

Helicopter Emergency Medical Service in Spain

Guillermo Burillo-Putze, MD,^{1,2} I. Herranz Duarte, JI, RN,² and J.A. Alvarez Fernandez, MD, PhD³

Abstract

No studies had been conducted about Spanish HEMS programs, so we conducted a nationwide survey by phone from January to June 1999. We identified 18 HEMS programs in 13 regions, which transported 4870 patients in 1998. The primary/interhospital missions ratio was 51.25/48.75. In 78% of responding programs, the medical crew was a physician and a nurse. Only 33% of HEMS had standard medical equipment; most lacked noninvasive blood pressure monitors, and one-third of the medical personal were correctly protected with flight helmets and flight suits. It is necessary to study the cost-effectiveness of the Spanish model of HEMS.

Introduction

Spain, located in southwest Europe, covers 506,000 square kilometers and has a population of 40 million inhabitants. Each year, the tourist zones receive an estimated 20 million foreign visitors.

Spain has a national health service (NHS), supported by general taxes, that provides medical assistance to all the population. The country is organized into 17 regional governments, some of which have a regional health system (RHS) that organizes and provides health service through the financial support of the NHS. In the past few years, the number of emergency medical services (EMS) has increased in Spain, generally because of the development of the RHSs and the medical helicopters (HEMS) dedicated to search and rescue missions, primary missions, and interhospital transport of critical patients.¹

As in the rest of Europe, the Spanish EMS presents an enormous variety of organizations, service providers, material and human resources, emergency phone numbers, etc.^{2,3} The HEMS are not indifferent to this variety, given the adaptation of each EMS to the geographical, medical, and political peculiarities of different regions.⁴ To our knowledge, no previous works have summarized and analyzed the features of the different HEMS transport teams in Spain.

Methods

We carried out a census of the HEMS programs that currently operate in Spain. We reviewed the literature on this topic in the past 5 years in the emergency and critical care Spanish journals and the MEDLINE database, looking for articles on air medical transport in Spain, Spanish helicopter companies, websites and directories that specialize in HEMS, and specific publications done in Spain.

Later, between January and June of 1999, we conducted a phone survey with the managers of Spanish EMS programs, asking about four main aspects—operational data (aeronautical

operation, equipment, etc.), medical crew, activity data, and equipment and security systems in flight.

Results

Eighteen HEMS programs from 13 regions were identified.

Operational Data

Of these 18 programs, eight (44%) were exclusively for medical use; the rest shared their activities with others such as mountain rescue, traffic control, fires, etc. Twelve programs (67%) operated on a day schedule, while the rest were active 24 hours a day. Eleven programs (61%) with a crew present had a median response time of 12 minutes (ST 38.9, range 0-60) (10 had a response time of less than 5 minutes), and five programs showed a response time of "0." Activation took place in 10 programs (56%) exclusively by means of medical or emergency coordination centers (phone numbers 061 or 112); in the rest, several forms of alert coexisted, including direct access to the helicopter base telephone or calls to first responder or public dispatchers.

1. Emergency department, Hospital Universitario de Canarias, University of La Laguna, Tenerife, Spain

2. Aeromédica Canaria SL, Islas Canarias, Spain

3. Intensive care unit, Hospital Universitario de Canarias, University of La Laguna, Tenerife, Spain

Address for correspondence:

Guillermo Burillo-Putze, MD, Urbanizacion Las Cuevas, C/Dinamarca, No. 27, La Orotava, 38300, Tenerife, Canary Islands, Spain, eliputze@santandersupernet.com

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Forty-four percent of the HEMS were located at airports, 33% at hospitals, and the rest at specific helipads, generally annexed to fire stations. Except for one program, each region had helipads in the reference hospitals and a regional net of helipads strategically distributed in their territory.

The total number of helicopters used in medical transport was 29, the more common models being the Agusta and Ecureuil. Only 56% of the programs used twin-engine helicopters, and 45% had rotors with four or more shovels. Forty-five percent of the programs generally took four crewmen, and the rest carried more, usually rescuers. Seventy-eight percent of the programs (14) transported one patient at a time; the figure varied between two and five patients for the rest.

Medical Crews

The medical crew of the most programs (78%) was made up of a physician (MD) and a registered nurse (RN); the rest were constituted by an MD (16%) or RN (6%) only. The total number of medical personnel who directly worked in the HEMS programs was 269 people. Sixty-seven percent of those interviewed said they conducted their own teaching program on air medical transport. The medical personnel's previous experience devoted to transport ranged between 0 and 8 years, with a mean of 4 years, although only 50% responded to this question. The medical crew was mainly recruited from EDs, critical care units, and ground EMS units. A third of the programs had personnel devoted exclusively to HEMS, another third combined this activity with ground transport, and the remaining third with in-hospital activity.

Activity Data

The global number of patients transported during 1998 was 4870, with a range that varied between 15 and 1200 patients per program. The mean ratio of primary versus secondary transports was of 51.25/48.75, although eight programs (44%) carried out mainly primary transport with interventions that occupied more than 75% of their activity. Two programs were devoted exclusively to secondary transport, whereas another two programs ignored this proportion. The average mortality rate was 0.36% (STD 0.35, range 0-2); seven programs showed a zero mortality, and another six did not track this figure. In-flight defibrillation was authorized in only five programs (28%), although two of them tried to avoid its use.

Equipment and Security Systems

Regarding the medical equipment, six programs (33%) possessed the standard equipment in advanced life support air medical units. In another nine cases (50%), the only element lacking was an automatic noninvasive blood pressure device. Two programs did not have a Kendrick extrication device, only one had capnography, and none had a portable blood analyzer. Half the programs did carry a transport incubator. Six programs had crane and rescue material.

With regard to personal security, 66% of the programs used flight suits as habitual wardrobe, although only half were made with fireproof material (Nomex). Only 39% of the programs used flight helmets.

Discussion

Ten years ago, six HEMS programs existed in Spain, but two of them have closed.⁵ We are aware that three new HEMS programs will start soon, so nearly all Spanish regions will have an

HEMS program. However, no study or law guarantees a minimal response time, as in Germany, for example.⁶

The response times reported in our survey are quite short compared with other European services.^{7,8} It was not possible to get total mission time nor access time to the patient. "Zero" response time probably refers to activation rather than takeoff.

The fact that only 56% of the helicopters are activated by coordination centers seems dangerous because it can lead to false takeoffs and inaccurate information about the crash environment and the patient's real state, which increases the helicopter's accident risk.⁹

The Spanish medical crew is mainly made up of a physician and a nurse, a different configuration from the rest of European (physician and technician) or U.S. (two technicians or a technician and nurse duo) HEMS programs.^{10,11} However, a standard national flight curriculum does not exist for HEMS, so the capability, experience, and personal recruitment vary by program. It is interesting to point out that 66% of the personnel involved in critical patient transport have no relationship with hospitals. We find it appropriate that the personnel are not exclusively devoted to HEMS because this permits them continuous professional growth and diminishes the burn-out phenomenon.

The percentage of primary missions is high compared with other series.⁷ However, some programs did not answer this question. Furthermore, the fact that six programs ignored their mortality rate makes us think they could have little knowledge about cost-effectiveness and quality improvement criteria. Although we tried to find out the cost of each program in the survey, we could not make the calculations because there was no answer in approximately 90% of the cases as a result of the program manager's ignorance or distrust or the complex cost-sharing among several administrations.

As far as medical equipment is concerned, we are surprised at the large number of programs without noninvasive blood pressure monitors or capnographs.^{12,13} Therefore, it is not strange that practically no more sophisticated equipment, such as blood analyzers, is used.

The medical personnel's safety is far below international standards (Nomex flight suit, flight helmet, etc.), in spite of the high primary mission percentages, leading to a greater accident risk.¹⁴

Finally, we think this work could contribute to the development of common standards for all Spanish HEMS programs that promote continuous quality improvement and serve as reference for future emergency systems.^{8,15} More work is necessary to assess Spanish HEMS cost-effectiveness—above all, regarding the relationship of different configurations in the medical crew.

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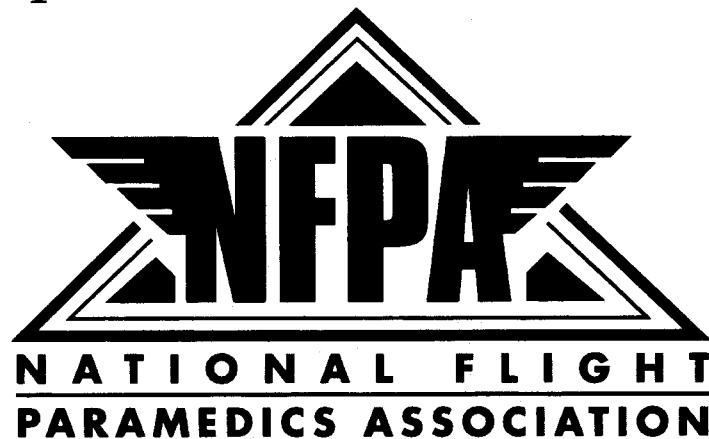
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