ORIGINAL ARTICLE

Prehospital emergency care of patients with acute heart failure in Spain the SEMICA study (Emergency Medical Response Systems for Patients with Acute Heart Failure)

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Objectives. To study the means of emergency transport used to bring patients with acute heart failure (AHF) to hospital emergency departments (EDs) and explore associations between factors, type of transport, and prehospital care received.

Methods. We gathered the following information on patients treated for AHF at 34 Spanish hospital EDs: means of transport used (medicalized ambulance [MA], nonmedicalized ambulance [NMA], or private vehicle) and treatments administered before arrival at the hospital. Twenty-seven independent variables potentially related to type of transport used were also studied. Indicators of AHF severity were triage level assigned in the ED, need for admission, need for intensive care, in-hospital mortality, and 30-day mortality.

Results. A total of 6106 patients with a mean (SD) age of 80 years were included; 56.5% were women, 47.2% arrived in PVs, 37.8% in NMAs, and 15.0% in MAs. Use of an ambulance was associated with female sex, age over 80 years, chronic obstructive pulmonary disease, a history of AHF, functional dependency, New York Heart Association class III-IV, sphincteral incontinence, labored breathing, orthopnea, cold skin, and sensory depression or restlessness. Assignment of a MA was directly associated with living alone, a history of ischemic heart disease, cold skin, sensory depression or restlessness, and high temperature; it was inversely associated with a history of falls. The rates of receipt of prehospital treatments and AHF severity level increased with use of MAs vs. NMAs vs. PV. Seventy-three percent of patients transported in MAs received oxygen, 29% received a diuretic, 13.5% a vasodilator, and 4.7% noninvasive ventilation.

Conclusions. Characteristics of the patient with AHF are associated with the assignment of type of transport to a hospital ED. Assignment appears to be related to severity. Treatment given during MA transport could be increased.

Keywords: Acute heart failure. Emergency health services. Treatment. Mortality. Ambulance services.

Atención prehospitalaria a los pacientes con insuficiencia cardiaca aguda en España: estudio SEMICA

Objetivo. Investigar, en los pacientes diagnosticados de insuficiencia cardiaca aguda (ICA) en servicios de urgencias hospitalarios (SUH), su forma de llegada, los factores asociados al tipo de transporte usado y el tratamiento prehospitalario administrado.

Método. En pacientes diagnosticados consecutivamente de ICA en 34 SUH españoles se recogió: forma de llegada (transporte sanitario medicalizado –TSM–, no medicalizado –TSNM– o propio –TP–) y tratamiento prehospitalario administrado. Se estudiaron 27 variables independientes potencialmente relacionadas con el tipo de transporte utilizado. Como indicadores de gravedad se registraron nivel de triaje en urgencias, necesidad de ingreso y de cuidados intensivos, mortalidad intrahospitalaria y a 30 días.

Resultados. Se incluyeron 6.106 pacientes [edad: 80 años (DE:10), 56,5% mujeres]; 47,2% llegaron en TP, 37,8% en TSNM y 15,0% en TSM. El uso de transporte sanitario se asoció a ser mujer, edad > 80 años, enfermedad pulmonar obstructiva crónica, antecedentes de ICA, dependencia funcional, NYHA III-IV, incontinencia esfínteres y presentar disnea, ortopnea, piel fría y depresión del sensorio/inquietud. La asignación de TSM se asoció directamente a vivir solo, antecedente de cardiopatía isquémica, presentar piel fría, depresión del sensorio o inquietud y temperatura elevada e inversamente al antecedente de caídas. Los traslados en TP, TSNM y TSM registraron porcentajes crecientes de tratamiento prehospitalario, y su gravedad también fue progresivamente creciente. El 73% de pacientes trasladados con TSM recibió oxígeno, el 29% diurético, el 13,5% vasodilatador y el 4,7% ventilación no invasiva.

Conclusiones. Existen características del paciente con ICA relacionadas con el tipo de recurso asignado para su traslado al SUH, y dicha asignación parece corresponderse con la gravedad del episodio. El tratamiento durante el TSM podría incrementarse.

Palabras clave: Insuficiencia cardiaca aguda. Servicios de emergencias médicas. Tratamiento. Mortalidad. Transporte sanitario.

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Introduction

Among the reasons for consulting the hospital emergency services (HES), dyspnoea occupies a relevant place and, in these patients, the final diagnosis of acute heart failure (AHF) is one of the most frequent[1-4]. On the other hand, AHF represents the second most frequent medical pathology treated by the Emergency Medical Services (EMS), and generates 5-6% of all prehospital warnings[5]. Although this is an alarming symptom and is globally a syndrome of high severity (with a mortality during the month following the emergency department visit of about 10%)[6], the way in which the patient arrives at the service is different. It includes own means or means provided by the EMSs, which can be medicalized (with medical or nursing staff) or non-medicalized (exclusively with emergency medical technicians), although which one is used in Spain, particularly by patients with AHF is not known. In the activation of these EMS, many factors are involved: some linked to the patient's symptoms and illness, others depending on his idiosyncrasy and environment. In this field, there are also no studies that value what factors determine the request for these services to the EMS by patients with AHF, which contrasts with other cardiovascular processes such as coronary syndrome, having studied which factors influence the use of EMS[7,8]. On the other hand, the factors that intervene in the allocation of each specific resource, in general medicalized or non-medicalized, by the EMS to the patients with AHF are also not well known. This allocation takes place from the emergency coordination centre (ECC) after a structured telephone interview, based on established and standardized criteria[9]. In the case of patients presenting severity data, a medical resource is allocated, which facilitates initiation prehospital treatments directed and early warnings to the EMS in the necessary cases. Again, the treatments administered and the interventions performed in this prehospital phase in patients with AHF have been poorly evaluated, probably due to the few prehospital studies, their retrospective nature, and the heterogeneity of the EMS among different countries (none of these studies were in Spain) and the limited number of patients included[10-19]. The present study was designed to investigate, for the first time in Spain, the aforementioned data. In addition, it was hypothesized that there should be a gradation between the patient's arrival to the emergency room and the treatments received and their prognosis.

Method

The objectives of the SEMICA study (attention of the Emergency Medical Services to patients with Acute Heart Failure) were to explore: 1) the way of accessing the patient's HES finally diagnosed with AHF; 2) the factors associated with the use of sanitary transport (ST) and the type of transport assigned by the EMS; 3) the type of treatment administered in the home and during the transfer in those patients who used ST, and 4) the short-term evolution that these patients had depending on their form of arrival in the emergency room. A multi-center, non-interventional analytical cohort study with a prospective follow-up, with two inclusive phases of patients was performed: the first one between November 1, 2011 and December 31, 2011, and the second between January 1 and February 28, 2014. During these four months, 34 Spanish HESs consecutively included all patients diagnosed with AHF, following the dynamics of the SEMICA Registry, which has been previously published[20,21]. The AHF diagnostic criteria were the criteria defined by the guidelines of the European Society of Cardiology in force at the time of the study[22,23]. The SEMICA Registry only excludes patients with acute myocardial infarction with ST elevation as the main diagnosis and who concomitantly develop an AHF.

In all cases, the form of arrival at the HES was recorded, which was the classifier variable of the study. Three different groups of patients were formed according to whether they had reached the hospital by: 1) medicalized ST (MST), if the patient was accompanied by a physician or nurse from the EMS; 2) Non-medicalized ST (NMST), if the patient was accompanied exclusively by health emergency technicians; and 3) own transport (OT), whatever the modality, by car, public transport or on foot. In Spain, the EMS are services integrated by a team of professionals (doctors, nurses, demand telemarketers, resource managers and ST technicians) whose main objective is to provide care response to emergency and out-of-hospital emergencies, 24 hours a day of the day, 365 days a year. The care process is developed in two areas: in the ECC, receiving and dealing with the demand for assistance and giving the appropriate response to each case, either by telephone council or by mobilizing the resource more appropriate to each situation and illness; and providing on-site assistance, both at home and in public spaces. The type of ST assigned depends on the ECC, whether is a MST or a NMST.

On the other hand, we collected 27 independent variables that the authors agreed a priori that could be potentially related to the use of ST and to the type (SST or NMST): 3 demographics (age, sex and if the patient lives alone), 11 personal history factors (hypertension, diabetes mellitus, ischemic heart disease, chronic renal failure, stroke, atrial fibrillation, peripheral arterial disease, valvular heart disease, chronic obstructive pulmonary disease (COPD), dementia and previous episodes of heart failure), 5 baseline functional status (Barthel score, functional dyspnea class according to NYHA classification, previous falls due to decreased stability, auditory or limiting visual deficit and urinary incontinence), and 8 referring to the symptomatology of the current episode of decompensation (dyspnea or increase of previous dyspnea, orthopnea, paroxysmal nocturnal dyspnea, oedemas in lower extremities, cold skin, purple skin, sensory depression or restlessness and high temperature). These variables were chosen based on the experience of the authors or previous work[20,21,24], es-

sentially because of the possibility of being questioned over the telephone from the ECC to the patient or their relatives. In addition, we analysed the prehospital use of four different treatments that can be used in the prehospital setting in patients with dyspnea and suspected to be caused by AHF: oxygen, intravenous diuretics, nitrates (sublingual or intravenous) and non-invasive ventilation.

The variables that were used to estimate the severity of the episode were: 1) level of triage awarded to the patient upon arrival at the emergency room (dichotomized at level 1-2 of the Spanish Triage System[20], or its red-orange equivalent of the Manchester System of Triage, which are the ones with the highest priority, compared to 3-4-5 or yellow-blue, respectively, which are the lowest priority); 2) the need for admission; 3) the need for admission in the intensive care unit/coronary; 4) in-hospital mortality from any cause; and 5) all-cause mortality after 30 days.

In all cases, the variables were expressed in dichotomous form, as absolute and relative values. In order to analyse the factors associated with the type of transport used by the patient (OT vs ST) and the ST type assigned by the ECC (NMST vs SST), a univariate analysis was performed using the chi-square test with the correction of Yates comparing patients who used ST to those who used OT, as well as patients who were assigned a SST compared to those who were assigned a NMST. Those variables that were statistically significant ($p < 0.05$) were included in a multivariate logistic regression model to determine the independent factors associated with the use of ST and the allocation of SST. The results were expressed as odds ratios (OR) with their 95% confidence interval (95% CI) and those variables whose 95% CI of the OR excluded value were considered significant. On the other hand, we analysed whether there were differences between the three groups of patients with regard to the prehospital treatments received and the outcome variables analysed. To test this, a linear trend chi-square test was used and it was accepted that the differences were statistically significant if the p-value was less than 0.05. The study was conducted following the Declaration of Helsinki, approved by the Ethics and Clinical Research Committees of the participating hospitals, and the parents signed an informed consent for inclusion in the study, review of their medical records and subsequent telephone contact.

Results

A total of 6,647 patients (2011: 3,414 patients, 2014: 3,233 patients) were included, of which 6,106 (91.9%) filled in the patient's arrival form at the hospital and were analyzed in the SEMICA study: 2,882 (47.2%) arrived in PT and 3,224 (52.8%) in ST, of which 2,308 (37.8%) did so in NMST and 916 (15.0%) in MST. The mean age was 80 (SD: 10) years and 56.5% were women. The rest of the characteristics of patients included are shown in Table 1.

There were differences in the patient's profile depending on whether the patient used PT or ST, and in fact there were differences in 21 of the 27 variables analyzed (Table 1). The multivariate analysis showed that 10 of these were independent factors that were directly associated with the fact that the patient or his/her relatives asked for ST to ECC: to be female, to be over 80 years old, COPD, previous episodes of insufficiency cardiac failure, a baseline Barthel score of less than 60, a NYHA III-IV functional class, incontinence of a sphincter, and dyspnoea, orthopnea, cold skin and depression of the sensorium or restlessness (Figure 1).

On the other hand, the allocation of SST by the ECC was related to 15 of the 27 variables analyzed (Table 1). The multivariate analysis showed that only 5 of these were directly associated with the allocation by the ECC of a SST (to live alone, to have the antecedent of ischemic heart disease, cold skin, depression of the sensorium or restlessness and having elevated temperature), while one did the reverse (having experienced previous falls due to stability decreased, which was associated with a lower probability of SST allocation) (Figure 2).

There was a statistically significant relationship regarding the type of transport used and the probability of receiving prehospital treatment, with a gradation of lower to higher use depending on whether the arrival to the HES occurred with PT, NMST or SST (Table 2). Out of the total 73% of patients transferred with SST received oxygen, 29% diuretic, 13.5% vasodilator and 4.7% non-invasive ventilation. On the other hand, the severity of the patients (level of triage 1-2 or red-orange, or in an intensive care unit, in-hospital mortality or at 30 days) was also increasing for patients who used OT, NMST and MST respectively (Table 3).

Discussion

The SEMICA study is the first to investigate in Spain different aspects related to the type of transfer to the HES of patients with AHF. We have not found, on the other hand, similar studies in the previous literature nor references in the most recent clinical guidelines and consensuses[25,26], making it difficult to compare the results obtained. Therefore, the results discussed below should be tested in the future.

Firstly, it is striking that almost half of the patients (47%) have attended the ED by PT, especially considering that dyspnea is an alarming symptom and that AHF is a diagnosis with a high implicit severity. Although we do not have the precise data, many of these patients make the decision without consulting the health centers or the EMS. Regarding the latter, we do not know if the performance of the EMS in these patients, either by assigning a NMSIS or a SST, would be associated with a change in some of the evolutionary results of the AHF. From the analysis of the factors associated with the use of ST (Figure 1), we conclude that being woman, the patient's dependence (interpreted by

Table 1. Characteristics of the patients included in the study. in total and according to the type of transfer

	Total N = 6.106 n (%)	Own Transport N = 2.882 n (%)	Sanitary Transfer N = 3.224 n (%)	p	Non-medical sanitary transfer N = 2.308 n (%)	Medical Sanitary transfer N = 916 n (%)	p
Demographic Data							
Age > 80	3,534 (58.0)	1,454 (50.6)	2,080 (64.5)	< 0.001	1,532 (66.4)	548 (59.9)	0.001
Female Sex	3,443 (56.5)	1,527 (53.2)	1,916 (59.5)	< 0.001	1,396 (60.5)	520 (56.9)	0.06
Lives alone, without caregiver	1,511 (25.1)	812 (36.5)	699 (25.1)	< 0.001	475 (23.4)	224 (29.6)	0.001
Personal Background							
Arterial Hypertension	5,162 (83.4)	2,405 (83.4)	2,757 (85.5)	< 0.05	1,981 (85.8)	776 (84.7)	0.44
Diabetes mellitus	2,568 (42.1)	1,180 (41.0)	1,388 (43.1)	0.10	951 (41.2)	437 (47.7)	0.001
Ischemic cardiopathology	1,853 (30.4)	851 (29.5)	1,002 (31.1)	0.19	664 (28.8)	338 (36.9)	< 0.001
Chronic Kidney failure (creatinine > 2mg/dL)	1,548 (25.4)	676 (23.5)	872 (27.1)	0.001	656 (28.4)	216 (23.6)	< 0.01
Stroke	831 (13.6)	362 (12.6)	469 (14.6)	< 0.05	321 (13.9)	148 (16.2)	0.11
Auricular fibrillation	2,971 (48.7)	1,436 (49.8)	1,535 (47.6)	0.09	1,137 (49.3)	398 (43.4)	< 0.01
Peripheral arterial disease	550 (9.0)	243 (8.4)	307 (9.5)	0.15	214 (9.3)	93 (10.2)	0.48
Valvular Disease	1,741 (28.5)	863 (29.9)	878 (27.2)	< 0.05	627 (27.2)	251 (27.4)	0.93
Chronic obstructive pulmonary disease	1,587 (26.0)	689 (23.9)	898 (27.9)	< 0.001	672 (29.1)	226 (24.7)	0.01
Dementia	818 (13.4)	279 (9.7)	539 (16.7)	< 0.001	394 (17.1)	145 (15.8)	0.42
Previous episodes of heart failure	3,569 (59.0)	1,574 (55.2)	1,995 (62.4)	< 0.001	1,435 (62.7)	560 (61.7)	0.60
Basic functional situation							
Barthel Index < 60 points	860 (17.6)	228 (10.1)	632 (24.1)	< 0.001	462 (24.2)	170 (23.8)	0.66
NYHA basal III- IV	1,367 (24.1)	521 (19.6)	846 (28.0)	< 0.001	613 (28.3)	233 (27.2)	0.56
Recent previous falls due to decreased stability	777 (13.6)	294 (11.1)	483 (15.7)	< 0.001	372 (16.8)	111 (13.0)	0.01
Visual or auditory limiting déficit	1,353 (23.6)	523 (19.7)	830 (27.0)	< 0.001	613 (27.6)	217 (25.5)	0.25
Sphincter incontinence	1,085 (18.9)	353 (13.3)	732 (23.8)	< 0.001	542 (24.4)	190 (22.3)	0.23
Symptomatology							
Dyspnoea or increase in usual dyspnoea	5,665 (92.9)	2,633 (91.6)	3,032 (94.0)	< 0.001	2,174 (94.2)	858 (93.7)	0.63.
Orthopnoea	3,358 (55.1)	1,471 (51.1)	1,887 (58.6)	< 0.001	1,341 (58.2)	546 (59.7)	0.46
Paroxysmal nocturnal dyspnoea	1,587 (26.0)	680 (23.7)	907 (28.2)	< 0.001	634 (27.5)	273 (29.8)	0.20
Lower extremity oedema	4,130 (67.7)	1,976 (68.7)	2,154 (66.8)	0.13	1,583 (68.6)	571 (62.3)	0.001
Cold skin	532 (8.7)	129 (4.5)	403 (12.5)	< 0.001	247 (10.7)	156 (17.0)	< 0.001
Lightness	86 (1.4)	19 (0.7)	67 (2.1)	< 0.001	33 (1.4)	34 (3.7)	< 0.001
Sensory or restlessness depression	334 (5.5)	74 (2.6)	260 (8.1)	< 0.001	155 (6.7)	105 (11.5)	< 0.001
High body temperature (> 37.3ºC)	278 (5.2)	106 (4.4)	172 (5.9)	< 0.05	109 (5.0)	63 (8.3)	0.001

a greater age, lower Barthel score, higher NYHA functional class, or sphincter dysfunction), history of dyspnea (whether due to COPD or previous episodes of AAI) and severity of symptoms (greater percentage of patients with dyspnea, orthopnea, cold skin and depression of the sensorium or restlessness) are those that are related to the use of ST. Some of these relationships between ST consumption and old age, comorbidity or dependence had been described, in a generic way, in previous studies[6]. In any case, since the use of ST depends essentially on the patient making a call to the EMS, this data can be relevant when designing public awareness campaigns. In addition, multidisciplinary management programs and the health care package designed to improve outcomes through structured follow-up with patient education, optimization of medical treatment, psychosocial support and improvements in access to care should be included in the equation the importance of early contact with EMS[27,28].

Secondly, when this contact with the EMS occurs, it is remarkable that the allocation of a SST is associated with living alone, the history of ischemic heart disease, presenting cold skin, depression of the sensorium or restlessness and having high temperature, as well as not having suffered previous falls due to diminished stability. Not all of these factors necessarily indicate a greater severity of the episode, so it seems that the consideration by the operator of the ECC to send a medicalized unit to the home also involves other aspects of a social nature. The evaluation of these aspects of paramedical nature is also important in the performance of the EMSs, which are not limited to making a strictly limited assessment of the medical process. However, it is surprising that the antecedent of previous falls is associated conversely with the MST assignment. Although the final reason for this is elusive and should be further explored in the future, it may be speculated that this fact may indirectly suggest to the SCC that the patient requires more mobility because of chronic mobility problems than due to the current pathology, so it is preferably assigned a NMST.

Thirdly, for the first time, treatment of patients with AHF before their arrival in the emergency room is collected. Patients who attended SST received more treatments and interventions than the rest. Some studies suggest that prehospital treatment may reduce morbidity and mortality[4], with early improvement of symptoms and effects that would be more evident in patients with more critically ill patients[11]. In this sense, the importance of the early initiation of therapy in AHF is exemplified by the fact that in certain experimental treatments (phase III), such as serelaxin, it seems that

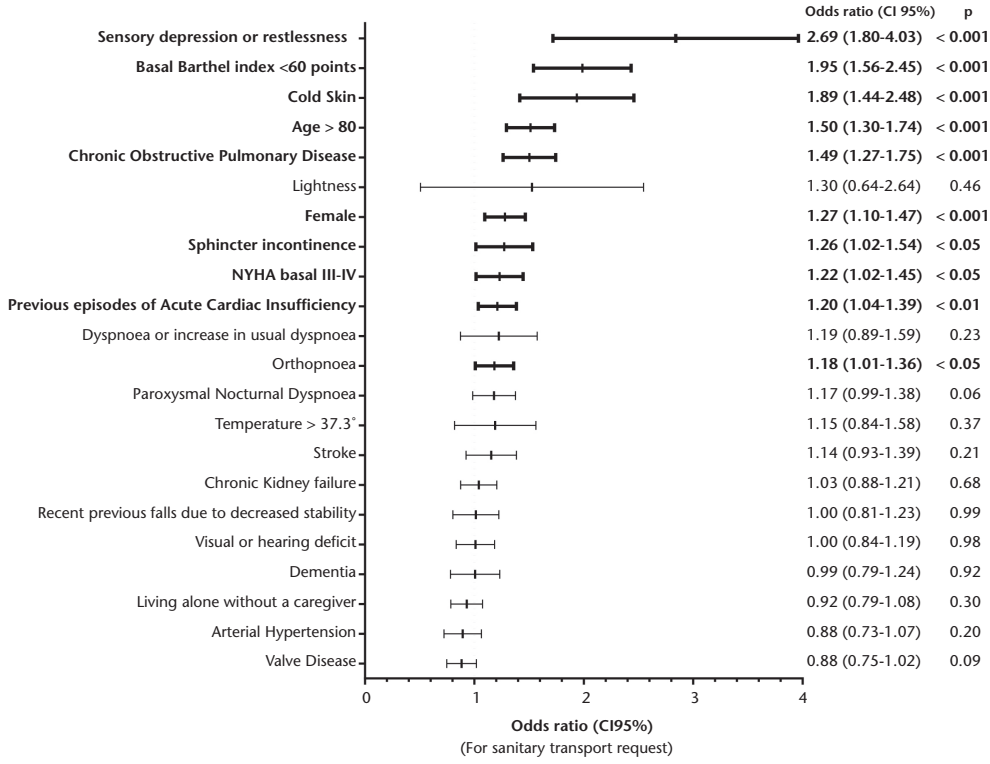

Figure 1. Multivariable analysis to identify the independent factors (in bold) associated to the use of healthcare transport in patients with acute heart failure (AHF).

precocity is essential in order to obtain the most optimal results[29]. Therefore, we believe that an option to be explored to improve care for these patients is to increase prehospital treatments administered, since there is still a percentage of patients who arrive at the emergency room with SST who received only oxygen therapy, as this study shows. Without analyzing each patient individually, 29% of patients treated with diuretics, 13.5% with vasodilators and 4.7% with NIV appear to be low percentages and are likely to indicate the possibility of a greater therapeutic attitude during this prehospital phase. As an example, although studies carried out in Spain have documented that 11% of patients with AHF reach the ED with acute pulmonary edema, and the vast majority come with SST[6], the use of NIV that we have been recorded in patients transferred with MST has been scarce, despite the different benefits of the use of NIV at the prehospital level[14-17,30].

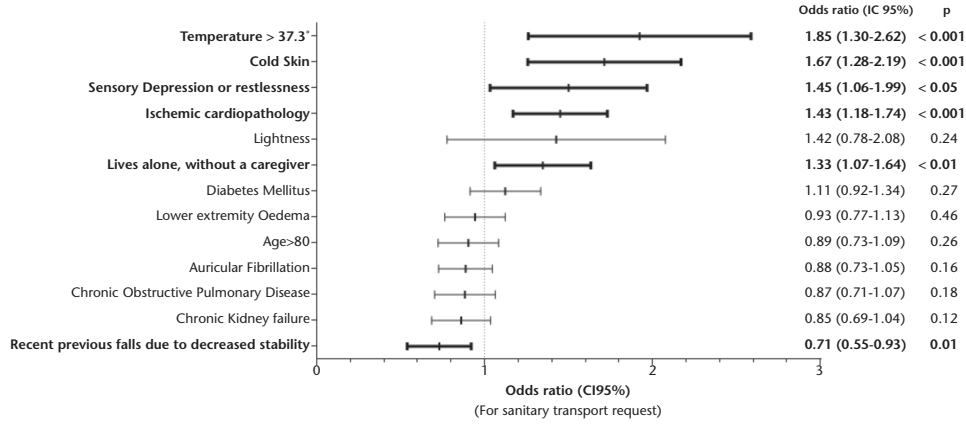

Figure 2. Multivariate analysis to identify the independent factors (in bold) associated with the assignment by the emergency coordinator of a medicalized health transport in patients with acute heart failure who are transported to the hospital by ambulance

Table 2. Prehospital treatment administered, total and according to the type of patient transfer

	Total N = 6,106 n (%)	Own transport N = 2,882 n (%)	Non-Medical Sanitary transfer N = 2,308 n (%)	Medical sanitary Transfer N = 916 n (%)	p**
Oxygen*	2,061 (33.8)	79 (2.7)	1,314 (57.0)	668 (73.0)	< 0.001
Diuretic (furosemide)	320 (5.2)	13 (0.5)	42 (1.8)	265 (29.0)	< 0.001
Vasodilators (nitroglycerin)	134 (2.2)	3 (0.1)	7 (0.3)	124 (13.5)	< 0.001
Non-invasive ventilation	46 (0.8)	1 (0.0)	2 (0.1)	43 (4.7)	< 0.001

*Oxygen: Administration through nasal glasses or mask **P calculated by the linear trend chi-squared test.

Finally, the SEMICA study investigated whether the type of transfer that the patient has used is related to their potential severity. Thus, it would be expected to be more serious, more intervention of the EMS and of greater intensity. This hypothesis has been verified in all its extremes. Indeed, the patients who reached the HES with SST had the worst results with higher levels of triage assigned to their arrival in the emergency room, greater need for hospital admission or in an intensive care unit, and with higher in-hospital and 30-day mortality rates; on the other hand, patients who arrived by PT had the best results, and those who did with NMST had intermediate results. Although indirectly, we believe that this tells us about a relative good recognition by the patient of the intensity and severity of their symptoms, as well as of a correct allocation of resources by the ECC.

The present study has limitations. The participating centres were not randomly assigned but voluntarily form part of the SEMICA Registry. For some variables analysed, the number of participants was low, so it cannot be excluded that in some cases a second species error was committed. On the other hand, the estimation of the correct adequacy of ST assigned by ECC has been done on a group basis, and not individually on a case-by-case basis. It is possible that there is a percentage of errors in both directions that we cannot estimate. Neither was it possible to analyse if there are differences between the actions of the EMSs of the different autonomous communities, since the great majority of them are represented in the SEMICA Registry with only one or two hospitals. Finally, the conclusions drawn can be extended to other EMS in Spain, but not to other countries, where the organization and staffing of their ambulances are different. However, we believe that the factors identified in the SEMICA study related to the ST request and the assigned ST type can facilitate the education of the population with heart failure about the need to request early attention from the EMS after having recognized symptoms of heart failure. On the other hand, the request and allocation of resources and the performance of the EMS are directly related to the severity of the AHF episode. In ST, it is possible that prehospital treatment given to patients with AHF may be increased.

Conflicting interests

The authors declare no conflict of interest in relation to this article.

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Table 3. Variables that estimated the severity of the patient and relation with the type of transport used to reach the emergency department.

	Total N = 6,106 n (%)	Own transport N = 2,882 n (%)	Non-Medical Sanitary transfer N = 2,308 n (%)	Medical sanitary Transfer N = 916 n (%)	p**
Triage priority grade† 1-2 (red-orange)	1,815 (37.5)	676 (29.6)	668 (36.2)	471 (65.7)	< 0.001
Hospital admission	4,634 (76.0)	2,009 (69.8)	1,819 (78.9)	806 (88.0)	< 0.001
Intensive care unit/ Coronary unit Admission	80 (1.3)	26 (0.9)	16 (0.7)	38 (4.1)	< 0.001
In-hospital Mortality	468 (7.7)	147 (5.1)	214 (9.3)	107 (11.7)	< 0.001
In- hospital mortality(only hospitalized)	439 (9.5)	139 (7.0)	200 (11.0)	100 (12.5)	< 0.001
Mortality at 30 days	604 (10.0)	196 (6.9)	272 (11.8)	136 (15.0)	< 0.001

* P calculated using the linear trend chi-square test.
** The percentages were calculated taking into account only the patients discharged alive from the hospital (from the emergency room or after hospitalization), once the deceased patients were discarded in-hospital.
† Triage: Level 1 or 2 Spanish-Andorran Triage System, Red-Orange: Manchester Triage system.

Ethical Responsibilities

The study was approved by the Ethics and Clinical Research Committees of all participating hospitals. Informed consent was obtained from participants. All authors have confirmed the maintenance of confidentiality and respect for patients' rights in the author's responsibilities document, publication agreement and assignment of rights to EMERGENCIAS.

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Annex

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