treatment was similar to the reported findings in ischemic heart disease and data from other countries. This difference does not seem to be related only to "competing risk".[4] It is likely that patients reduced their physical activity during the state of alarm and, therefore, their probability of experiencing symptoms. In addition, those with mild symptoms were less likely to seek medical assessment. This could explain the lower pacemaker implantation rate in asymptomatic and presyncope patients. The disruption of ambulatory activity may also have limited the possibility to attain a prompt diagnosis in patients with mild conduction disorders, which could explain the relative increase in implants for cAVB. These findings should be taken into account in future COVID-19 waves to improve organization during crises by maintaining essential outpatient activity and fostering public confidence that all areas of the health system are safe against contagion.

Acknowledgements

The coordinators of this study express their sincere gratitude to the researchers who collaborated by collecting and sending data from their respective centers: Francisco de Asís Díaz Cortegana, Javier García Seara, Julia Martínez Solé, Pablo Ávila Alonso, Luis Borrego Bernanbé, José María González Rebollo, Ernesto Díaz Infante, Óscar Alcalde Rodríguez, Josep Navarro Manchón, Francisco Javier García Fernández, José Manuel Rubio Campal, Luis Álvarez Acosta, María del Carmen Expósito Pineda, Rosa Macías-Ruíz, Pilar Cabanas Grandío, Rubén Juárez Prera, Miguel Ángel Arias, Pablo Moriña Vázquez, Tomás Ripoll-Vera, Marta Pombo Jiménez, Fernando Cabestrero de Diego, Diego Lorente Carreño, Vicente Bertomeu González, Rafael Raso Raso, Pau Alonso Fernández and Jorge Toquero Ramos.

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Available online 30 November 2020

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https://doi.org/10.1016/j.rec.2020.10.015
1885-5857/

Surgical facemask: an ally of exercise stress echocardiography during the COVID-19 pandemic?

Mascarilla quirúrgica: ¿aliada del ecocardiograma de estrés con ejercicio durante la pandemia de la COVID-19?

To the Editor,

The American Society of Echocardiography (ASE) has recently published a document with recommendations for the reintroduction of activity in echocardiography laboratories during the coronavirus disease 2019 (COVID-19) pandemic.[1] Regarding stress echocardiography, a key diagnostic tool in patients with coronary heart disease or suspected coronary heart disease, many studies have been delayed, giving priority to the pharmacological modality over the exercise modality, following previous ASE recommendations.[2] Nonetheless, exercise stress echocardiography (ESE) provides us with very valuable information such as the patient's functional capacity and chronotropic response. The use of a surgical mask during ESE is currently recommended, since it has been shown to reduce the transmission of respiratory viruses.[3] On the other hand, its use during exercise has demonstrated a negative impact on cardiopulmonary capacity, as well as increasing the feeling of discomfort, in healthy volunteers.[4] This could lead us to inconclusive studies in our patients. The aim of our study was to assess whether the use of a surgical facemask during ESE negatively impacts on patients' functional capacity and the percentage of conclusive studies.

We conducted a retrospective analysis including those patients who came to our center to perform an ESE from the resumption of our activity on 10/04/2020 to 30/07/2020. Studies in patients with active or highly suspected severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection were cancelled. We selected those patients in sinus rhythm whose indication was diagnosis or prognostic assessment of coronary heart disease. A symptom-limited standard Bruce protocol was performed. A surgical facemask was placed on all patients to carry out the test, completely covering the nose and mouth, and was not allowed to be removed at any moment. As a control group, we used patients who attended our center to perform an ESE with equal inclusion criteria during the same period in 2019. Of a total of 212 patients, 180 (84.91%) met the inclusion criteria. An experienced echocardiographer acquired rest, peak-exercise and postexercise images. Positive ESE was defined as newly developed wall motion abnormalities during exercise. We calculated predicted MET with the formulas of Gulati [women: 14.7-(0.13 x age)] and Morris [men: 18.0-(0.15 x age)]. A study is considered conclusive when the patient reaches 85% of the age-predicted maximum heart rate. To isolate the effect of facemask use on the variables of interest (MET achieved and percentage of conclusive studies), we performed both

Table 1
Baseline characteristics of the patients

	Control group (without facemask) n = 116	COVID-19 era group (with facemask) n = 64	*P*
Female sex	46 (39.66)	28 (43.75)	.593
Age	63.65 ± 11.65	63.34 ± 9.92	.861
BMI, kg/m²	28.32 ± 3.75	27.32 ± 3.75	.090
COPD	11 (9.48)	5 (7.81)	.706
Coronary artery disease	36 (31.03)	17 (26.56)	.529
LVEF ≤ 50%	10 (8.62)	3 (4.69)	.386
Chronotropic drug	42 (36.21)	18 (28.12)	.271
Beta-blocker	40 (95.24)	15 (83.33)	
Calcium channel blocker	1 (2.38)	2 (11.11)	
Ivabradine	1 (2.38)	1 (5.56)	
Inpatient	27 (23.28)	17 (26.56)	.623
Appropiate indication	87 (75.00)	54 (84.38)	.144
Predicted MET	7.65 ± 1.92	7.61 ± 1.74	.897
Resting heart rate	77.79 ± 12.89	80.48 ± 16.15	.223
Resting systolic blood pressure	133.29 ± 19.02	132.73 ± 17.60	.847
Heart rate reserve	78.56 ± 15.35	76.17 ± 17.30	.341

BMI, body mass index; COPD, chronic obstructive pulmonary disease; LVEF, left ventricular ejection fraction; MET, metabolic equivalents; Heart rate reserve, age predicted maximum heart rate - resting heart rate.
Data are expressed as No. (%) or mean ± standard deviation.

Table 2
Data on hemodynamic, workload and test results

	Control group (without facemask) n = 116	COVID-19 era group (with facemask) n = 64	*P*
Positive ESE	19 (16.38)	9 (14.06)	.681
Peak systolic blood pressure, mmHg	173.77 ± 25.82	181.81 ± 23.69	.041*
Peak heart rate, bpm	140.72 ± 22.32	146.84 ± 19.04	.065
Double product	24 621.34 ± 6011.60	26 640.14 ± 4406.74	.019*
MET	8.76 ± 2.88	8.77 ± 2.69	.984
MET reached – MET predicted	1.12 ± 2.31	1.16 ± 2.27	.898
Patients reaching predicted MET	86 (74.14)	44 (68.75)	.440
Conclusive study	76 (65.52)	55 (85.94)	.003*

ESE, exercise stress echocardiogram; MET, metabolic equivalents; Double product, peak systolic blood pressure x peak heart rate.
Data are expressed as No. (%) or mean ± standard deviation.
* $P < .05$.

multivariate analyses adjusted for theoretical confounders (age, sex, body mass index, coronary heart disease, chronotropic treatment, chronic obstructive pulmonary disease, left ventricular ejection fraction ≤ 50%, and positive ESE result).

The total study sample consisted of 180 patients, 64 in the COVID-19 era (facemask group) and 116 in the pre-COVID-19 group (control group). Within the total sample, 74 (41.11%) were women, 53 (29.44%) had previous coronary artery disease, 13 (7.22%) had left ventricular systolic dysfunction, and the mean age was 63.54 years (standard deviation, 11.04). The baseline characteristics of the sample distributed by groups are summarized in table 1. We found no differences between the 2 groups in the analyzed variables, except for a nonsignificant trend toward a higher body mass index in the control group.

The data on hemodynamic parameters, workload and ESE results are shown in table 2. The main reason for stopping the test in both groups was muscle fatigue (75.00% facemask, 62.93% control, *P* = .09). The workload reached was very similar in both groups (8.77 MET facemask, 8.76 MET control, *P* = .984). Compared with patients with the control group, patients in the facemask group had significantly higher peak systolic blood pressure (181.81 mmHg vs 173.77 mmHg; *P* = .041) and double product (26 640 vs 24 621; *P* = .019). We obtained a higher percentage of conclusive studies in the facemask group (85.94% vs 65.52%; *P* = .003). In the multivariate analysis, the use of the mask maintained a significant positive association with the percentage of conclusive studies (odds ratio, 3.95, 95% confidence interval, 1.52-10.25, *P* = .005), and was not associated with the MET achieved (beta –0.25, 95% confidence interval, –0.84 to 0.35, *P* = .411).

Previous studies have shown that heart rate during exercise is increased by the use of surgical facemasks in healthy participants.[5] This may partly explain the higher percentage of conclusive studies obtained. The main weakness of our study is the impossibility of using the same patients without a facemask as their own control group, given the risk of aerosolization during ESE in the current pandemic situation. Given the retrospective nature of the analysis, it has not been possible to incorporate other variables related to chronotropic response, such as the level of sedentariness. However, this bias was mitigated by the use of body mass index as a surrogate variable. Finally, we cannot exclude a possible causal role of physical deconditioning, caused by confinement, on the maximum heart rate achieved.

In conclusion, our study demonstrates that ESE with a surgical facemask is a feasible procedure. The use of a facemask does not negatively affect the functional capacity of our patients, nor the percentage of conclusive studies. This enables us to benefit from the information provided by the exercise stress modality, while reducing the risk of infection in healthcare personnel. Given the current pandemic situation, and in view of the results of our study, we strongly recommend the systematic incorporation of the surgical facemask in ESE protocols.

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Available online 29 October 2020

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https://doi.org/10.1016/j.rec.2020.10.007
1885-5857/

Decrease in the number of primary angioplasty procedures during the pandemic and its relationship with mortality from COVID-19. The role of competing risks

Descenso del número de angioplastias primarias durante la pandemia y su relación con la mortalidad por COVID-19. El papel de los riesgos competitivos

To the Editor,

In late 2019, a new disease called coronavirus disease 2019 (COVID-19) emerged in China. The infection quickly spread to the rest of the world and a pandemic ensued. Spain has been one of the hardest-hit countries in terms of the number of cases and deaths. The entire health system has been put under stress and there has been a shift in the care of many diseases, including cardiovascular disease. There have been significant drops in the number of admissions for acute myocardial infarction (AMI) not only in Spain,[1] but also in other countries such as the United States and Italy.[2] A similar situation exists in relation to the number of primary angioplasties.[3] The reasons for these drops are controversial. One of the hypotheses suggests that mortality from COVID-19 would constitute a competing risk.[4] Many of the patients who experienced an AMI event would have died as a result of COVID-19 without the opportunity for the event to occur. Our study aim was to establish whether there is a relationship between deaths from COVID-19 in each of the Spanish Autonomous Communities (ACs) and the number of primary percutaneous coronary interventions (PCIs) recorded during the pandemic. We conducted a sensitivity analysis to compare the relationship between the excess total mortality recorded and variation in primary PCIs, given that an unknown number of patients without a confirmed diagnosis of COVID-19 probably died from this disease but were not counted.

To this end, we obtained data on primary PCIs recently published by the working group on the Infarction Code of the Interventional Cardiology Association of the Spanish Society of Cardiology (ACI-SEC), whose methodology has already been described.[3] Briefly, primary PCIs performed in 73 Spanish interventional cardiology centers were compared in 2 time periods, the first before the start of the pandemic (February 24 to March 1, 2020) and the second after the start (March 16 to 22, 2020). These centers represent 90% of all Spanish centers performing this type of activity. We calculated the number of procedures per million population in each period and the difference between them to obtain the variation between the 2 periods (table 1). Data on mortality and excess mortality due to COVID-19 were obtained from the records of the Ministry of Health, the Carlos III Health Institute (ISCIII), and the Mortality Monitoring System (MoMo) of the ISCIII.[5] Linear and nonlinear models were used to determine the association between mortality due to COVID-19, excess of total mortality, and variation in the rate of primary PCI per million population. R^2 and significance levels were obtained for both models.

The comparison showed that between the 2 periods the number of primary PCIs dropped in most ACs. There were marked differences in mortality and excess mortality between the ACs (table 1).

Neither of the models found a statistically significant association between mortality due to COVID 19 and variation in the primary PCI rate in the ACs (linear model: $R^2 = 0.008$; $P = .918$; nonlinear model: logarithmic $R^2 = 0.068$; $P = .314$; quadratic $R^2 = 0.07$; $P = .954$; cubic $R^2 = 0.147$; $P = .744$). The same strategy was used to determine associations between the excess of total mortality and variation in the PCI rate. Neither of the models found a statistically significant association between the variables (linear model: $R^2 = 0.0059$; $P = .771$; nonlinear model: logarithmic $R^2 = 0.057$; $P = .356$; quadratic $R^2 = 0.007$; $P = .952$; cubic $R^2 = 0.021$; $P = 0.963$).

Mortality and variation in primary PCIs were plotted in the ACs (figure 1A). Although the Community of Madrid and Castile-La Mancha had the most deaths, they had drops in the primary PCIs rate that were similar to those in other ACs with lower mortality, such as Aragon or Cantabria, but lower than those in other ACs with much lower mortality, such as the Principality of Asturias or the Chartered Community of Navarre. No statistically significant association was found between the excess of total mortality and variation in the PCI rate (figure 1B).