

## Care Network for ST-elevation Myocardial Infarction: What Is the Ideal Catchment Area for Primary Angioplasty?



### Redes de atención al infarto con elevación del ST: ¿cuál es el área idónea de referencia para angioplastia primaria?

#### To the Editor,

Clinical practice guidelines recommend establishing regional networks as the most appropriate system for attending patients with ST-elevation acute coronary syndrome.

Data are available on the minimum number of primary percutaneous coronary interventions (PPCIs) per center and operator to guarantee appropriate care.<sup>1</sup> However, little has been published on the maximum catchment population per center. Excessively large catchment populations may lead to patient overlap, overload of the on-call teams, saturation of beds for acute events in the recipient hospital, and interference with elective percutaneous interventions. Although the European Cardiology Society suggests an average population size of half a million inhabitants (with a lower limit of 0.3 million and an upper limit of 1 million),<sup>2</sup> the actual figures in Europe range from 31 300 to 6 533 000 inhabitants.<sup>3</sup>

In the design of the network in the Spanish region of Asturias in 2011, there was debate about the need to concentrate all activity in a previously existing center or to take advantage of the opening of a second center to distribute the population. In the end, the latter option was chosen. During this debate, it was decided to analyze the percentage of patients with an indication for PPCI who had overlapped in time in our region, and who would have experienced a delay in the door-to-balloon time on account of all the activity being concentrated in the initial center.

Asturias has a population of 1 077 410 inhabitants and 8 health districts (Figure). The regional plan establishes that districts I and II, with populations of 48 788 and 29 484 inhabitants, respectively, conduct fibrinolysis in a nonhospital setting, if possible, with immediate transfer to the *Hospital Universitario Central de Asturias* in Oviedo, given that a first contact-balloon time < 120 min would not be possible. In the remaining 6 districts, with a population of 999 138 inhabitants, PPCI is the option. Of these, districts III, IV, and VII are referred to Oviedo while the remaining 3 districts, V, VI, and VIII, are referred to the *Hospital de Cabueñes*, in Gijón. Oviedo has 2 rooms in operation from 8:00 am to 3:00 pm and 1 room in operation from 3:00 pm to 10:00 pm on week days, but with an additional on-call team, so that on week days from 10:00 pm onwards, 2 emergencies can be attended at the same time. In contrast, *Hospital de Cabueñes* can only provide coverage for a single patient at a time. With this structure, PPCI is available to 92.8% of the population, while only 7.2% are covered by fibrinolysis.

Between May 1, 2013 and April 30, 2014, the time between activation of the catheterization team and the end of the procedure was analyzed for all PPCIs performed in the region. The percentage of patients who overlapped in time and who, for this reason, had experienced a delay in reperfusion was calculated. Because 1 of the 2 centers had 2 rooms, if 2 patients overlapped during daytime on week days in this center, they were not considered as coincident.

In total, 632 activations were recorded, that is, 590 activations per million inhabitants. In 531 of these cases, PPCI was performed, corresponding to 84.1% of the total number of activations and 496 PPCI per million inhabitants. The patients' clinical characteristics and the activation times are presented in the Table. Of the 632 activations, 104 procedures (16.5%) were performed with overlap in the reported interval, which would have meant the procedure was delayed in 1 out of every 2 patients (52 cases, 8.2%). Counted according to PPCI, of these 104 cases, PPCI was performed

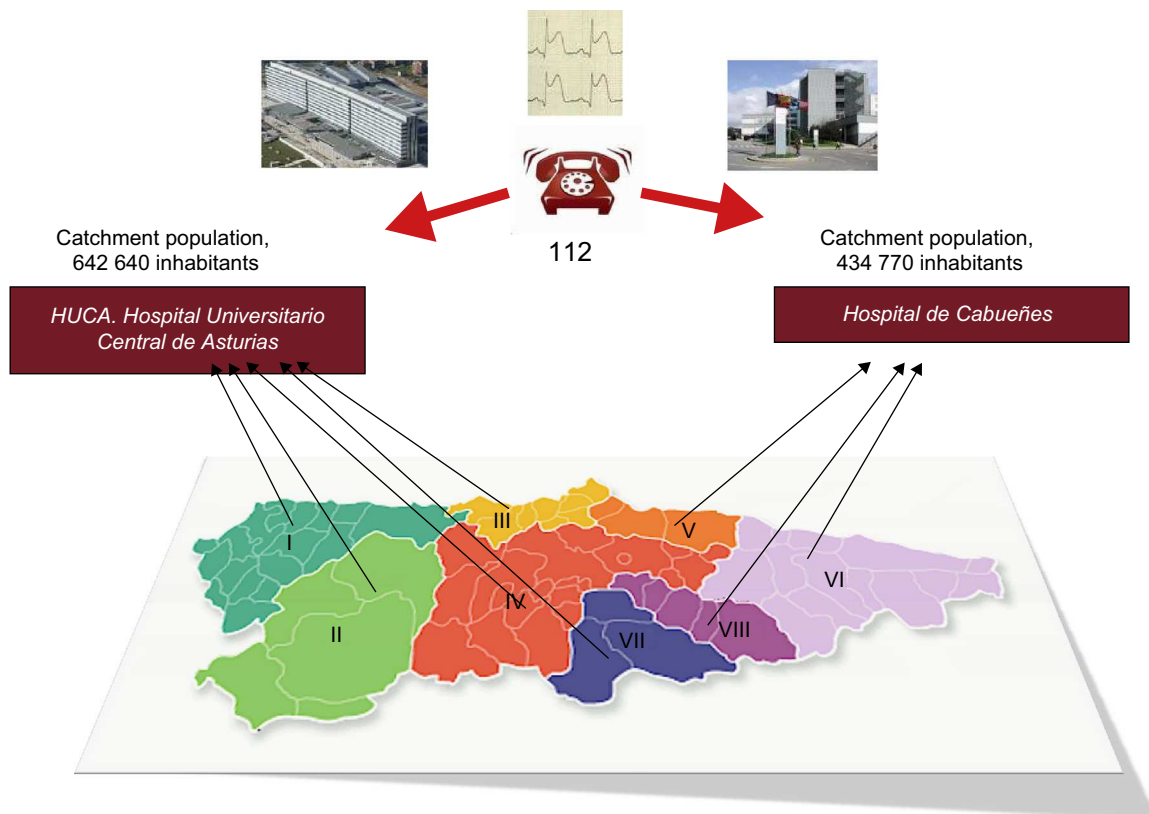


Figure. Asturian Regional Plan for care of ST-elevation acute coronary syndrome.

**Table**  
Clinical Characteristics and Delays

	N	%
Age, mean (SD)	64.3 (13.2)	–
Female sex	154	24.3
Diabetes mellitus	145	22.9
Hypertension	317	50.1
Hypercholesterolemia	226	35.7
Smoking habit	333	52.7
Prior percutaneous coronary intervention	61	9.6
Time symptom onset –first medical contact	76 (Q <sub>25</sub> 35–Q <sub>75</sub> 165)	–
Time first medical contact–activation	25 (Q <sub>25</sub> 15–Q <sub>75</sub> 43)	–
Time activation–arrival in the room	35 (Q <sub>25</sub> 24–Q <sub>75</sub> 55)	–
Time symptoms–balloon	170 (Q <sub>25</sub> 120–Q <sub>75</sub> 270)	–
Delay first medical contact–balloon	85 (Q <sub>25</sub> 68–Q <sub>75</sub> 111)	–
Delay activation–end of procedure	76 (Q <sub>25</sub> 35–Q <sub>75</sub> 165)	–

Times are expressed in minutes.  
SD, standard deviation.

in 92, and so 46 patients may have experienced a delay in reperfusion, that is, 7.2% of the overall series.

The data presented are only applicable to the network described, as the demographic characteristics, geography, hospital network, and catheterization laboratories vary for each region.<sup>4</sup> The fact that overlap started when the catheterization team was activated instead of when the patient arrived in the room may have increased the percentage of patients reported to have a delay. However, the end time of the procedure is not always predictable and, if the activity had been concentrated in a single center, the transfer times would have been longer for 40% of the patients in the catchment area of the second center. This may have led to overlap with patients other than those indicated, greater ambulance use with a subsequent deterioration in other areas of care, and increased mortality due to delays.<sup>5</sup> There may also have been an increase in the percentage of

patients referred for fibrinolysis if the option of a second center were not available, while some of the 6 patients who experienced delay and who did not undergo PPCI may have received unnecessary fibrinolysis.

In summary, we believe that the design of regional networks should take potential demand into account and, once in operation, the percentage of patients who have experienced delays in the past year could be used as an indicator analyzed in annual steering committee meetings for the regional network.

Iñigo Lozano,<sup>a,\*</sup> Alfonso Suárez-Cuervo,<sup>b</sup> Juan Rondán,<sup>a</sup> Pablo Avanzas,<sup>b</sup> José M. Vegas,<sup>a</sup> and César Morís<sup>b</sup>

<sup>a</sup>Servicio de Cardiología, Hospital de Cabueñes, Gijón, Asturias, Spain

<sup>b</sup>Servicio de Cardiología, Hospital Central de Asturias, Oviedo, Asturias, Spain

\* Corresponding author:

E-mail address: [inigo.lozano@gmail.com](mailto:inigo.lozano@gmail.com) (I. Lozano).

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## Changes in Clinical Profile, Epidemiology and Prognosis of Left-sided Native-valve Infective Endocarditis Without Predisposing Heart Conditions



### *Cambios en el perfil clínico, epidemiológico y pronóstico de la endocarditis infecciosa nativa izquierda sin lesión cardíaca predisponente*

To the Editor,

Traditionally, infective endocarditis (IE) has been considered as a disease affecting patients with underlying heart disease (HD).<sup>1</sup> This profile appears to have changed in recent decades, in that EI affects both patients with degenerative valve disease and those with no apparent HD.<sup>1–4</sup> Various studies have shown that the proportion of patients with IE and no underlying HD has increased in our setting.<sup>2,5,6</sup> Although each type of IE appears to have distinct epidemiologic and prognostic characteristics,<sup>2,5</sup> it is not known whether the profile of non-HDIE has changed in recent years, which could have implications for prognosis. The objectives of our study were: a) to compare the characteristics of HD-associated left-sided native-valve IE (HDIE) and non-HD-associated left-sided native-

valve IE (non-HDIE) diagnosed at our center between 1987 and 2013, and b) to study changes in the profile of non-HDIE during this period.

We analyzed a series of 420 consecutive patients diagnosed with IE between 1987 and 2013, of which 240 (57%) had left-sided native-valve IE. Diagnosis was made according to the Von Reyn, Duke and modified Duke criteria, depending on the time period. The management protocol did not change over this period, except for the introduction of transesophageal echocardiography during the 1990s. Each patient was classified as having either HDIE or non-HDIE, depending on the results of transthoracic and transesophageal echocardiography during the episode of IE, previous echocardiograms, medical history, and surgical and autopsy findings. The valve was considered normal when the portions of the leaflets that were unaffected by infection were normal and there was no chordal involvement or commissural fusion.<sup>5</sup> The active phase of the disease was defined as the first 6 weeks from symptom onset. Urgent surgery was defined as that which could not be postponed for more than 24 hours without risk to the patient's life, while elective surgery was defined as that carried out after 24 hours.

Of the 240 cases of left native-valve IE, 104 (43%) were classified as non-HDIE, and the remaining 136 (57%) were diagnosed with HDIE. The proportion of cases of non-HDIE increased significantly,