, whereby the prognosis for overweight or obese heart failure patients is better than for normal weight patients¹⁶. Yet, weight loss in se-

verely overweight persons and smoking cessation can reduce the risk¹⁷. Previous studies have reported that elderly patients that survive hospitalization for heart failure are particularly vulnerable to readmission¹⁸. The striking rate of readmission demands effort to develop preventive strategies for this outcome. Failure in hospital bed utilization could be responsible for a substantial proportion of short-term acute heart failure readmissions. Although compliance with medication treatment and lifestyle changes such as salt intake restriction is recommended, it is unclear whether this information was provided to the patients¹⁹. According to published reports, in-hospital mortality was approximately 20% and many patients with heart failure died or were re-hospitalized within the next six months¹⁹. Compared to these studies, our data suggest that the quality of care and survival of acute heart failure patients has improved in the last decade; the recorded mortality rate was 9.6% and was expected when adjusted to APACHE II and SAPS II points (expected mortality 10-14 points 15% and 29 points 9.7%). Male gender emerged as a prognostic risk factor only after correction for age²⁰.

Underlying and concomitant diseases

The main findings in this study were that females more frequently had hypertension and hypertensive acute heart failure, while males were more frequently cigarette smokers, suffered from chronic obstructive pulmonary disease (COPD), and had definitive diagnosis of acute heart failure associated with acute coronary syndrome. Hypertension, coronary artery disease, and valvular dysfunction were most frequently the causal risk factors for acute heart failure or co-existed with another primary etiology in the study, as reported elsewhere^{1,11,21}. Diabetes mellitus as a risk factor was frequently a concomitant disorder in acute heart failure patients; however, there was no significant gender-associated difference¹. An acute heart failure patient requires immediate diagnostic evaluation and care, and frequent resuscitative measures to improve symptoms and survival²². COPD patients have a markedly elevated risk of heart failure, and COPD is a strong and independent risk factor for cardiovascular morbidity and mortality²³. Coronary artery disease is a major contributor to the

development of chronic heart failure, particularly in men²⁴.

Symptoms and signs

Acute heart failure symptoms and signs did not differ between genders. The main complaint of dyspnea (85.5%) was the most disturbing symptom the patients experienced and often urged them to seek medical care²⁵. It requires urgent attention upon presentation. Surprisingly, there was a lack in the use of oxygen in the ED acute heart failure patients (41.6%), although it is part of every acute heart failure management algorithm^{1,12}. Noninvasive ventilation relieves dyspnea in acute heart failure and its use has been associated with decreased resource utilization and mortality²⁶.

Echocardiographic and electrocardiographic findings

Several diagnostic tests are routinely employed to confirm or rule out the diagnosis of heart failure. An ECG should be performed in every patient with suspected heart failure¹. Doppler echocardiography is an essential diagnostic tool for the evaluation of the functional and structural changes underlying or associated with acute heart failure. The prevalence of heart failure rises as a function of its severity, but it is also known that persistent atrial fibrillation with an uncontrolled ventricular response may induce heart failure²⁷. Echocardiography, the most useful method for evaluating systolic and diastolic dysfunction, is the preferred method for documenting cardiac dysfunction at rest^{1,12}.

Medication before admission, on admission, and at discharge

Cardiac glycosides, an old-fashioned heart failure medication that may continue having a role in patients with atrial fibrillation, was used in about one-third of the study population, significantly more in females, where atrial fibrillation was more frequent²⁸. According to the EuroHeart Failure Survey, the prescription of cardiac glycosides has significantly increased in patients with supraventricular tachycardia/atrial fibrillation²⁸. Digoxin improves the hemodynamics in heart failure without activating neurohormones or negatively affecting the heart rate, blood pressure, or renal function²⁹. Due to higher blood pressure at ED admission, females were more frequently treated with nitrates as acute

therapy, while males had more nitrates at discharge for the treatment of concomitant coronary artery disease². It can also be useful to relieve dyspnea¹². Despite similar treatment regimens at discharge, significantly more males were discharged with amiodarone, an observation also supported by other studies¹⁵. Only a limited number of ED acute heart failure patients have an absolute indication for cardiac monitoring and a high level of care, which is very important in the settings of restricted ED resources. An acute heart failure patient may recover extremely well, depending on the etiology and underlying pathophysiology. Prolonged ward treatment and expert care are required in one-half of the patients. A multidisciplinary approach appears to provide an important opportunity to improve the outcomes of these patients.

Limitations

By its observational design, this study could only partly elucidate the causes of the results and explain the gender-associated differences in acute heart failure patients. The use of a convenience sample was the limitation, but unlikely to have introduced systematic bias. The screening of consecutive patients provided some protection from systematic error. Measurement of the heart failure biomarker brain natriuretic peptide was available for a small proportion of the patients, so they were not included in the survey.

Conclusion

Our research showed patient gender to be clinically relevant for the presentation of acute heart failure. However, gender is not an independent predictor of mortality. According to the present study results, early identification and proper treatment of gender-associated concomitant diseases, e.g., hypertension and atrial fibrillation in females, and acute coronary syndrome and COPD in males, could improve acute heart failure patient quality of life and survival. To conclude, aggressive identification and management of all possible etiologies of heart failure should be recommended in the ED.

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Sažetak

RAZLIKE PREMA SPOLU U BOLESNIKA S AKUTNIM ZATAJIVANJEM SRCA PRIMLJENIH NA HITNI PRIJAM

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Malo toga je poznato o spolno-zavisnim razlikama u značajkama i preživljenju bolesnika s akutnim zatajivanjem srca. Rastuća incidencija obvezuje na ispitivanje mogućnosti poboljšanog liječenja. Svrha ove studije je bila utvrditi spolno-zavisne razlike u bolesnika s akutnim zatajivanjem srca u hitnom prijmu radi poboljšanja kvalitete liječenja i preživljenja. Prospektivna opservacijska studija na 22.713 bolesnika je provedena u hitnom prijmu Sveučilišnog bolničkog centra tijekom 2010. godine i uključila je 726 uzastopnih bolesnika s akutnim zatajivanjem srca. Najučestaliji uzrok akutnog zatajivanja srca bilo je pogoršanje kroničnog zatajivanja srca. Žene su učestalije bolovale od hipertenzivnog akutnog zatajivanja srca, a muškarci od akutnog zatajivanja srca udruženog s akutnim koronarnim sindromom. Žene su bile starije, s višim indeksom tjelesne mase, atrijskom fibrilacijom, infekcijama mokraćnog sustava, anamnezom hipertenzije, hipertenzijom kod prijma i višim zbirom SAPS II. pri prijmu. Muškarci su imali višu učestalost srčanog infarkta s ST-elevacijom i dilatacijske kardiomiopatije, ultrazvučno potvrđenu sniženom izbačajnom frakcijom i dilatacijom lijeve klijetke sa smanjenom izbačajnom frakcijom. Muškarci su učestalije bili pušači s anamnezom kronične opstruktivne bolesti pluća. Treba naglasiti važnost liječenja hipertenzije i atrijske fibrilacije u žena te akutnog koronarnog sindroma i kronične opstruktivne bolesti pluća u muškaraca. Agresivnu identifikaciju i liječenje svih mogućih etiologija zatajivanja srca treba preporučiti u hitnom prijmu.

Ključne riječi: Zatajivanje srca – terapija; Akutna bolest – terapija; Spol; Hitna služba u bolnici