

Scientific letters

Therapeutic Strategy in Patients With Severe Anemia Admitted for Non–ST-segment Elevation Acute Coronary Syndrome and Prognostic Impact



Actitud terapéutica ante pacientes con anemia grave ingresados por síndrome coronario agudo sin elevación del segmento ST e impacto pronóstico

To the Editor,

In recent years, the use of invasive strategies has become the generalized approach in the management of patients with acute coronary syndrome, not only those with ST-segment elevation, but also in those with non–ST-segment elevation (NSTEMACS). An invasive strategy is justified by the associated prognostic benefit due to reduced mortality.^{1,2} However, the benefits of an invasive approach in NSTEMACS are not all that clear in certain subgroups in which the risks and consequences of percutaneous coronary intervention (PCI) can outweigh the benefit associated with revascularization.³ One of the groups in which the benefit of an invasive approach is not clear is the population with significant anemia. In these patients, aggressive antithrombotic therapy associated with an invasive approach can produce deleterious effects, exacerbate the severity of anemia and, consequently, decrease oxygen delivery to tissue with an already reduced oxygen supply. A number of studies have demonstrated the independent negative prognostic value of anemia in acute coronary syndrome, which has been proposed as a variable to be taken into account in mortality risk stratification in these patients.^{4,5} In this context, we describe our experience in the management of patients hospitalized for NSTEMACS with hemoglobin levels < 10 g/dL on admission.

For this purpose, we used data from the CardioCHUS Registry, which includes 5443 acute coronary syndrome patients consecutively admitted to Hospital Clínico de Santiago in northwestern Spain (2003–2012); 3689 were admitted with NSTEMACS, 765 of

whom (20.7%) had anemia at admission (hemoglobin < 12 g/dL in women and < 13 g/dL in men); 109 (2.9%) had severe anemia, defined as hemoglobin levels < 10 g/dL. The main baseline characteristics of these patients are summarized in the Table. In comparison with those without severe anemia, patients with hemoglobin < 10 g/dL were older (mean age [standard deviation], 73.6 [SD,10.2] years vs 67.5 [SD,12.2] years; $P = .001$) and had a higher prevalence of diabetes mellitus (59.6% vs 29.2%; $P < .001$), hypertension (72.5% vs 60.3%; $P = .010$), and peripheral arterial disease (23.9% vs 10.3%; $P < .001$), poorer renal function (mean creatinine level, 1.8 [SD,1.1] mg/dL vs 1.1 [0.6] mg/dL; $P < .001$), and worse functional class (Killip ≥ 2 , 43.1% vs 15.3%; $P < .001$). On admission, there was evidence of active bleeding in 33 patients (30.3%) (the origin was gastrointestinal in 23, urinary in 6, and respiratory in 4), and 58 patients required at least 1 transfusion.

Of the 109 patients with NSTEMACS and hemoglobin < 10 g/dL, 75 patients (68.8%) underwent cardiac catheterization. No significant differences were found between the patients who underwent an invasive strategy and those receiving conservative treatment (without catheterization) in terms of age, sex, the incidence of diabetes mellitus, hypertension, dyslipidemia, chronic renal failure, peripheral arterial disease, or mean hemoglobin level. Thirty-five patients underwent PCI, 32 with implantation of a conventional stent and 2 with a drug-eluting stent; only 1 patient underwent simple angioplasty. The management of the patients with severe anemia was most often conservative (without catheterization, 31.2% vs 21.0% of the patients with mild anemia vs 10.4% of those without anemia; $P < .001$), and PCI was less widely performed (32.1% vs 45.3% of the patients with mild anemia and vs 53.7% of the patients without anemia; $P < .001$).

Regarding drug therapy, on admission, 99 patients (90.8%) were prescribed acetylsalicylic acid, 70 (64.2%) clopidogrel, 57 (52.3%) beta-blockers, 50 (45.9%) angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers, and 79 (72.5%) statins. Low-molecular-weight heparin was used in 76 patients (69.7%), unfractionated heparin in 16 (14.7%), and fondaparinux in 12 (11.0%). Dual antiplatelet therapy was initiated on admission in 67 patients (61.5%), although only 34 (31.2%) continued taking 2 antiplatelet agents at discharge and 42 (38.5%) were taking 1. Twelve patients (11.0%) left the hospital with a prescription for oral anticoagulation therapy.

There were 13 in-hospital deaths (11.9%). Mortality was higher in patients with severe anemia than in those with mild anemia (8.4%) or without anemia (2.8%); 14 patients (12.8%) experienced heart failure during their hospital stay and another 14 (12.8%) had refractory angina. The performance of PCI had no significant impact on in-hospital mortality (odds ratio [OR] = 0.40; 95% confidence interval [95%CI], 0.09–1.83; $P = .239$) or on the combination of death, heart failure, and refractory angina (OR = 0.45; 95%CI, 0.29–1.75; $P = .450$).

Of the 96 patients who were discharged from the hospital, half ($n = 48$) died during follow-up (2.8 [2.5] years), 20 (20.8%) had a reinfarction, and 32 (33.3%) experienced heart failure. In the univariate analysis, the performance of PCI was associated with a lower mortality rate during follow-up (hazard ratio [HR] = 0.49; 95%CI, 0.25–0.94; $P = .032$); however, this significance was lost after

Table

Baseline Characteristics of the Patients Hospitalized With Non–ST-Segment Elevation Acute Coronary Syndrome and Hemoglobin Levels Less Than 10 g/dL at Admission

Age, mean (SD), y	73.6 (10.2)
Women	35.8
Hypertension	72.5
Dyslipidemia	51.4
Diabetes mellitus	59.6
Peripheral arterial disease	23.9
Chronic renal failure	38.5
Previous myocardial infarction	19.3
History of atrial fibrillation	20.2
Killip class \geq II	43.1
Troponin I, mean (SD), ng/mL	8.0 (11.2)

SD, standard deviation.

Data are expressed as no. (%) or mean (standard deviation).

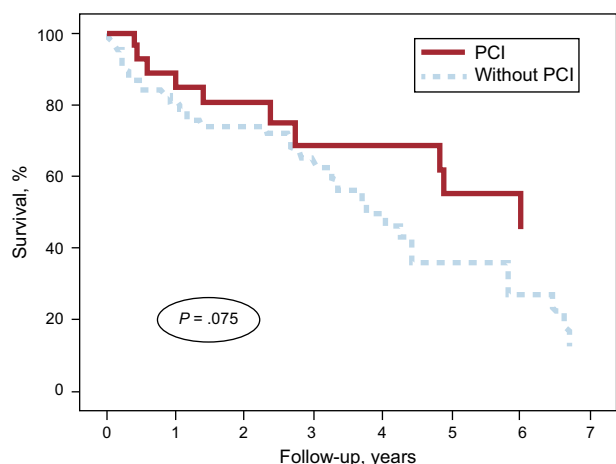


Figure. Survival curves for patients with non-ST-segment elevation acute coronary syndrome and severe anemia (hemoglobin < 10 g/dL) at admission, stratified according to whether or not they had undergone PCI, and after adjustment for the GRACE score at discharge. GRACE, Global Registry of Acute Coronary Events; PCI, percutaneous coronary intervention.

adjustment for the GRACE (Global Registry of Acute Coronary Events) score at hospital discharge, and a trend toward a lower mortality rate persisted (HR = 0.52; 95%CI, 0.26–1.07; $P = .075$) (Figure).

Thus, we conclude that, in routine clinical practice, it is not uncommon to encounter patients admitted for NSTEMACS who have severe anemia (3 out of every 100), a comorbidity that will influence the treatment of the coronary event, and most patients are undertreated with respect to currently recommended drug therapy. The prognosis of these patients is frankly poor, with a mortality rate higher than 10% during the hospital stay and greater than 50% at 3 years. The interventional strategy has not been

shown to reduce the high in-hospital mortality rate in this patient population, although there is a trend toward a reduction in long-term mortality.

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Early Treatment of Refractory Cardiogenic Shock With Percutaneous Veno-arterial ECMO Implanted in the Cardiac Catheterization Laboratory



Tratamiento precoz del shock cardiogénico refractario mediante implante percutáneo de ECMO venoarterial en el laboratorio de hemodinámica

To the Editor,

Circulatory support devices such as veno-arterial extracorporeal membrane oxygenation (VA-ECMO) help maintain hemodynamic support and adequate tissue oxygenation, and form part of the therapeutic armamentarium in cardiac arrest and refractory cardiogenic shock.^{1–3} Percutaneous implantation is less invasive than the approach used in other short-term devices, with femoral cannulation most commonly used due to its simplicity and speed.⁴ VA-ECMO can be used as a bridge to recovery or to the decision for a long-term ventricular assist device or heart transplantation. It is in widespread use,³ and experience continues to increase in adult patients in Spain,⁵ where the sole alternative is cardiac surgery.

It is well known that early treatment with appropriate circulatory support is vital in patients with cardiogenic shock.^{1–3} For this reason, in July 2013 we set up a transfemoral percutaneous ECMO implantation program in nonsurgical patients with refrac-

tory cardiogenic shock at our hospital. The interventional cardiologist implanted the CARDIOHELP™ system (MAQUET Cardiopulmonary AG, Germany) in all patients in the cardiac catheterization laboratory, and inpatient care then continued in the cardiac intensive care unit. This article describes the baseline patient characteristics; the indications, duration and management of circulatory support; and progress at follow up.

Between July 2013 and April 2014 VA-ECMO was implanted in 4 consecutive patients with refractory cardiogenic shock, INTERMACS level 1 (critical cardiogenic shock).⁶ Three of these patients had cardiogenic shock following an anterior, inferior and right ventricular myocardial infarction, respectively, and the fourth had a refractory cardiac arrest secondary to an anterior infarction. The baseline characteristics and the clinical progress of the 4 patients are described in the Table. The mean (standard deviation) age was 54.5 (7.4) years. Three patients were male. The mean left ventricular ejection fraction before ECMO implantation was 10% (5%) (n = 3) and the fourth patient had severe right ventricular dysfunction. The decision to implant VA-ECMO was made in the cardiac catheterization laboratory due to poor clinical outcome of the primary percutaneous coronary intervention. An interventional cardiologist performed the cannulation. Implantation was successful in all cases and the mean time to pump initiation was 14 (8–20) minutes. At 24 hours postcannulation, lactic acid levels had dropped from a precannulation baseline of 8.4 (1.7) mmol/L to 2.3 (1) mmol/L ($P < .001$). All patients had previously