

Scientific letters

Prognostic Impact of Primary Percutaneous Coronary Intervention in the Very Elderly STEMI Patient: Insights From the Codi Infart Registry



Impacto pronóstico del intervencionismo coronario percutáneo primario en el paciente muy anciano: datos del registro Codi Infart

To the Editor,

The incidence of acute myocardial infarction (AMI) in elderly individuals is high.¹ This population has higher rates of complications and represents a greater burden on health resources.^{2,3} Moreover, elderly individuals are underrepresented in clinical trials. A few randomized trials on reperfusion in elderly patients with AMI have included patients aged around 80 years,⁴ but extrapolation of these results to the general elderly population could be limited. Information on the impact of reperfusion on very elderly patients in everyday clinical practice is also limited.

The objective of this study was to analyze the association between primary percutaneous coronary intervention and mid-term mortality in very elderly patients with AMI and ST-elevation AMI (STEMI) attended in clinical practice after implementation of a regional program (June, 2009, Codi Infart). Two cohorts were studied. The first was a retrospective cohort of consecutive patients aged 80 years or more with STEMI who were not reperfused or who underwent fibrinolysis in tertiary hospitals (between 2005 and 2009). The second was a prospective cohort of consecutive patients aged 80 years or older with STEMI who underwent primary percutaneous intervention between 2010 and 2011, drawn from

the regional Codi Infart network (which covers all of Catalonia). The main baseline clinical characteristics, in-hospital outcome, and mortality during 24 months of follow-up were recorded. Mortality in the retrospective cohort was obtained by examination of the medical records. In the Codi Infart cohort, mortality registries were used. Patients in both cohorts were stratified into 3 age groups: 80 to 84 years, 85 to 90 years, and >90 years.

Quantitative variables were compared with the Mann-Whitney *U* test. Categorical variables were compared using the chi-square test. For analysis of the association between primary percutaneous coronary intervention and mid-term mortality, the Cox regression method was used. The models included potential confounding variables with significant association with both exposure (Codi infarct-derived cohort) and effect (mortality). Comparison of survival between the 2 cohorts was performed separately for each of the 3 age groups. The survival curves were plotted using estimates derived from the fitted model.

In total, 669 patients were included, 171 in the retrospective cohort and 498 in the Codi Infart cohort. The mean age was 83.9 years. No statistically significant differences in age, sex, or prevalence of the main concurrent illnesses were seen between the 2 groups: the only difference of note was a greater trend toward a higher prevalence of diabetes mellitus and prior AMI in the retrospective cohort (Table). Higher prevalences of Killip class III/IV and incidences of ventricular and atrial fibrillation during admission were observed among patients in the retrospective cohort. Mortality during both admission to hospital and follow-up was significantly greater in the retrospective cohort (median follow-up, 24 months; interquartile range, 2–24 months).

Table
Clinical Characteristics, Management, and Outcome by Cohort

	Retrospective cohort (n = 171)		Codi Infart cohort (n = 498)		Total (n = 669)		P
	Patients, n		Patients, n		Patients, n		
Age, mean $\pm$ SD, y	171	83.8 $\pm$ 3.7	498	83.8 $\pm$ 3.2	669	83.8 $\pm$ 3.3	.488
Age groups	171		498		669		
80–84 y		120 (70.2)		322 (64.7)		442 (66.1)	
85–90 y		38 (22.2)		143 (28.7)		181 (27.1)	
> 90 y		13 (7.6)		33 (6.6)		46 (6.8)	
Female sex	171	81 (47.4)	498	229 (46)	669	310 (46.3)	.754
Diabetes mellitus	171	58 (33.9)	498	138 (27.7)	669	196 (29.3)	.124
Prior AMI	171	30 (17.5)	498	67 (13.5)	669	97 (14.5)	.190
Prior PCI	171	8 (4.7)	498	37 (7.4)	669	45 (6.7)	.215
Prior CABG	171	2 (1.2)	498	7 (1.4)	669	9 (1.3)	.817
Anterior site	170	88 (51.8)	471	256 (54.4)	641	344 (53.7)	.562
Killip III–IV	39	39 (23.6)	65	65 (13.1)	104	104 (15.7)	.002
Fibrinolysis	171	41 (24)	498	0 (0)	669	41 (6.1)	.001
Coronary angiography	171	89 (52)	498	498 (100)	669	587 (87.7)	.001
Ventricular fibrillation	15	15 (8.8)	18	18 (3.6)	33	33 (4.9)	.012
Atrial fibrillation	21	21 (12.3)	28	28 (5.6)	49	49 (7.3)	.004
AVB	21	21 (12.3)	56	56 (11.2)	77	77 (11.5)	.714
In-hospital mortality	171	35 (20.5)	498	44 (8.8)	669	79 (11.8)	.001
Mortality during follow-up	167	108 (64.7)	498	181 (36.3)	665	289 (43.5)	.001

AMI, acute myocardial infarction; AVB, atrioventricular block; CABG, coronary artery bypass grafting; PCI, percutaneous coronary intervention. Unless otherwise indicated, values expressed as no. (%).

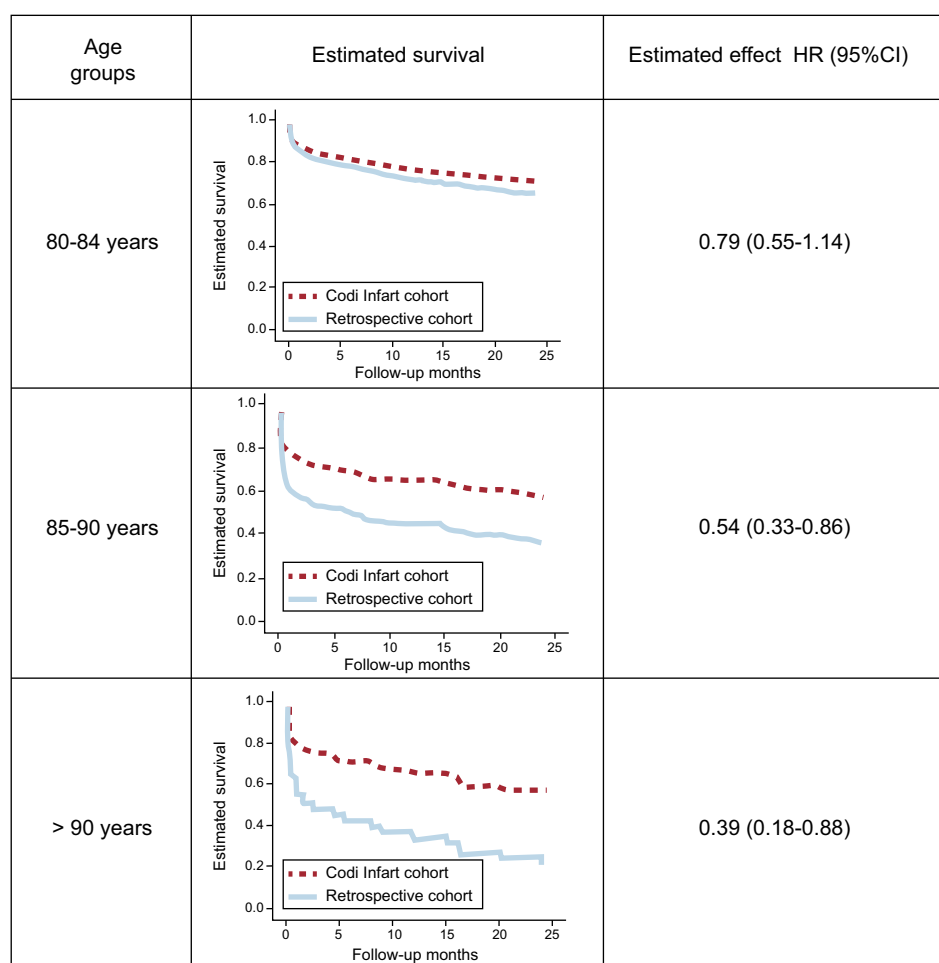


Figure. Survival curves of the cohorts by age group. HR: hazard ratio.

The **Figure** shows changes in mortality during follow-up for the 3 age groups (80–84 years, 85–90 years, and > 90 years). Patients in the Codi Infart cohort had lower mortality in all age groups; these differences were statistically significant for the 85 to 90 year and >90 year age groups.

Among the patients in the first period, those who underwent fibrinolysis had significantly lower mortality than those who were not reperfused (hazard ratio [HR], 0.48; 95% confidence interval [95%CI], 0.25–0.92; $P=.026$). The small size of this group ($n = 41$) did not allow a separate analysis by age group.

On multivariate analysis, the tertiary hospital-derived cohort was an independent predictor of mortality during follow-up (HR, 0.72; 95%CI, 0.55–0.96). The remaining predictors identified were age (HR, 1.11), female sex (HR, 0.72), diabetes mellitus (HR, 1.28), and Killip class on admission (HR, 1.88).

Therefore, the data from our study show that implementation of primary percutaneous coronary intervention was associated with a significant improvement in mortality during follow-up of elderly patients with STEMI, particularly in the case of the oldest individuals.

Our study has noteworthy limitations. Given its observational design, a selection bias for reperfusion therapy is likely, and this is likely to be particularly marked during the first period (given the clearly lower mortality within the group of patients who underwent fibrinolysis). This bias appears to be much lower during the Codi Infart period, as the data available from the IAMCAT-IV registry (a prospective registry of all STEMI in

Catalonia during a 3-month period) show a low percentage (3%) of nonreperused patients of all ages. The interesting aspect of the findings, in our opinion, is that the Codi Infart program, with a much lower selection bias, reflects a survival similar to the “best” patients from the first period (those who underwent fibrinolysis, who represented approximately 25% of the patients in the initial period). In addition, omission of relevant variables in the registry may represent a residual confounding factor. Finally, the specific causes of death and variables related to aging (frailty, functional status) would provide valuable information on the prognostic impact of the Codi Infart in this age group.

Despite these limitations, in our opinion, the data, taken from a broad cohort of elderly patients with STEMI in everyday clinical practice, indicate a decrease in mortality, particularly among the oldest patients, who have not been widely studied to date. With the progressive aging of the population, such findings are of particular importance and should be confirmed in trials designed specifically to investigate elderly patients with their particular biological characteristics.

SUPPLEMENTARY MATERIAL



Supplementary material associated with this article (list with the investigators in the Codi Infart registry) can be found in the online version available at [doi:10.1016/j.rec.2015.07.026](https://doi.org/10.1016/j.rec.2015.07.026).

Albert Ariza-Solé,^{a,*} Cinta Llibre,^b Marcos Ñato,^a Eva Bernal,^b Antoni Curós,^b and Àngel Cequier^a, on behalf of the investigators of the Codi Infart Registry

^aUnidad Coronaria, Hospital Universitari de Bellvitge, L'Hospitalet de Llobregat, Barcelona, Spain

^bServicio de Cardiología, Hospital Germans Trias i Pujol, Badalona, Barcelona, Spain

* Corresponding author:

E-mail address: aariza@bellvitgehospital.cat

(A. Ariza-Solé).

Available online 30 October 2015

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<http://dx.doi.org/10.1016/j.rec.2015.07.026>

Control of Anticoagulation With Warfarin or Acenocoumarol in Spain. Do They Differ?



Control de la anticoagulación con warfarina o acenocoumarol en España. ¿Hay diferencias?

To the Editor,

Vitamin K antagonists (VKAs) have been shown to be effective in the prevention of thromboembolic complications in distinct clinical situations, including atrial fibrillation. However, VKAs are not exactly equivalent. Genetic polymorphisms are affected differently according to the type of VKA. The CYP2C9 isoenzyme would appear to be more important for warfarin clearance than for acenocoumarol or phenprocoumon clearance.¹ Although warfarin is the most widely used VKA, in some countries, acenocoumarol or phenprocoumon are used.²

In Spain, the most widely used VKA is acenocoumarol. However, most of the available evidence on the efficacy and safety of VKAs is derived from warfarin. The results obtained with this VKA have in general been extrapolated to the other VKAs.

PAULA is a cross-sectional study whose objective was to determine the degree of anticoagulation control in the preceding 12 months in patients with nonvalvular atrial fibrillation who received anticoagulation therapy with a VKA in the primary health care setting in Spain. The degree of anticoagulation control was

determined by time in therapeutic range, using both a direct method (poor control < 60%) and the Rosendaal method (poor control < 65%).³

The objective of the present analysis was to determine whether there were differences in the clinical profile, anticoagulation control, and thromboembolic/bleeding events according to type of VKA. A total of 1524 patients were included. Of these, 79 (5.2%) were taking warfarin (1127 international normalized ratio [INR] assessments; 14.4 ± 0.12 assessments/patient) and the rest were taking acenocoumarol (94.8%). Warfarin use varied according to autonomous community: Catalonia (n = 201), 16.92%; Andalusia (n = 263), 9.89%; Galicia (n = 150), 6.67%; Balearic Islands (n = 33), 6.06%; Chartered Community of Navarre (n = 24), 4.17%; Principality of Asturias (n = 54), 3.70%; Canary Islands (n = 56), 3.57%; Aragon (n = 63), 1.59%; Region of Murcia (n = 53), 1.89%; Valencian Community (n = 123), 0.81%; and Cantabria (n = 11), Castile-La Mancha (n = 72), Castile and León (n = 58), Extremadura (n = 70), Community of Madrid (n = 206), and the Basque Country (n = 87), < 0.5%.

Except for a larger proportion of patients with diabetes mellitus among those treated with acenocoumarol, the remaining clinical characteristics were similar for both groups (Table 1). The degree of anticoagulation control was similar for both types of VKA. The number of visits both to the primary care physician and to the specialist for anticoagulation control was similar for both VKAs. Likewise, there were no differences in terms of the incidence of thromboembolic, bleeding, or cardiovascular events (Table 2).

Table 1

Baseline Characteristics of the Patients in the PAULA Study

Variables	Acenocoumarol (n = 1445)	Warfarin (n = 79)	P
Age, y	76.7 ± 0.28	76.0 ± 1.1	.15
Sex, female, %	49.7 ± 1.7	41.3 ± 5.1	.18
Hypertension, %	79.8 ± 1.3	77.5 ± 4.7	.53
Diabetes mellitus, %	33.9 ± 1.5	18.8 ± 4.4	.006
History of stroke, %	14.1 ± 1.1	10.0 ± 3.4	.32
Most recent known unstable INR, %	10.9 ± 1.0	13.8 ± 3.9	.69
History of myocardial infarction, %	9.6 ± 1.0	6.3 ± 2.7	.30
History of bleeding episodes, %	8.6 ± 0.9	6.3 ± 2.7	.41
History of kidney failure, %	6.5 ± 0.8	7.5 ± 3.0	.57
History of left ventricular dysfunction, %	5.9 ± 0.8	6.3 ± 2.7	.77
History of alcoholism, %	3.1 ± 0.6	6.3 ± 2.7	.37
History of thromboembolism episodes, %	3.9 ± 0.6	1.3 ± 1.3	.20
History of liver failure, %	1.9 ± 0.4	1.3 ± 1.2	.81

INR: international normalized ratio.