Analysis of times of emergency service transport of patients to a catheterization laboratory in the first year implementing a code of practice for attending acute ST-elevation myocardial infarction in Asturias

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CONFLICT OF INTEREST:
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Background and objectives: To assess the degree of compliance with time objectives for starting a primary percutaneous coronary intervention in Asturias, Spain, and to determine whether there are differences between patients first treated by prehospital emergency medical services and taken directly to a catheterization laboratory and those first taken to hospitals without laboratories.
Methods: Cross-sectional descriptive observational study of cases of acute ST-elevation myocardial infarction attended by the prehospital emergency services in Asturias in 2012. Cases were classified into 2 groups: in the first were patients taken directly to the catheterization laboratory (direct route) and in the second, patients first taken to emergency departments in hospitals without a laboratory (indirect route). We compared times between the onset of symptoms, first medical contact, activation of the catheterization laboratory, and balloon inflation in the laboratory.
Results: We analyzed 359 cases (direct route, 238; indirect route, 121). The mean time between first medical contact and balloon inflation was 88.9 minutes; 87.7% of the patients were attended within 120 minutes or less (direct route, 93.3%; indirect route, 76.7%). Patients who sought care within 2 hours of onset of symptoms experienced a mean delay of 87.8 minutes; 58.8% were attended within 90 minutes or less (direct route, 70.2%; indirect route, 32.3%).
**Conclusions:** Time objectives are being met in Asturias. The best care scenario is for patients to be treated at the scene by the prehospital emergency service and taken directly to a catheterization laboratory. Efforts must be made to advise the population to call a local emergency number (112 or 061) as soon as chest pain suggests a coronary event. First responders should make the effort to diagnose the condition and transfer the patient quickly to a catheterization laboratory. [Emergencias 2014;26:259-266]

Keywords: ST-elevation myocardial infarction (STEMI). Primary angioplasty. Care delays. Prehospital emergency health services.Analysis of times of emergency service transport of patients to a catheterization laboratory in the first year implementing a code of practice for attending acute ST-elevation myocardial infarction in Asturias

Introduction

In October 2011, after inauguration of the catheterization laboratory (cath lab) in Hospital de Cabueñes (HC), Gijón, following the recommendations of the Stent For Life[1] initiative and Ischemic Heart Disease Strategy of the National Health System[2], the regional authorities of Asturias launched the project IAMASTUR[3] (Autonomy Plan "strategy for early reperfusion of acute coronary syndrome with ST elevation") and the Heart Code (CC)[4] for the coordination, assistance and emergency transport of STEMI patients for early reperfusion. Until then, Asturias with 1,081,487 inhabitants and 9 public hospitals had one cath lab available for primary percutaneous coronary inter-
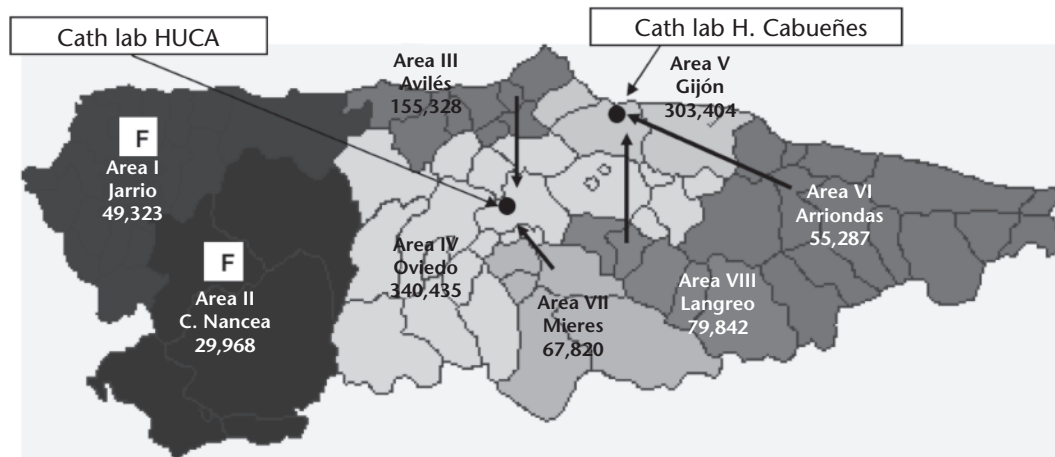
Figure 1. Map of the health areas of Asturias and hospitals with a catheterization laboratory specified in the Heart Code. F: fibrinolysis; H: hospital; HUCA: Central University Hospital of Asturias.

vention (PCI) in the Central University Hospital of Asturias (HUCA) in Oviedo, which provides coverage for 31.5% of the Asturian population. In other cases, STEMI patients received fibrinolysis as the first-line therapeutic strategy.

The IAMASTUR project and CC involve coordinating the services of cardiology, primary care, urgent medical care (SAMU) and hospital emergency departments (ED), making it possible to offer PCI in either of the cath labs 24 hours a day, 365 days a year.

Inclusion criteria for reperfusion (mechanical or pharmacologic) are coronary ischemic symptoms within 12 hours of onset, associated with persistent ST-segment elevation or new complete block of the left bundle branch[5,6]. Following the recommendations of the European Society of Cardiology[7], PPCI is established as the treatment of choice if the estimated time between the first medical contact (FMC) and balloon inflation (FMC-balloon time) is less than or equal to 120 minutes (90 minutes in patients with symptoms of less than 2 hours duration) and for patients in cardiogenic shock or with contraindications for fibrinolysis. The latter is reserved for when primary PCI is not possible within the recommended time limits, with a time between FMC and administration of fibrinolysis (FMC-needle) not exceeding 30 minutes. FMC is considered as the time of ECG diagnosis.

Asturias is divided into 8 health areas (Figure 1), each with its own hospital (Gijón has two). The distance between hospitals without a cath lab and the reference cath lab varies between 7 and 115 Km. For prehospital care, SAMU has a medicalized emergency unit (UME in Spanish) in each health area, except for health areas I and II , whe-

re emergency medical care is carried out by basic life support (BLS) ambulance teams, which can medicalized if necessary with primary care teams. SAMU also has an inter-hospital transport UME located in Gijón. Patients of health areas I, II, III, IV and VII are transferred to the HUCA cath lab and those from areas V, VI and VIII to the HC. It also has a medical helicopter, whose activity depends on weather conditions and daytime visibility, which always transfers patients to HUCA

The request to activate CC is usually made by UME physicians or emergency physicians, by calling the emergency coordinator (CCU) center, which contacts the attending cardiologist at the hospital with a cath lab, and if the cardiologist sees fit, the interventional cardiology team is activated, thus activating the CC.

The UME teams are responsible for initiating or confirming activation of CC for prehospital patients, with direct transfer to the nearest cath lab, as well as transfers from secondary hospitals without a cath lab. In addition, inter-hospital transport UME teams are responsible for returning stable patients to the coronary care unit of their reference hospital.

Previous studies in other countries[8-14] and in different Spanish regions[15-18] conclude that the delay times between FMC and PPCI are lower in patients treated directly by prehospital emergency services than when the patient first attends a health center without a cath lab. Therefore, the objectives of the present study were: 1) to analyze the response times and evaluate the degree of compliance with the objectives established for primary PCI in patients managed by SAMU in the first year of implementation of CC in Asturias; and

Table 1. Heart Codes in Asturias in 2012

	Total N = 594	HUCA cath lab N = 353	Hospital Cabueñes cath lab N = 241
Patients transferred by SAMU	359 (60.4%)	212 (60.1%)	147 (61%)
Patients from their EDs	235 (39.6%)	141 (39.9%)	94 (39%)
Patients undergoing primary PCI	495 (83.3%)	276 (78.1%)	219 (90.1%)

SAMU: emergency medical services; cath lab: catheterization laboratory; HUCA: Central University Hospital of Asturias; PCI: percutaneous coronary intervention.

2) compare the degree of compliance between patients attended by SAMU UME and those treated in emergency departments of hospitals without a cath lab.

Method

We performed a descriptive observational cross-sectional study. The initial study sample were all cases of CC activation in Asturias from 1 January to 31 December 2012. We included all cases managed by SAMU and excluded all cases not managed by SAMU because they were 1) treated in one of the two hospitals with a cath lab; or 2) treated with fibrinolysis in areas I and II (no infrastructure for PPCI).

Two groups of patients were established: 1) primary activations (G1), where the diagnosis and activation of the CC were made before hospitalization; and 2) secondary activation (G2), where the diagnosis and CC activation were performed in the ED without a cath lab available in that center.

The variables collected were: monthly distribution, activation time, place of the initial attention, sex and age of patients, resource involved, destination - a hospital with a cath lab, time of onset of symptoms, time of FMC, CC activation time, time of arrival at the hospital with a cath lab, time from symptom onset to FMC and from FMC to CC activation, from CC activation to balloon time and FMC-balloon time. The study was approved by the Ethics Committee of Clinical Research, HUCA.

Statistical analysis was performed with SPSS 18.0. We performed a descriptive analysis of the data using mean and standard deviation for quantitative variables, and absolute and relative frequencies for qualitative variables. Student t was used to compare quantitative variables, and chi-square test was used for qualitative variables.

Results

CC was activated for 594 cases, of which 359 (60.4%) were managed by the SAMU. The remai-

ning 39.6% (235 cases) were direct activation from the two emergency departments in hospitals with a cath lab (Table 1).

Of the 594 cases, primary PCI was performed in 495 of these (83.3%), 276 in HUCA and 219 in HC. Coronary arteries without significant angiographic lesions were found in 8.2% of cases.

Of the 359 cases handled by SAMU, 238 were classified as G1 (63.3%) and 121 as G2 (33.7%). In 100% of these cases primary PCI was the first-line reperfusion therapy; 358 patients arrived at the cath lab alive (only one patient died, of cardiac arrest during transfer). Table 2 shows the socio-demographic variables of the patients; 79.9% male, mean age of 61.9 (14.3) years. Men were younger than women: 59.5 (13.7) versus 71.4 (12.5) years, p <0.0001. There were no significant differences in age and gender between the two groups. Most (80.7%) events occurred between 08:00 am and 21:59 pm (Figure 2), with no significant differences between the two groups in terms of time of day (p = 0.84). The average incidence was 30 cases per month (Figure 3); 59.1% (212 patients) were transferred to HUCA and 40.9% (147) to HC (p = 0.42).

Table 3 shows the characteristics of CC analyzed. In 94 cases (26.2%), CC was activated from the patient's home, in 25 cases (7%) from public places or public roads, in 119 cases (33.1%) from primary care health centers or private clinics and in 121 cases (33.7%) from hospitals without a cath lab. In 66.8% of cases (N = 240), the patient came for treatment to a health center (health center, private clinic or hospital without a cath lab), while in the remaining 33.2% (N = 119), the patient called the emergency number 112 and was treated in situ directly by the SAMU UME team. Table 3 also shows in detail the outpatient resource used in each case. The UME-4 Oviedo made no secondary transfers (all cases were classified as G1).

Table 4 shows CC delay times. Patients made contact with health services 128.8 (117) minutes from the onset of symptoms, with no significant differences between the two groups (p = 0.95); 71.8% consulted within 2 hours of symptom onset.

Table 2. Socio-demographic variables of patients

	Total N = 359	G1 N = 238	G2 N = 121	P
Socio-demographic variables				
Men [n (%)]	287 (79.9)	192 (80.7)	95 (78.5)	0.63
Age (years) [mean (SD)]	61.9 (14.3)	62.2 (14.2)	61.3 (14.5)	0.59
Age men [mean (SD)]	59.5 (13.7)	60.2 (13.9)	57.9 (13.3)	0.18
Age women [mean (SD)]	71.4 (12.5)	70.2 (12.8)	73.6 (11.9)	0.28
Time of day [n (%)]				
08:00-14:59	147 (40.9)	100 (42)	47 (38.8)	0.84
15:00-21:59	143 (39.8)	93 (39.1)	50 (41.3)	
22:00-07:59	69 (19.2)	45 (18.9)	24 (19.8)	
Admissions to hospital with cath lab [n (%)]				
Central University Hospital of Asturias (Oviedo)	212 (59.1)	137 (57.6)	75 (62)	0.42
Hospital Cabueñes (Gijón)	147 (40.9)	101 (42.4)	46 (38)	

Cath lab: Catheterization Laboratory. % of the total N of each column.

Average time from FMC to CC activation was 21.3 (20.4) minutes; in G1 this was 18.2 (15.7) minutes [11.8 (10.9) minutes in the cases handled directly by SAMU UME and 24.4 (16.5) in those initially treated at health centers]; in G2 this was 27.6 (20.3) minutes (p = 0.002).

Average time from CC activation to balloon inflation was 68.5 (24.6) minutes: 62.6 (24.2) in G1 and 80.1 (21.2) in G2 (p <0.0001).

Average FMC-balloon time was 88.9 (32.9) minutes; 87.7% of them exceeding 120 minutes. In G1, the delay was 79.5 (26.3) minutes, 93.3% with less than or equal to 120 minutes, while the delay in G2 was 107, 1 (37, 2) minutes, 76.7% with less than or equal to 120 minutes (p <0.0001) time.

There was no gender difference in FMC-balloon time [87.7 (31.8) minutes for men and 93.8 (37.2) for women, p = 0.13], nor in destination "hospital with a cath lab" [91.3 (35) minutes for HUCA and 85.5 (29.6) for HC, p = 0.77]. Although in G1 there were no differences in destination (p = 0.73), other differences in G2 (p = 0.01) were found: significantly less time when the hospital with a cath lab was HC [96.8

(28.6) versus 113.6 minutes (40.3) for HUCA].

Differences, although not statistically significant (p = 0.08), were observed between the time of day at which the event occurred and compliance with the time window of ≤ 120 minutes: the highest percentage of compliance was between 22:00 and 07:59 hours (94.2%), and lowest between 08:00 and 14:59 hours (83.7).

Average FMC-balloon time was 87.8 (33.9) minutes [79.5 (27.7) in G1 and 107.1 (38.7) in G2, p <0.0001]; 58.8% of the patients (70.2% in G1 and 32.3% in G2) arrived within 90 minutes as required for primary PCI. Table 5 shows in detail the times between FMC-balloon inflation for each outpatient resource and individual hospitals without a cath lab.

Discussion

The implementation of the Project IAMASTUR and CC has meant almost generalized primary PCI as reperfusion therapy for STEMI in Asturias, as in other regions[15,16,19,20]. This conforms to international recommendations[1,7]. The number of pri-
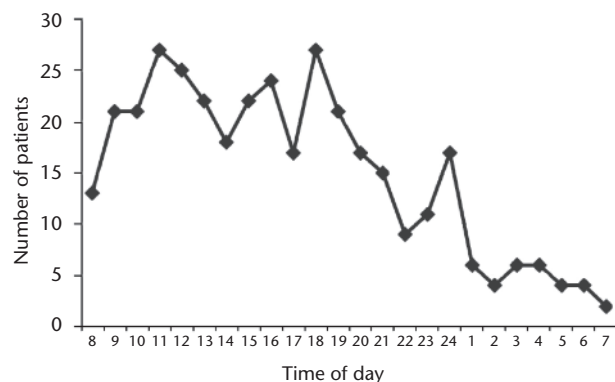
Figure 2. Time slot distribution of Heart Code patients.
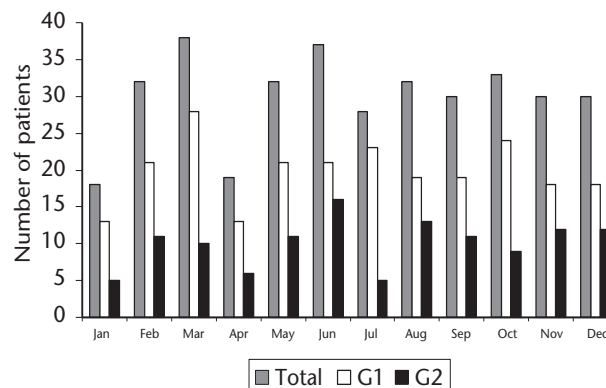
Figure 3. Monthly distribution of Heart Code patients.

Table 3. Characteristics of Heart Code patients analyzed

Location of first aid	Total N = 359	G1 N = 238	G2 N = 121
Out-of-hospital patients [n (%)]			
- Home	94 (26.2)	94 (39.5)	
- Public places / street	25 (7.0)	25 (10.5)	
- Health Center / Clinic / Prison	119 (33.1)	119 (50)	
Hospital without cath lab (City - distance to cath lab) [n (%)]			
- Hospital San Agustín (Avilés - 38 Km)	40 (11.1)		40 (33.0)
- Hospital de Jove (Gijón - 7 Km)	24 (6.7)		24 (19.8)
- Large Covián Hospital (Arriondas - 67 Km)	13 (3.6)		13 (10.7)
- Hospital Alvarez Buylla (Mieres - 19 Km)	22 (6.1)		22 (18.2)
- Nalón Valley Hospital (Langreo - 29 Km)	20 (5.6)		20 (16.5)
- Hospitals Jarrio (Jarrio - 115 Km)	1 (0.3)		1 (0.8)
- Hospital Cabueñes (Gijón - 38 Km)	1 (0.3)		1 (0.8)
Transfer performed by (city where it is located) [n (%)]			
- EMU 3 (Aviles)	58 (16.1)	34 (14.3)	24 (19.8) from HSA to HUCA
- UME 4 (Oviedo)	56 (15.6)	56 (23.5)	0
- UME 5 (Gijón)	67 (18.7)	61 (25.6)	6 (4.9) to FHJ to HC
- UME 6 (Arriondas)	31 (8.6)	18 (7.6)	13 (10.7) from HGC to HC
- UME 7 (Mieres)	47 (13.1)	28 (11.8)	19 (15.7) from HAB to HUCA
- UME 8 (Sama Langreo)	44 (12.2)	23 (9.7)	21 (17.3) 19 from HVN to HC. 2 from HAB to HUCA
- EMU 10 - Interhospital (Gijón)	43 (12.0)	7 (2.9)	36 (29.7) 17 to FHJ to HC. 16 from HSA to HUCA. 1 from HVN to HC. 1 from HAB to HUCA. 1 from HC to HUCA
- BLS Ambulance	6 (1.7)	5 (2.1)	1 (0.8) from FHJ to HC
- Helicopter medicalized (Lugo de Llanera)	7 (1.9)	6 (2.5)	1 (0.8) from HJ to HUCA

UME: medicalized emergency unit; BLS: Basic Life Support; % of the total N of each column. HSA – Hospital San Agustín (Avilés); HUCA – Hospital Universitario Central de Asturias (Oviedo); FHJ – Fundación Hospital de Jove (Gijón); HC – Hospital de Cabueñes (Gijón); HGC – Hospital Grande Covián (Arriondas); HAB – Hospital Álvarez-Buylla (Mieres); HVN – Hospital Valle del Nalón (Langreo); HJ – Hospital de Jarrio.

mary PCIs per million population has increased from 123 in 2010[21] to 467 in 2012[22], which places Asturias at the head of the National Register of primary PCI for acute myocardial infarction. SAMU was involved in 60.4% of these cases.

In general, patients transferred by SAMU met the time objectives[3], with a mean FMC-balloon time of 88.9 minutes (87.7% within the 120 minute time window). For G1 FMS-balloon time did not exceed 120 minutes in 93.3% of cases, while for G2 this was only achieved in 77%.

Among patients presenting within 2 hours of symptom onset, i.e. the majority, the differences were even more significant; in 58.8% of patients, balloon inflation was achieved in less than 90 minutes, but as this was achieved for 70% of patients in G1, it was only achieved in 32% of patients in G2.

Of the strategies for improving timely access to

primary angioplasty[23], the Principality of Asturias has already implemented some, but others could still be implemented such as direct activation of PPCI teams by the emergency physician or SAMU (without contacting the cardiologist) and feedback of data between process participants.

Regarding the reasons for not meeting the recommended times, we found that the delay in activating the CC was higher in patients treated at health centers than in those directly attended by SAMU UME. In the case of hospital EDs without a cath lab available, this delay was 27 minutes, which could be due to workload and the fact that the ECG is performed by nurses but the interpretation is done by a physician and this may be delayed because of the workload. In the case of primary care health centers, 24 minutes delay on average may be because CC activation only occu-

Table 4. Time intervals for Heart Code patients (minutes)

	Global	G1	G2	P
Symptom onset-FMC [mean (SD)]	128.8 (117)	129.2 (124.5)	127.9 (116.1)	0.95
FMC-Heart Code activation [mean (SD)]	21.3 (20.4)	18.2 (15.7)	27.6 (20.3)	0.002
Heart Code activation-balloon time [mean (SD)]	68.5 (24.6)	62.6 (24.2)	80.1 (21.2)	< 0.0001
FMC-balloon time [mean (SD)]	88.9 (32.9)	79.5 (26.3)	107.1 (37.2)	< 0.0001
FMC-balloon time in patients with symptoms <2 h evolution (N = 258) [mean (SD)]	87.8 (33.9)	79.5 (27.7)	107.1 (38.7)	< 0.0001

FMC: first medical contact; SD: standard deviation.

Table 5. First medical contact (FMC)-balloon time for patients attended by different mobile units or at hospitals without a catheterization laboratory

	N	Global [mean (DE)]	G1 [mean (DE)]	G2 [mean (DE)]	P	t ≤ 120 min (%)
Mobile units (mins)						
UME 3 (Aviles)	58	89,9 (24,4)	84,9 (19,6)	96,9 (28,7)	0,31	97,1
UME 4 (Oviedo)	56	65,1 (20,7)	65,1 (20,7)	0	–	98,2
UME 5 (Gijón)	67	71,4 (25,1)	70,1 (24,6)	84,8 (28,4)	0,12	98,4
UME 6 (Arriondas)	31	112 (29,4)	105,1 (26,6)	122,4 (28,8)	0,08	72,2
UME 7 (Mieres)	47	98,8 (32,6)	89,7 (21,4)	112,3 (41,1)	0,01	92,9
UME 8 (Sama Langreo)	44	95 (27,3)	85,8 (17,9)	104,7 (32,1)	0,01	88,4
UME-10 (Interhospital)	43	108,2 (43,1)	91,8 (29,6)	112 (44,7)	0,21	75
Medicalized helicopter	7	115,4 (24,9)	113,6 (26,2)	126	0,64	57,2
BLS Ambulance	6	90,6 (35,6)	92,6 (39,1)	81	0,79	66,6
Hospital without a cath lab (mins)						
Hospital San Agustín (Avilés)	41	111,6 (43,5)				75,6
Hospital de Jove (Gijón)	23	87,1 (22,7)				95,7
Large Hospital Covián (Arriondas)	13	122,4 (31,3)				58,3
Hospital Alvarez Buylla (Mieres)	22	114,9 (39,4)				68,2
Nalon Valley Hospital (Langreo)	20	101,2 (30,1)				85
Hospital Jarrio (Jarrio)	1	126				t > 120 min
Hospital Cabueñes (Gijón)	1	133				t > 120 min

UME: medicalized emergency unit; t: time; BLS: Basic Life Support; SD: standard deviation.

rred after the ECG was confirmed by the UME physician. In SAMU UME teams this time was 11 minutes, which seems excessive since the physician was present at the time of performing the ECG but may be due to telephone activation. In any case, efforts should be made to reduce this time as much as possible.

Regarding the different transfer resources, UME-6 (Arriondas) had 27% of cases with FMC-balloon time over 120 minutes, which could be because 42% of their transfers were from the Hospital Grande Covián and the great distance from certain points in their area VI to the cath lab at Hospital Cabueñes Gijon. UME-10 (inter-hospital transport) had 25% of cases with more than 120 minutes, which could be because they performed transfers from St. Augustine to HUCA Hospital, where prior to transfer this unit had to get from Gijón (where it is located) to Aviles (27 Km) to pick up the patient. From January 2013, to mitigate these delays, transfers from St. Augustine's Hospital were performed by UME-3 Avilés. The medicalized helicopter was associated with times over 120 minutes in 42% of cases, explained by its complex mobilization and landing sites with difficult access and transfer from the helipad to the cath lab at HUCA. The helicopter was only used on 7 occasions and was probably the best resource available.

As for hospitals without a cath lab, the recommended times were not achieved in 41% of transfers from Hospital Grande Covián (Arriondas) Hospital, 31% from Hospital Álvarez- Buylla (Mieres) and 15% from Hospital Valle de Nalón (Langreo). In addition to the delay in CC activation, this may

be due to the fact that patients had to wait for the SAMU UME to get to the hospital to pick them up.

The reperfusion strategy of choice in all cases was PCI, regardless of whether the recommended time window of 90 or 120 minutes. The percentages of cases that exceeded the recommended time for PPCI should lead to reflection on whether this is always the best treatment option; in some cases early fibrinolysis and transfer for PCI may be an alternative to consider[24].

Arguably, the best option for patients with STEMI in our region appears to be attention by SAMU UME and direct transfer to a cath lab. Like other studies[8-14,17], we also conclude that the shortest ischemia time was achieved in those patients treated directly by pre-hospital emergency services compared with the times of patients treated in primary care or emergency departments of hospitals without a cath lab. Of the 594 cases of CC, 40% were attended before hospitalization, but only 20% called 112 for treatment in situ by UME (119 of the total 594 cases). So, it seems necessary to intensify public awareness campaigns such as Stent for Life and the Spanish Society of Cardiology "seconds count, save a life" in Catalonia[25]. These initiatives warn that at the onset of chest pain of coronary characteristics, one should call the health emergency number 112 rather than seeking attention at a health center which results in a slight delay, but further delay occurs when the patient attends a hospital without a cath lab. We need to reduce myocardial ischemia time, and accelerate the transfer of patients to a cath lab, but in cases where the time window for

PCI is not acievable, we must consider alternative therapeutic strategies.

Adenda

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References

1 Objetivos de Stent For Life en España para el periodo 2010-2013. Rev Esp Cardiol. 2011;11(Supl.):6-8.
2 Estrategia en Cardiopatía Isquémica del Sistema Nacional de Salud. Madrid: Ministerio de Sanidad, Política Social e Igualdad; 2011. pp. 64-67.
3 Proyecto IAMASTUR. AsturSalud (portal de salud del Principado de Asturias). (Consultado 14 Octubre 2013). Disponible en: http://www.asturias.es/Astursalud/Ficheros/AS_SESPA/AS_Asistencia%20Sanitaria/SAMU/IAMASTUR-Octubre.pdf
4 Código Corazón. Estrategia de Reperfusión Precoz en el Síndrome Coronario Agudo con Elevación del ST en el Principado de Asturias. AsturSalud (portal de salud del Principado de Asturias). (Consultado 14 Octubre 2013). Disponible en: http://www.asturias.es/Astursalud/Ficheros/AS_SESPA/AS_Asistencia%20Sanitaria/SAMU/CODIGO%20CORAZON%20Enero%202013.pdf
5 Boersma E, Maas AC, Deckers JW, Simoons ML. Early thrombolytic treatment in acute myocardial infarction: reappraisal of the golden hour. Lancet. 1996;348:771-5.
6 Boersma E. Does time matter? A pooled analysis of randomized clinical trials comparing primary percutaneous coronary intervention and in-hospital fibrinolysis in acute myocardial infarction patients. Eur Heart J. 2006;27:779-88.
7 Steg PG, James SK, Atar D, Badano LP, Blömstrom-Lundqvist C, Borger MA, et al. Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. Eur Heart J. 2012;33:2569-619.
8 Scorcu G, Meloni L, Pilleri A, Loi B, Pirisi R, Sanna F, et al. The network for acute coronary syndromes in the metropolitan area of Cagliari (Italy): management of ST-elevation myocardial infarction, reperfusion time, and adherence to guidelines. G Ital Cardiol (Rome). 2013;14:66-75.
9 Thorn S, Attali P, Boulenc JM, Gladin M, Monassier JP, Roul G, et al. Delays of treatment of acute myocardial infarction with ST elevation admitted to the CCU (coronary care unit) in Alsace. Arch Mal Coeur Vaiss. 2007;100:7-12.
10 Hafiz AM, Naidu SS, DeLeon J, Islam S, Alkhatib B, Lorenz M, et al. Impact of first contact on symptom onset-to-door time in patients presenting for primary percutaneous coronary intervention. Am J Emerg Med. 2013;31:922-7.
11 Leleu H, Capuano F, Ferrua M, Nitenberg G, Minvielle E, Schiele F. Symptom-to-needle times in ST-segment elevation myocardial infarction: shortest route to a primary coronary intervention facility. Arch Cardiovasc Dis. 2013;106:162-8.
12 Cone DC, Lee CH, Van Gelder C. EMS activation of the cardiac catheterization laboratory is associated with process improvements in the care of myocardial infarction patients. Prehosp Emerg Care. 2013;17:293-8.
13 Fosbol EL, Granger CB, Jollis JG, Monk L, Lin L, Lytle BL, et al. The impact of a statewide pre-hospital STEMI strategy to bypass hospitals without percutaneous coronary intervention capability on treatment times. Circulation. 2013;127:604-12.
14 Giuliani E, Melegari G, Lazzerotti S, Fantini G, Serantoni C, Barbieri A. Estudio de los tiempos transcurridos desde el inicio de los síntomas hasta la angioplastia primaria. Emergencias. 2013;25:51-4.
15 Íñiguez A, Jiménez VA, Baz JA, Barreiros MV. Resultados tras 6 años de funcionamiento de la red asistencial de reperfusión coronaria de pacientes con infarto agudo de miocardio en la Comunidad de Galicia-Área Sur (PROGALIAM Sur). Rev Esp Cardiol. 2013;66:506-7.
16 Bosch X, Curós A, Argimon JM, Faixedas M, Figueras J, Jiménez-Fábrega X, et al. Modelo de intervención coronaria percutánea primaria en Cataluña. Rev Esp Cardiol. 2011;11(Supl.C):51-60.
17 Rodríguez-Leor O, Fernández-Nofrerías E, Mauri F, Salvatella N, Carrillo X, Curós A, et al. Análisis de los tiempos de atención en pacientes con infarto agudo de miocardio tratados con angioplastia primaria según su procedencia y según el horario de realización del procedimiento. Rev Esp Cardiol. 2011;64:476-83.
18 Gómez-Hospital JA, Dallaglio PD, Sánchez-Salado JC, Ariza A, Homs S, Lorente V, et al. Impacto en tiempos de actuación y perfil de los pacientes tratados con angioplastia primaria en el área metropolitana sur de Barcelona al implantar el programa Código Infarto. Rev Esp Cardiol. 2013;65:911-8.
19 Peral V, Carrillo A, Bethencourt A, Fiol M, Gómez-Jaume A, Alameda M, et al. Modelo de intervención coronaria percutánea primaria en las Islas Baleares. Rev Esp Cardiol. 2011;11(Supl C):35-43.
20 Moreu J, Espinosa S, Canabal R, Jiménez-Mazuecos J, Fernández-Vallejo V, Cantón T, et al. Modelo de intervención coronaria percutánea primaria en la Comunidad de Castilla-La Mancha. Rev Esp Cardiol. 2011;11(Supl C):61-8.
21 Díaz JF, de la Torre JM, Sabaté M, Goicolea J. Registro Español de Hemodinámica y Cardiología Intervencionista. XX Informe Oficial de la Sección de Hemodinámica y Cardiología Intervencionista de la Sociedad Española de Cardiología (1990-2010). Rev Esp Cardiol. 2011;64:1012-22.
22 García B, Rumoroso JR, Hernández F, Trillo R. Registro Nacional de Actividad en Cardiología Intervencionista. XXIV Informe Oficial de la Sección de Hemodinámica y Cardiología Intervencionista de la Sociedad Española de Cardiología (1990-2012). Rev Esp Cardiol. 2013;66:894-904.
23 Curós A, Ribas N, Baz JA, Serra J, Fernández E, Oriol R, et al. Estrategias para reducir el tiempo de reperfusión en el tratamiento con angioplastia primaria. Rev Esp Cardiol. 2009;9(Supl.):34C-45C.
24 Armstrong PW, Gershlick AH, Goldstein P, Wilcox R, Danays T, Lambert Y, et al. STREAM Investigative Team. Fibrinolysis or primary PCI in ST-segment elevation myocardial infarction. N Engl J Med. 2013;368:1379-87.
25 Campaña de concienciación 'Los segundos cuentan, salva una vida' en Cataluña. Actividades de Stent for Life. 13/08/2012. (Consultado 10 Julio 2013). Disponible en: http://www.secardiologia.es/practica-clinica-investigacion/stent-for-life/actividades-sfl/4279-arranca-campana-concienciacion-los-segundos-cuentan-salva-una-vida-en-cataluna#

Análisis de tiempos en los pacientes trasladados por el SAMU para intervención coronaria percutánea primaria en el primer año de instauración del Código Infarto en el Principado de Asturias

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Objetivos: Evaluar el grado de cumplimiento de los objetivos de tiempo establecidos en Asturias para angioplastia primaria y comprobar diferencias entre pacientes atendidos directamente por el servicio de atención médica urgente (SAMU) y aquéllos atendidos previamente en hospitales sin laboratorio de hemodinámica.

Método: Estudio observacional descriptivo trasversal de los Código Infarto (CI) gestionados por el SAMU-Asturias en 2012. Se establecen dos grupos: pacientes atendidos a nivel prehospitalario (G1), y atendidos previamente en hospitales sin hemodinámica (G2). Se comparan los tiempos de demora entre inicio de síntomas, primer contacto médico, activación del CI e inflado del balón.

Resultados: Se analizaron 359 casos (238 del G1 y 121 del G2). El retraso medio desde primer contacto médico e inflado del balón fue de 88,9 minutos, 87,7% de los pacientes con tiempo inferior o igual a 120 minutos (93,3% del G1 y 76,7% del G2). En los pacientes que consultaron en las 2 primeras horas de síntomas, el retraso medio fue de 87,8 minutos, 58,8% de ellos con un tiempo inferior o igual a 90 minutos (70,2% del G1 y 32,3% del G2).

Conclusiones: En Asturias se están cumpliendo los objetivos de tiempo establecidos para el CI. La mejor opción para el paciente es ser atendido *in situ* por el servicio de emergencias y trasladado directamente al laboratorio de hemodinámica. Son necesarias iniciativas de divulgación que aconsejen que ante un dolor torácico de características coronarias se llame al número de emergencias sanitarias (112, 061,…). Aun así, deberían hacerse esfuerzos para acelerar el diagnóstico y traslado de los pacientes al laboratorio de hemodinámica. [Emergencias 2014;26:259-266]

Palabras clave: SCACEST. Angioplastia primaria. Retrasos. Sistema de emergencias prehospitalario.