Table 1 (Continued) Patient characteristics according to systolic strain phenotype in the polar map

<table>
<thead>
<tr>
<th>Clinical, demographic, and echocardiography parameters</th>
<th>Overall population (n = 92)</th>
<th>RELAPS &lt; 1 (n = 53)</th>
<th>RELAPS &gt; 1 (n = 39)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVGmax nanometers mmHg</td>
<td>51.9 ± 14.2</td>
<td>48.9 ± 13.2</td>
<td>55.9 ± 14.9</td>
<td>.020</td>
</tr>
<tr>
<td>AET, ms</td>
<td>333.3 ± 37.5</td>
<td>340.2 ± 38.0</td>
<td>324.4 ± 35.3</td>
<td>.053</td>
</tr>
</tbody>
</table>

AET, aortic ejection time; AF, atrial fibrillation; AS, average peak systolic longitudinal strain of the apical segments; AVGmax, peak aortic valve gradient; AVGmax mean aortic valve gradient; AYA, aortic valve area; basal LS, average peak systolic longitudinal strain of the basal segments; BMI, body mass index; CFH, chronic kidney failure; COPD, chronic obstructive pulmonary disease; DL, dyslipidemia; DM, diabetes mellitus; DT, E-wave transmural deceleration time; E/E', ratio of early mitral inflow E-wave to pulse-wave tissue Doppler mitral annular E' wave; ECC IN, eccentricity index (IVSD/PWTd ratio); GLS, global longitudinal strain; HF, prior admission due to heart failure; HTN, hypertension; IVSd, interventricular septal thickness at end diastole; LAVI, indexed left atrial volume by biplane area-length method; LVEDD, LV end-diastolic diameter; LVEDV, LV end-diastolic volume; LVESV, LV end-systolic volume; MCF, myocardial contraction fraction (ratio of stroke to myocardial volume, ie, LV mass ratio/1.055); myocardial density; mid LS, average peak systolic longitudinal strain of the mid segments; MI, history of myocardial infarction; MWT, maximum wall thickness; PWTd, posterior wall thickness at end diastole; RWT, relative wall thickness (2*PWTd/LVEDD); S', S' wave of the lateral mitral annulus with pulse-wave tissue Doppler; stroke, history of ischemic stroke; Ymax, peak aortic jet velocity.

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

Table 1 lists the baseline characteristics of the entire cohort analyzed with myocardial deformation parameters and the differences between the RELAPS < 1 and > 1 subgroups. In patients able to undergo strain analysis (n = 92), average GLS was −15.1%; 39 patients (42%) showed RELAPS value > 1; 82 (89%) patients had an SAB ratio > 2.1, and 39 (42%) had EFSR > 4.1.

Figure 1B shows patient distribution according to these 3 LS-based indices.

No differences in clinical or demographic variables were found between the groups with RELAPS < 1 or > 1. The echocardiography variables showed that the RELAPS > 1 group had significantly more severe AS and increased LV hypertrophic remodeling. No differences were found in the conventional parameters used to evaluate systolic function; however, myocardial contraction fraction was significantly lower in the group with normal apical strain. No differences were found in diastolic function parameters.

In the multivariate analysis, predictive echocardiography variables for strain with an apical sparing pattern were LV mass (OR, 1.02; 95% CI, 1.01-1.03; P = .002), LV end-systolic volume (OR, 0.97; 95% CI, 0.94-0.99; P = .014), aortic valve area (OR, 0.10; 95% CI, 0.01-0.38; P = .018), and aortic ejection (OR, 0.98; 95% CI, 0.96-0.99; P < .010). The c-statistic was 85.6% (95% CI, 76.6%-94.7%).

In our series, patients with severe symptomatic AS without CA were highly likely to exhibit strain with an apical sparing phenotype and EFSR similar to that described in CA. These findings could have relevant clinical implications, as they would not be applicable in regular clinical practice for CA screening in patients with a condition as common as severe AS.

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**Reference**


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We analyzed 1031 patients admitted to the Hospital of Cremona, the epicenter of the COVID-19 outbreak in Italy, between February 22 and April 7, 2020, and followed up until May 3, 2020.

COVID-19 pneumonia was confirmed by chest computed tomography and a SARS-CoV-2-positive real-time reverse transcriptase-polymerase chain reaction assay from nasopharyngeal swabs. Treatment protocols were based on off-label use of HCQ (400 mg twice a day on the first day and 200 mg twice a day thereafter for 10 days), as well as lopinavir/ritonavir or darunavir/ritonavir, intravenous methylprednisolone, empirical antimicrobial therapy, low-molecular-weight heparin, and supplemental oxygen.

From the hospital data warehouse, we extracted data on the admitting ward, cardiovascular risk factors and disease, drug therapies, and in-hospital outcomes. Demographic covariates (age, sex), cardiovascular covariates (smoking, hypertension, obesity, diabetes, atrial fibrillation, coronary heart disease, cerebrovascular disease, systolic dysfunction), and treatment covariates (antidiabetic agents, beta-blockers, calcium channel blockers, loop diuretics, antivirals, steroids) were tested by univariable Cox regression and those significantly associated (P < .10) with death or intensive care unit admission (combined end point) were entered in a multivariable model. Additionally, we performed weighted Cox regression using inverse probability of treatment weighted estimation with robust standard errors. A multivariable logistic regression model that included the same covariates as Cox regression was used to estimate the inverse probability of treatment weights for the individual propensities for ACEI/ARB receipt.

The institutional review board approved this retrospective analysis and waived the need for individual informed consent.

All 1031 patients received HCQ during hospitalization (table 1). Overall, 559 patients (54.2%) took ≥ 1 cardiovascular drugs (diuretics, beta-blockers, calcium channel blockers, or ACEIs/ARBs); of these, 278 (27%) received either an ACEI (135 [13.1%], 11 ± 4 mg/d enalapril equivalents) or an ARB (143 [13.9%], 64 ± 34 mg/d losartan equivalents) and 239 (86%) continued to take them throughout the hospitalization. Although patients treated with ACEIs/ARBs were older, had a higher cardiovascular comorbidity burden, and were more often taking antidiabetic agents and subject to cardiovascular polypharmacy, they had similar intensive care unit admission and mortality rates to patients not being treated with ACEIs/ARBs (table 1).

In total, 117 patients (11.3%) were admitted to the intensive care unit and 217 died (21%); 273 (27%) met the combined end point. After covariate adjustment (table 1), ACEIs/ARBs were independently associated with the combined outcome. ACEIs and ARBs conferred similarly lower risk (figure 1). The results were replicated in analysis restricted to mortality (adjusted hazard ratio [HR] for ACEIs/ARBs, 0.661; 95% confidence interval [95%CI], 0.490-0.890; P = .006) after further adjustment for the need for ventilatory support. The effects were consistent in the analysis weighted by inverse probability of treatment weighting (HR for ACEI/ARB use, 0.666; 95%CI, 0.445-0.997; P = .048).

In our hospitalized cohort treated with HCQ for COVID-19 pneumonia, ACEIs/ARBs were independently associated with a lower hazard of mortality or severe disease requiring intensive care unit admission. ACEI or ARB receipt was balanced and both, administered at relatively high doses, had a similar impact on outcome. The findings were confirmed in the analysis weighted by inverse probability of treatment weighting.

Recent observational studies in geographically diverse populations found no differences in the need for invasive ventilation or death in patients with SARS-CoV-2 pneumonia treated with ACEIs/ARBs. None of these studies reported on the coadministration of HCQ, which might represent a confounding factor. Moreover,
D-dimer and right ventricular abnormalities as prognostic factors in critically ill COVID-19 patients

Dímero D y alteraciones del ventrículo derecho como factores pronósticos en pacientes críticos con COVID-19

To the Editor,

Coronavirus disease 2019 (COVID-19) seems to be associated with a higher risk of myocardial injury, especially in critically ill patients. Previous definitions of acute COVID-19 cardiovascular syndrome have been heterogeneous, and therefore its true incidence, clinical relevance and prognostic impact remain unclear. The aim of this study was to analyze echocardiographic abnormalities and biomarkers in COVID-19 patients requiring intensive care and their association with 30-day survival.

Observational, prospective cohort study of patients admitted to the intensive care unit (ICU) of Hospital Universitario La Paz (Madrid, Spain) with confirmed COVID-19 infection and acute respiratory distress syndrome between March 1 and April 8, 2020. We analyzed serum biomarkers in all patients. Following current recommendations, a focused cardiac ultrasound study was performed by accredited cardiologists. The main outcome was 30-day survival. Major cardiovascular events during follow-up were recorded, including myocarditis, pericarditis, pulmonary embolism (PE), and ventricular arrhythmias. The patients were followed up until hospital discharge or death. The study was conducted in compliance with the Declaration of Helsinki and was approved by the ethics committee of our institution.

Fifty-two patients were included (table 1), and the median follow-up was 46 [22–54] days. The most common findings in our study were right ventricular (RV) abnormalities, mainly RV systolic