

## Letters to the Editor

**Comments on the Long-term Prognosis of Patients With Non-ST-segment Elevation Acute Myocardial Infarction and Coronary Arteries Without Significant Stenosis**



**Comentarios al pronóstico a largo plazo de pacientes con infarto agudo de miocardio sin elevación del segmento ST y arterias coronarias sin estenosis significativa**

**To the Editor,**

We have read the article published by Redondo-Diéguez et al<sup>1</sup> with interest. Our reading of this article has prompted us to offer a few comments.

In 2010, we published the results of the GYSCA Registry,<sup>2</sup> analyzing the relevance of hospital type (tertiary care or secondary care) in the approach to Non-ST-segment elevation acute coronary syndrome (NSTEMACS) and its prognosis. Data from this registry, including those referring to patients with no significant lesions (SL), have been presented at scientific meetings.

The GYSCA study was a prospective registry of 1133 consecutive patients admitted to 15 Spanish hospitals for NSTEMACS. The prevalence of coronary angiographies without SL was 14.8%. At discharge, these patients received fewer treatments for secondary prevention. The incidence of major cardiac events was lower (2.5% vs 14%;  $P < .001$ ) (Figure 1A). There were no cardiac-related deaths in this group of patients. With respect to the events evaluated in the study by Redondo-Diéguez et al<sup>1</sup> (death or readmission due to acute coronary syndrome), the incidence in the GYSCA registry was 4.1% vs 11.2% ( $P = .042$ ) (Figure 1B). This follow-up (1 year) was shorter than that in the study by Redondo-Diéguez et al<sup>1</sup> (4.8 years), although, importantly, GYSCA was a prospective study with minimal losses to follow-up.

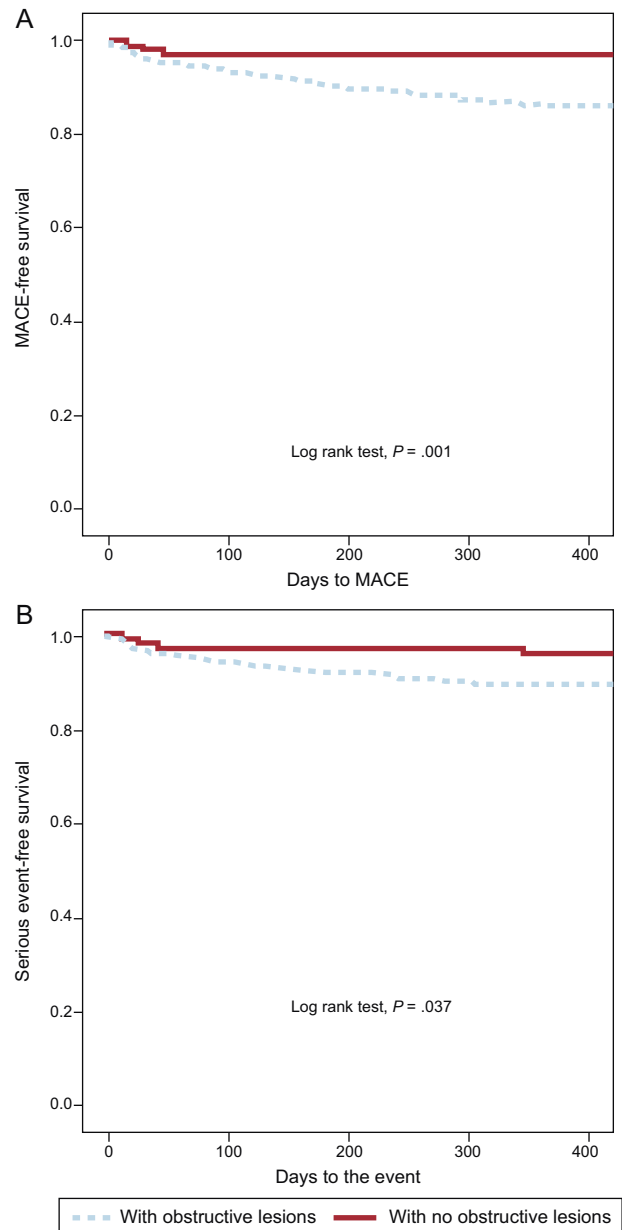
We also analyzed prognostic differences according to the extent of coronary artery disease. The mortality rate was very similar in patients with no SL and in those with single-vessel disease (Figure 2).

We consider that the prognosis of patients with no SL should focus on coronary events and cardiac death, since overall mortality does not faithfully reflect the contribution of coronary artery disease to prognosis. Our study showed a better outcome in this population, a finding that coincides with that of Cortell et al,<sup>3</sup> who observed that rates of death and myocardial infarction at 3 years were lower among patients with non-ST-segment elevation myocardial infarction without SL (6% vs 27%;  $P = .0001$ ). Other studies have also demonstrated a favorable prognosis in the absence of SL, but there is a lack of agreement on the benign nature of the condition, as most authors report a small percentage of recurrent events, especially if there are irregularities in the coronary angiogram.

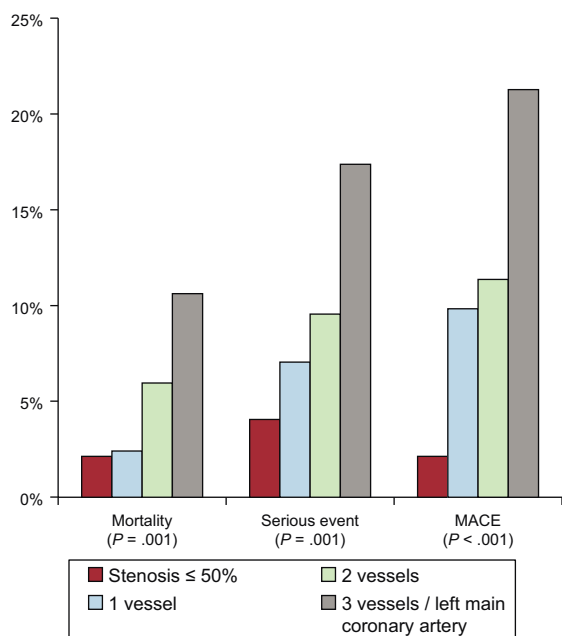
The frequency of NSTEMACS without SL ranges from 8.6% to 14%. These differences may depend on the characteristics of the study populations (NSTEMACS with or without biomarker elevation) and on the definition of insignificant lesions (normal coronary arteries or stenosis  $\leq 50\%$ ).

Moreover, the pathophysiological mechanism of the ischemic event does not always involve rupture of an atheromatous plaque. The difficulty lies in correct determination of the cause, which will enable treatment optimization. The prognosis of those patients

with arteriosclerotic disease who undergo spontaneous reperfusion is probably similar to that of individuals with "culprit" lesions. The absence of obstruction could be mistaken for the absence of disease and result in fewer measures being taken for secondary prevention, thus exposing the patient to a higher risk of event occurrence. In fact, in the study by Redondo-Diéguez et al<sup>1</sup> and the GYSCA<sup>2</sup> registry, the administration of treatments with a class I indication for secondary prevention was less widespread among individuals with no SL.



**Figure 1.** A: Kaplan-Meier survival curves for major adverse cardiac events (cardiac death + acute coronary syndrome + revascularization). B: Kaplan-Meier survival curves for serious events (death + acute coronary syndrome). MACE, major adverse cardiovascular events.



**Figure 2.** Risk of events at 1 year according to the extent of coronary artery disease. MACE, major adverse cardiovascular events (cardiac death + acute coronary syndrome + revascularization); Serious event (death + acute coronary syndrome).

In view of the above, it is essential to establish a correct etiological diagnosis. This can be based on techniques such as intravascular ultrasound, optical coherence tomography, or coronary computed tomography angiography, which aid in the identification of arteriosclerosis, or magnetic resonance, which reveals areas of subendocardial fibrosis corresponding to necrosis.

With the application of these techniques, acute coronary syndrome without SL should now be less of an enigma. However,

their use is limited by their lack of universal availability, their cost, and the added workload. Consequently, many Spanish patients are discharged from hospital without an accurate diagnosis and even worse—without proper treatment to minimize the risk of new ischemic events.

Teresa Lozano Palencia,<sup>a,\*</sup> Juan M. Ruiz-Nodar,<sup>a</sup> Ángel Cequier-Fillat,<sup>b</sup> and César Morís de la Tassa<sup>c</sup> on behalf of the GYSCA registry investigators

<sup>a</sup>Servicio de Cardiología, Hospital General Universitario de Alicante, Alicante, Spain

<sup>b</sup>Servicio de Cardiología, Hospital Universitario de Bellvitge, L'Hospitalet de Llobregat, Barcelona, Spain

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

\* Corresponding author:

E-mail address: [tereloz@yahoo.es](mailto:tereloz@yahoo.es) (T. Lozano Palencia).

Available online 27 May 2015

## REFERENCES

- Redondo-Diéguez A, Gonzalez-Ferreiro R, Abu-Assi E, Raposeiras-Roubin S, Saidhodjayeveva O, López-López A, et al. Pronóstico a largo plazo de pacientes con infarto agudo de miocardio sin elevación del segmento ST y arterias coronarias sin estenosis significativa. *Rev Esp Cardiol.* 2015;68:777–84.
- Ruiz-Nodar JM, Cequier A, Lozano T, Fernández-Vázquez F, Möller I, Abán S, et al. Impacto del tipo de hospital en el tratamiento y evolución de los pacientes con síndrome coronario agudo sin elevación del ST. *Rev Esp Cardiol.* 2010;63:390–9.
- Cortell A, Sanchís J, Bodí V, Núñez J, Mainar L, Pellicer M, et al. Infarto de miocardio sin elevación del ST y coronarias normales: predictores y pronóstico. *Rev Esp Cardiol.* 2009;62:1260–6.

### SEE RELATED ARTICLES:

<http://dx.doi.org/10.1016/j.rec.2014.09.022>

<http://dx.doi.org/10.1016/j.rec.2015.04.008>

<http://dx.doi.org/10.1016/j.rec.2015.03.003>

## Comments on the Long-term Prognosis of Patients With Non-ST-segment Elevation Acute Myocardial Infarction and Coronary Arteries Without Significant Stenosis. Response



### Comentarios al pronóstico a largo plazo de pacientes con infarto agudo de miocardio sin elevación del segmento ST y arterias coronarias sin estenosis significativa. Respuesta

#### To the Editor,

First and foremost, we would like to thank Lozano et al for their interest and comments on our study.<sup>1</sup> Our objective was to analyze and compare the prognostic value of the absence or presence of stenosis on coronary angiography in patients with non-ST-segment elevation acute myocardial infarction.

On discharge, the current clinical guidelines on non-ST-segment elevation acute coronary syndrome recommend the use of risk scores, which offer prognostic information not only on new thrombotic events but also on overall mortality.<sup>2</sup> As indicated by Lozano et al, overall mortality does not reflect the possible nonstenotic underlying coronary artery disease in patients without significant coronary lesions. However, from the clinical standpoint, the prognosis for death provides relevant clinical information for

patients and their loved ones and helps to guide decisions on appropriate treatment and follow-up. This is of particular importance in patients without significant lesions who, in the absence of stenosis on coronary angiography, are usually considered to have a good prognosis. There is thus interest in emphasizing that long-term mortality in patients with non-ST-segment elevation acute myocardial infarction and no significant coronary lesions is similar to that in patients with significant coronary lesions.

To homogenize the sample and avoid a possible confounding effect of the inclusion of processes that could resemble non-ST-segment elevation acute coronary syndrome, our study included only patients with markers of myocardial damage within the range considered myocardial infarction. Thus, patients with unstable angina were excluded, unlike in the GYSCA registry.<sup>3</sup> It is plausible that the more favorable prognosis for mortality in non-ST-segment elevation acute coronary syndrome in the GYSCA registry is the result of better prognosis in patients with unstable angina compared with those with non-ST-segment elevation acute myocardial infarction.

We used propensity score matching to ensure that patients with no significant coronary lesions and those with significant coronary lesions were comparable and to control for differences in baseline characteristics in the prognosis. The statistical analysis was conducted in the paired cohort with the intention of