

Part-time interventional cardiology activity as a source of inequity in the reperfusion therapy of patients with STEMI



Hemodinámica a tiempo parcial como causa de inequidad en el tratamiento de reperfusion del IAMCEST

Pablo Ramos-Ruiz,* Luciano Consuegra-Sánchez, Samantha Wasniewski, Francisco Guillermo Clavel-Ruipérez, José Domingo Cascón-Pérez, and Juan Antonio Castillo-Moreno

Servicio de Cardiología, Hospital General Universitario Santa Lucía, Cartagena, Murcia, Spain

Dear editor,

In Spain the implementation of ST-segment elevation acute myocardial infarction (STEMI) networks between 2003 and 2012 was associated to a higher rate (50%) of primary percutaneous coronary interventions (PCI) and a lower mortality rate (that dropped from 10.2% to 6.8%). However, throughout the years we have been able to witness the appearance of inevitable differences in the development and implementation of primary PCI programs among the different regions.¹ And, although these differences are slowly disappearing, some situations can generate inequity while managing reperfusion. One of these differences can be found in those interventional laboratories that only do primary PCIs part-time ignoring the recommendations from the European Society of Cardiology that establishes that primary PCI-capable centers should conduct this procedure on a 24/7 schedule and categorizes other healthcare models as "non-desirable".²

Thus, given the limited availability of our hospital interventional laboratory (from 8 AM through 3 PM only on business days), we decided to explore the in-hospital mortality rate of patients with STEMI who received primary PCIs in our center and compare it to that of patients who received another reperfusion therapy (primary PCI at the regional reference center or fibrinolysis).

Our hemodynamic laboratory provides healthcare to nearly 400 000 inhabitants. Whenever a patient suffers a STEMI on business hours he is transferred to the interventional suite and undergoes a primary PCI. Outside this schedule, the management of the patient is heterogeneous (primary PCI in the reference hospital, which is 50 kilometers away, or fibrinolysis) and it is the interventionist on call at the reference hospital who, based on recommendations from the regional network on the management of STEMI, will pick one modality or the other. This situation is exceptional in our country³ which is why we think it deserves some analysis.

We conducted a retrospective study of all the patients in our unit with a diagnosis of STEMI from January 2014 through September 2016 who had received reperfusion therapy. We categorized them into two groups: those who had received a primary PCI at our hospital (the so-called "in situ PCI" group), and those who had already received a different reperfusion strategy, whether a

primary PCI at the reference hospital or fibrinolysis (the so-called "other reperfusion" group). The main study hypothesis was that in-hospital all-cause mortality can be different based on the possibility to conduct primary angioplasties at our center. We conducted logistic regression analysis adjusted by age, Killip class, shock or out-of-hospital cardiac arrest, diabetes, or chronic renal disease.

Out of the 459 patients included, 174 were categorized into the "in situ PCI" group, and 285 into the "other reperfusion" group (139 of these patients underwent fibrinolysis, and 146 underwent a primary PCI at the reference hospital). Both cohorts were similar when it comes to the main clinical variables (table 1). Thirty-three in-hospital deaths were reported (7.2%; 95% confidence interval [95%CI], 5.2-9.9). The "in situ PCI" group had lower in-hospital mortality rates compared to the "other reperfusion" group (4.0% versus 9.1%; $P = .040$). Mortality was particularly high in the latter group of patients compared to those who underwent

Table 1. Basal characteristics of the sample based on the reperfusion modality

	<i>In situ</i> PCI group (n = 174)	Another reperfusion group (n = 285)	<i>P</i> value
Age, years	63.8 ± 12.8	62.6 ± 13.2	.35
Women, n (%)	33 (19)	63 (22.1)	.42
DM, n (%)	56 (32)	72 (25.3)	.109
CKD, n (%)	26 (14.9)	42 (14.7)	.95
LVEF, %	51.5 ± 11.2	50.8 ± 11.2	.56
Killip class ≥ II, n (%)	38 (22.4)	53 (18.8)	.36
CA, or shock, n (%)	19 (10.9)	26 (9.1)	.53
In-hospital mortality, n (%)	7 (4)	26 (9.1)	.040

DM, diabetes mellitus; CKD, chronic kidney disease; LVEF, left ventricular ejection fraction; PCI, percutaneous coronary intervention (primary); CA, cardiac arrest.

* **Corresponding author:** Servicio de Cardiología, Hospital General Universitario Santa Lucía, Mezquita s/n, 30202 Santa Lucía, Cartagena, Spain. E-mail address: pablo.ramos1989@gmail.com (P. Ramos-Ruiz).

Online: 09-05-2019.

<https://doi.org/10.24875/RECICE.M19000019>

2604-7322 / © 2019 Sociedad Española de Cardiología. Published by Permanyer Publications. This is an open access journal under the CC BY-NC-ND 4.0 license.

fibrinolysis (12.2%). Receiving the primary PCI at our center was associated with a significant reduction of the risk of in-hospital mortality (adjusted RR, 0.238; 95%CI, 0.055-0.600; $P = .004$; C-statistic = 0.90; Hosmer-Lemeshow test = 0.74) even after re-sampling.

Most interventional laboratories are open for business 24/7; the so-called "business hour" schedule is something exceptional. However, we did not find any studies like the one we conducted that evaluated whether there are in-hospital mortality differences depending on the reperfusion modality used in this context. Maybe the potential benefit seen in the *in situ* primary PCI compared to other reperfusion modality had to do with the advantages of primary PCI versus fibrinolysis,⁴ and the fact that the procedure was conducted in the same hospital rather than the reference hospital after the transfer of the patient.⁵ One of the limitations of our study was the fact that reperfusion times were not available. Our data suggest that in populations whose hospital has one interventional laboratory available by limited time there may be differences in STEMI-induced mortality that may have to do with the

different reperfusion modality used, which would confirm the "non-desirable" category of this healthcare model.

REFERENCES

1. Cequier A, Ariza-Solé A, Elola FJ, et al. Impacto en la mortalidad de diferentes sistemas de asistencia en red para el tratamiento del infarto agudo de miocardio con elevación del segmento ST. La experiencia de España. *Rev Esp Cardiol.* 2017;70:155-161.
2. Ibáñez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J.* 2018;39:119-177.
3. Íñiguez Romo A, Bertomeu Martínez V, Rodríguez Padial L, et al. Proyecto RECALCAR. La atención al paciente en las unidades de cardiología del Sistema Nacional de Salud, 2011-2014. *Rev Esp Cardiol.* 2017;70:567-575.
4. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. *Lancet.* 2003;361:13-20.
5. Kawecki D, Gierlotka M, Morawiec B, et al. Direct Admission Versus Interhospital Transfer for Primary Percutaneous Coronary Intervention in ST-Segment Elevation Myocardial Infarction. *JACC Cardiovasc Interv.* 2017; 10:438-447.