Role of Emergency Departments in Acute Myocardial Infarction Care. EVICURE Study

Ángel Loma-Osorio[a], Luis García-Castrillo[b], Fernando Arós[a], Pedro Lopetegui[c], Enrique Recuerda[d] and Francisco Epelde[e], in representation of the investigators of the EVICURE study

[a]Área de Cardiología y Críticos. Hospital de Txagorritxu. Vitoria. [b]Servicio de Urgencias. Hospital Marqués de Valdecilla. Santander. [c]Servicio de Urgencias. Hospital de Txagorritxu. Vitoria. [d]Servicio de Urgencias. C.S. Pino Montano. Carmona. Sevilla. [e]Servicio de Urgencias. Hospital Mútua de Terrassa. Barcelona. España.

No published information is available about myocardial infarction management in Spanish emergency departments. The EVICURE is a prospective, multicenter, observational study involving 35 hospitals that for a 3-week period collected all the cases of patients requiring care in which the final diagnosis of the cause of symptoms was ischemic heart disease. The study included 2,216 patients, of which 600 (27.1%) with acute myocardial infarction formed the study population. Fifteen patients died in the emergency department (2.5%) and 80 (13.3%) diagnosed as myocardial infarction were admitted to the ward instead of the coronary care unit. The median time before patients were admitted to the coronary care unit was 32 minutes versus a median time of 111 minutes for all patients. Before leaving the emergency room, 461 patients (76.5%) received aspirin and 93 (15.5%) underwent fibrinolysis. We concluded that there is room for improvement in light of current standards of care.

Key words: *Acute myocardial infarction. Emergency department. Guidelines.*

El infarto agudo de miocardio en los servicios de urgencias hospitalarios españoles. El estudio EVICURE

Los datos sobre el tratamiento y la evolución de los pacientes con infarto agudo de miocardio en los servicios de urgencias de los hospitales españoles son escasos. El estudio EVICURE es un estudio observacional prospectivo, en el que participaron 35 hospitales españoles durante 3 semanas en el período 1998-1999, y en el que se incluyó a los pacientes que al final de su estancia en el área de urgencias se concluyó que habían acudido por síntomas provocados por cardiopatía isquémica. Se incluyó a 2.216 pacientes, de los cuales 600 (27,1%) presentaban infarto agudo, que constituyen el núcleo del presente estudio. Quince pacientes (2,5%) fallecieron en el servicio de urgencias y 80 (13,3%) ingresaron fuera de la unidad coronaria. La media de duración de la estancia en urgencias de los pacientes que ingresan directamente en la unidad coronaria es de 32 minutos y de 111 minutos la del total de los pacientes. Al abandonar el área de urgencias, 461 pacientes (76,8%) habían recibido aspirina y 93 (15,5%) fibrinólisis. Se concluye que existe un margen de mejora, si se comparan los datos del estudio con las recomendaciones actuales del tratamiento del infarto agudo de miocardio.

Palabras clave: *Infarto agudo de miocardio. Servicio de urgencias. Recomendaciones.*

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INTRODUCTION

In recent years our knowledge of the epidemiology of acute myocardial infarction (AMI) in Spain has increased considerably. Population-based registries like MONICA and REGICOR have made it possible to know the incidence and rate of AMI in Spain,[1,2] whereas hospital registries like PRIAMHO and RISCI provide information about the treatment and results obtained in patients with AMI after admission to coronary units.[3,4] However, information is lacking on the treatment of AMI in hospital emergency services (HES), and the resources used at that stage, although almost all patients with AMI are admitted to hospitals from emergency areas.

This article reports data on the treatment and evolution in emergency services of patients whose diagnosis at the end of the emergency room stay was AMI. Data were collected prospectively at a total of 35 Spanish hospitals over a 3-week period.

Correspondence: Dr. A. Loma-Osorio Montes.
Área de Cardiología y Críticos. Hospital Txagorritxu.
Jose Atxotegui, s/n. 01009 Vitoria-Gasteiz. España.
E-mail: aloma@scisquemica.net

Received 25 January 2002.
Accepted for publication 10 May 2002.

MATERIAL AND METHODS

In 1998-1999, the EVICURE study was carried out (Evaluation of the Treatment of Cardiac Ischemia in Spanish Hospital Emergency Services *[Evaluación del tratamiento de la Isquemia Cardíaca en los Servicios de Urgencias Hospitalarios Españoles]*), a project of the Ischemic Heart Disease group of the Spanish Society of Urgent and Emergency Medicine, whose methodology and results have been published.[5] Briefly, it is a prospective, multicenter, observational study. In this study, 35 hospitals of 15 autonomic communities participated, which covered a total population of 11 124 000 inhabitants, who had a total of 2 946 337 emergencies attended each year. Fifteen hospitals attended 30 000 to 70 000 emergencies/year, 9 hospitals attended 70 000 to 100 000 emergencies, and 11 hospitals, 100 000 to 200 000 emergencies. The study included all patients who concluded their stay in the emergency area of the hospital with a diagnosis of ischemic heart disease (IHD). These patients were classified according to the diagnosis at discharge from the HES as *a)* AMI; *b)* cardiac sudden death; *c)* unstable angina, and *d)* patients seen for symptoms related to ischemic heart disease, but not classifiable as acute coronary syndrome (ACS).

Data were collected over a 3-week period (7 to 13 December 1998, 18 to 24 January 1999, and 1 to 7 March 1999). During these periods, all patients who met the entrance criteria were included in the study.

The diagnosis of AMI, made when the patient left the HES, was based on the presence of at least two of the three criteria formulated by the World Health Organization (WHO): clinical, enzymatic, and electrocardiographic.[4]

RESULTS

Of 2216 patients with a diagnosis of IHD included in the study (1.3% of visits to the HES), the final diagnosis was AMI in 600 patients (27.1%), unstable angina (UA) in 1067 (48.1%), and sudden cardiac arrest in 28 (1.3%). In the remaining 512 patients, the symptoms could not be classified as acute coronary syndrome. Patients with AMI had a mean age of 66.9±12.7 years, 70.3% were men, and only 28.3% had a history of ischemic heart disease.

While patients were in the emergency services, the drugs most often given were acetylsalicylic acid (ASA) (59.8%), nitrates (57.8%), and i.v. heparin (24.3%). Fibrinolytics were administered to 11.5% of patients in the HES (Table 1).

The destination of patients with AMI is described in Table 2. It should be noted that 15 patients (2.5%) died in the HES and 80 patients (13.3%) were hospitalized in general wards. Patients with AMI usually remained in the HES for a long time, as shown by the data in Table 2, in which patients are distributed by their destination.

DISCUSSION

The present study analyzes the treatment of patients with AMI from a vantage point that has not often been explored. It contributes information usually overlooked in studies of AMI, whether population or hospital studies. Nevertheless, some results are of evident epidemiological and clinical interest. Thus, the lethality of AMI in HES has not been published in the

TABLE 1. **Drugs administered to patients with AMI during their stay in the HES**

Treatment received	No. of patients	%
ASA in HES	102	17
ASA in ES	359	59.8
Fibrinolysis in HES	24	4
Fibrinolysis in ES	69	11.5
Heparin i.v.	146	24.3
Nitrates (oral, patch, i.v.)	347	57.8
Beta-blockers	67	11.2
ACEIs	21	3.5
Antiarrhythmic agents	43	7.3
Calcium antagonists	37	6.2

ASA indicates acetylsalicylic acid; ACEIs, angiotensin II converting enzyme inhibitors; HES, hospital emergency services; ES, emergency services.

TABLE 2. **Destination of patients diagnosed as acute myocardial infarction and duration of stay in emergency services**

			Time (min)	
Distribution by destination	No. of patients	%	Median	75th percentile
Admission to ward	21	3.5	160	361
Admission to ICCU	298	49.7	32	75
Observation and admission to a ward	80	13.3	745	1.232
Observation and admission to ICCU	159	26.5	305	720
Death	15	2.5	175	250
Transfer to another center	24	4	220	383
Total	597	99.5	111	475

ICCU indicates intensive cardiological care unit/coronary care unit.

literature, to our knowledge, and perhaps should be added to the results of hospital mortality.

Analysis of the treatments given in the HES also yields noteworthy data. In view of national and international recommendations,[6,7] the use of ASA in the HES should be close to 100%. However, only 77% of patients received ASA. Therefore, the use of ASA in HES is low.[8] The same occurred with fibrinolysis, which was only administered to 15.5% of patients with AMI before hospitalization. Although prehospital fibrinolysis has its detractors, fibrinolysis administered in HES is a safe procedure that saves time, as Torrado et al[9] have demonstrated.

In this study, 13.5% of patients with AMI were not admitted to the coronary unit, compared with 10.9% in the IBERICA study[10] made in 1997 in 8 Spanish autonomic communities. Both figures contradict the classic recommendation that patients with AMI should always be admitted to coronary units, and only exceptionally to other wards.[6] Admission to general wards may be determined by the characteristics of the patient, infarction, hospital, the availability of beds in the area, or delay in reaching the emergency service or in obtaining the diagnosis.

The stay in the HES of patients with AMI is prolonged, lasting a mean time of 111 min for the overall group (Table 2). Although no relevant data like the door-to-ECG and door-to-injection times are available, these times are assumed to be prolonged and longer than necessary.[6,7]

Study limitations

The EVICURE Study was designed from the vantage point of emergency services, which determines some of the limitations of this study. The study does not include the follow-up of patients while hospitalized. Therefore, it is possible that some patients with AMI may not have been detected in the HES. The opposite phenomenon cannot be excluded either, and the diagnosis of AMI may sometimes have not been confirmed later. On the other hand, if the new definition of AMI,[11] which was published after this study concluded, had been applied, the number of patients with AMI would have been different. In addition, not having information on the state of patients at discharge deprives us of information that could have been of interest.

The fact that the behavior of the ST segment at admission was not recorded makes it impossible to establish what proportion of patients had an indication for immediate revascularization treatment. Therefore, the proportion of patients that received fibrinolysis can only be assessed indirectly. However, in the registries in which similar admission criteria were used, such as PRIAMHO,[3] the proportion of patients who received fibrinolytic treatment exceeded 40%.

CONCLUSIONS

Ischemic heart disease is responsible for about 1.3% of visits to HES in Spain. Of them, approximately one-fourth are for AMI. Once patients reach the HES, 2.5% of those who have AMI die. The stay of patients with AMI in the HES is prolonged but, nonetheless, ASA and, probably, fibrinolytics, are given infrequently. Therefore, there is clearly room for improving the quality of care given to our patients.

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