Impact of the first wave of the SARS-CoV-2 pandemic on preferential/emergent pacemaker implantation rate. Spanish study

Impacto de la primera ola de la pandemia de SARS-CoV-2 en la tasa de implante de marcapasos con indicación preferente/urgente. Estudio español

To the Editor,

On 14 March 2020, a state of alarm was declared in Spain because of the SARS-CoV-2 coronavirus (COVID-19) pandemic, and home confinement was made mandatory to control the high number of cases of this infection. In the health sector, all nonpriority medical activity was limited, but urgent activity was maintained. Nonetheless, during the first weeks of confinement, a decrease of up to 40% was observed across the country in the number of alerts for ST-segment elevation acute myocardial infarction.[1] According to reports from other countries, there may have been a similar reduction in the treatment of bradyarrhythmia.[2,3] The present study analyzes the impact of the first COVID-19 wave on the treatment of severe bradyarrhythmia in Spain.

Through the Cardiac Pacing Section of the Spanish Society of Cardiology, centers with activity in this field were requested to collaborate in the study. An online database was provided to record the number and characteristics of pacemaker implantation procedures with a preferential/urgent indication carried out between 15 March and 15 May, 2019, and the same dates in 2020, in order to perform a comparison. Scheduled elective procedures, battery replacements, lead repositioning, and pacing system extensions were not included. The deadline for submitting the data was 15 June, 2020.

Data were sent by 31 centers in 13 autonomous communities of Spain. The general characteristics are shown in table 1. Although the populations were similar during the 2 periods, there was a significant reduction in the number of procedures performed in asymptomatic patients (10% vs 6.3%; $P = .014$) and those with presyncope (21.9% vs 15.8%; $P = .005$) relative to the 2019 activity. Complete atrioventricular block (cAVB) was the most common cause in the 2 periods, but it was significantly more frequent in 2020 (41.6% vs 47.7%; $P = .023$).

Patients in the 2020 period had slightly worse creatinine clearance values (median, 65.2 vs 61.1 mL/min; $P = .019$) and higher levels of the amino-terminal fraction of brain pro-natriuretic peptide (median, 1012 vs 1429; $P = .010$). Although these factors could indicate greater severity, there were no differences in the percentage of patients treated in intensive care units (ICUs) or in transvenous pacemaker use. The only difference found was more frequent vasoactive drug prescription in 2020 (22.8% vs 32.2%; $P = .001$), which could be related to the higher percentage of patients with cABV.

As in other reported series, there was a 35.2% total decrease in the number of preferential/urgent pacemaker implantations compared with 2019 (568 vs 877; $P < .001$).

All autonomous communities analyzed except the Balearic Islands experienced a reduction in activity, although to a varying degree (table 2). Through the use of data from official reports of the Ministry of Health and the National Institute of Statistics, an attempt was made to explain this variability by relating it to the impact of the pandemic in each region. No correlations were found with the number of infected individuals in each autonomous community (Spearman $\rho = 0.162$; $P = .596$), the number persons hospitalized with a diagnosis of COVID-19 ($\rho = -0.028$; $P = .929$), the number of persons admitted to the ICU ($\rho = -0.217$; $P = .476$), or the number of deaths due to this disease ($\rho = 0.105$; $P = .734$) per 100 000 population. Nor was there an association between the decrease in pacemaker procedures and saturation of the health system in each region, measured by the following ratios: number of COVID-19 hospitalizations/beds available at baseline ($\rho = 0.080$; $P = .796$), or the number of COVID-19 ICU hospitalizations/ICU beds available at baseline ($\rho = 0.061$; $P = .844$). As mentioned, the aim of this study was to obtain a general view of what happened during the first wave of the pandemic in Spain. However, to properly interpret these results it is important to note that the information collected covered only 40% of the provinces, and the population at risk included in the analysis represented an average of 33.3% of the total in each autonomous community (table 2). This was an important limitation for establishing a relationship between the impact of the pandemic and the reduction in activity.

To summarize, the first wave of the COVID-19 pandemic significantly affected treatment of acute heart disease, even though urgent care was guaranteed. The impact on bradyarrhythmia

Table 1
Characteristics of the total population, 2019 and 2020

	Total	2019	2020	*P*
Description of the population				
Age, years	80 ± 12.4	81 ± 11.8	80 ± 13	.700
Women	611 (42.3)	376 (42.9)	235 (41.4)	.610
HT	1068 (73.9)	640 (73)	428 (75.4)	.403
DM	485 (33.6)	277 (31.6)	208 (36.6)	.087
Heart disease	762 (52.7)	468 (53.4)	294 (51.8)	.551
Dilated	31 (2.1)	17 (1.9)	14 (2.5)	.500
Hypertensive	200 (13.8)	129 (14.7)	71 (12.5)	.235
Hypertrophic	18 (1.2)	14 (1.6)	4 (0.7)	.135
Ischemic	211 (14.6)	121 (13.8)	90 (15.8)	.282
Valve disease	249 (17.2)	159 (18.1)	90 (15.8)	.261
Others	53 (3.7)	28 (3.2)	25 (4.4)	.233
Symptoms				
Asymptomatic	124 (8.6)	88 (10)	36 (6.3)	.014
Asthenia	171 (11.8)	99 (11.3)	72 (12.7)	.425
Dyspnea	276 (19.1)	154 (17.6)	122 (21.5)	.064

Table 1 *(Continued)*
Characteristics of the total population, 2019 and 2020

	Total	2019	2020	*P*
Presyncope	282 (19.5)	192 (21.9)	90 (15.8)	.005
Syncope	547 (37.9)	316 (36)	231 (40.7)	.076
Cardiorespiratory arrest	22 (1.5)	13 (1.5)	9 (1.6)	.877
ECG abnormality justifying the device				
Sinus dysfunction	183 (12.7)	118 (13.5)	65 (11.4)	.261
1st degree block,	3 (0.2)	2 (0.2)	1 (0.2)	.832
Type 1 2nd degree block,	17 (1.2)	9 (1)	8 (1.4)	.510
2:1 block	132 (9.1)	83 (9.5)	49 (8.6)	.589
Type 2 2nd degree block	69 (4.8)	46 (5.2)	23 (4)	.298
Complete block	636 (44)	365 (41.6)	271 (47.7)	.023
Slow AF	124 (8.6)	78 (8.9)	46 (8.1)	.598
Blocked AF	159 (11)	93 (10.6)	66 (11.6)	.547
Bifascicular block	37 (2.6)	28 (3.2)	9 (1.6)	.059
Trifascicular block	34 (2.4)	21 (2.4)	13 (2.3)	.897
Alternating block	11 (0.8)	6 (0.7)	5 (0.9)	.675
Bradycardia-tachycardia syndrome	23 (1.6)	17 (1.9)	6 (1.1)	.191
AVN ablation	8 (0.6)	6 (0.7)	2 (0.1)	.406
Carotid sinus hypersensitivity	3 (0.2)	2 (0.2)	1 (0.2)	.832
Clinical situation/severity				
Heart rate, bpm	40 ± 21	41 ± 24	40 ± 20	.023
Creatinine clearance, mL/min/1.73 m^2	63.3 ± 36.7	65.2 ± 37.1	61.1 ± 37.3	.050
NT-proBNP, pg/mL	1.230 ± 3.330	1.012 ± 2.885	1.429 ± 4.846	.010
LVEF, %	60 ± 5	60 ± 6.5	60 ± 5	.039
ICU requirement	445 (32.4)	276 (33.2)	169 (31.3)	.468
Age in ICU, y	79.2 ± 12.6	79.7 ± 13.6	79 ± 12	.900
Vasoactive drug requirement	383 (26.5)	200 (22.8)	183 (32.2)	.001
Temporary PM requirement	228 (15.8)	137 (15.6)	91 (16)	.734
Implantation and hospital stay				
Total days of hospitalization	4 ± 6	4 ± 6	3 ± 5	< .001
Days to implantation	2 ± 3	2 ± 4	1 ± 3	< .001
Days hospitalized following implantation	1 ± 2	1 ± 2	1 ± 2	< .001
Pacing mode				.524
AAI	3 (0.2)	3 (0.2)	0	.284
VVI	532 (36.8)	321 (36.6)	211 (37.1)	.834
VDD	53 (3.7)	35 (4)	18 (3.2)	.417
DDD	827 (57.2)	504 (57.5)	323 (56.9)	.821
CRT	26 (1.8)	13 (1.5)	13 (2.3)	.226
Complications	64 (4.4)	43 (4.9)	21 (3.7)	.276
Pericardial effusion	4 (0.3)	3 (0.3)	1 (0.2)	.487
Perforation	1 (0.1)	1 (0.1)	0	.607
Displacement	24 (1.7)	17 (1.9)	7 (1.2)	.305
Hematoma	18 (1.2)	11 (1.3)	7 (1.2)	.971
Pneumothorax	11 (0.8)	7 (0.8)	4 (0.7)	.552
Death	6 (0.4)	4 (0.5)	2 (0.4)	.559

AF, atrial fibrillation; AVN, atrioventricular node; CRT, cardiac resynchronization therapy; DM, diabetes mellitus; ECG, electrocardiogram; HT, hypertension; ICU, intensive care unit; LVEF, left ventricular ejection fraction; NT-proBNP, amino-terminal fraction of brain pro-natriuretic peptide; PM, pacemaker.
Values are expressed as No. (%) or mean ± standard deviation.

Table 2
Relationship between the number of implant procedures during the 2019 and 2020 study periods and impact of the COVID-19 pandemic, by autonomous community

Autonomous community	Autonomous community population	Implants in 2019	Implants in 2020	Reduction in 2020 activity	Infected*	Hospitalized*	ICU hospitalized*	Deaths*	Hospitalizations/ beds	Hospitalizations/ ICU beds
Andalusia	29.1%	149	93	−37.6%	147.61	73.22	9.01	16.39	0.29	1.43
Hospital 1	5.5%	23	6	−73.9%						
Hospital 2	5.3%	26	13	−50.0%						
Hospital 3	6.6%	42	40	−4.8%						
Hospital 4	6%	23	11	−52.2%						
Hospital 5	5.7%	35	23	−34.3%						
Aragon	30.3%	53	25	−52.8%	413.56	200.71	17.13	66.10	0.50	1.38
Hospital 6	30.3%	53	25	−52.8%						
Community of Madrid	35.9%	188	120	−36.2%	993.64	632.67	53.68	120.96	2.05	5.95
Hospital 7	5.6%	44	27	−38.6%						
Hospital 8	2.9%	19	9	−52.6%						
Hospital 9	6.6%	29	20	−31.0%						
Hospital 10	3.4%	7	4	−42.9%						
Hospital 11	6.7%	33	31	−6.1%						
Hospital 12	5.9%	12	2	−83.3%						
Hospital 13	4.8%	44	27	−38.6%						
Valencian Community	22%	116	72	−37.9%	216.84	108.62	14.43	27.78	0.39	1.46
Hospital 14	2.8%	14	5	−64.3%						
Hospital 15	5%	33	23	−30.3%						
Hospital 16	6%	44	30	−31.8%						
Hospital 17	4.3%	15	9	−40.0%						
Hospital 18	3.9%	10	5	−50.0%						
Castile-La Mancha	22.1%	20	16	−20.0%	815.94	444.05	31.29	137.93	1.62	4.84
Hospital 19	22.1%	20	16	−20.0%						
Castile and León	25.6%	69	44	−36.2%	765.52	360.44	22.68	108.85	0.92	3.74
Hospital 20	11%	28	25	−10.7%						
Hospital 21	14.6%	41	19	−53.7%						
Catalonia	2%	11	9	−18.2%	725.52	382.26	39.73	71.45	0.85	4.49
Hospital 22	2%	11	9	−18.2%						
Galicia	36.9%	68	46	−32.4%	334.91	95.94	10.93	22.45	0.26	1.31
Hospital 23	22.2%	21	18	−14.3%						
Hospital 24	14.7%	47	28	−40.4%						
Balearic Islands	36.4%	37	38	2.7%	172.43	98.66	14.70	19.05	0.29	1.19
Hospital 25	28.7%	22	23	4.5%						
Hospital 26	7.7%	15	15	0.0%						
Canary Islands	44.3%	52	33	−36.5%	106.07	43.61	8.27	7.06	0.12	0.76
Hospital 27	24.3%	33	13	−60.6%						
Hospital 28	20%	19	20	5.3%						
La Rioja	100%	17	7	−58.8%	1.268.95	470.33	28.72	110.48	1.42	6.42
Hospital 29	100%	17	7	−58.8%						
Chartered Community of Navarre	30.8%	39	18	−53.8%	785.22	312.59	20.79	80.25	0.89	2.15
Hospital 30	30.8%	39	18	−53.8%						
Basque Country	17.3%	58	47	−19%	602.01	317.56	26.18	65.59	0.88	4.25
Hospital 31	17.3%	58	47	−19.0%						

ICU, intensive care unit.
Hospitalizations/beds: number of COVID-19 hospitalizations in the community/available hospital beds in the community at baseline.
ICU hospitalizations/beds: number of COVID-19 ICU hospitalizations in the community/available ICU beds in the community.
Autonomous community population: percentage of the total population of the autonomous community attending each center.
The information used in this table was obtained from the official reports of the Ministry of Health on the course of the pandemic (report No.º 107) and the National Institute of Statistics (2019 Registry).
* Per 100 000 population.

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.

Ricardo Salgado Aranda,[a,*] Nicasio Pérez Castellano,[a,b] Óscar Cano Pérez,[c] Andrés Ignacio Bodegas Cañas,[d] Manuel Frutos López,[e] and Julián Pérez-Villacastín Domínguez[a,b]

[a]*Unidad de Arritmias, Instituto Cardiovascular, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos (IdISSC), Madrid, Spain*
[b]*Centro de Investigación Biomédica en Red de Enfermedades Cardiovasculares (CIBERCV), Madrid, Spain*
[c]*Unidad de Electrofisiología, Servicio de Cardiología, Hospital Universitario y Politécnico La Fe, Valencia, Spain*
[d]*Unidad de Electrofisiología, Servicio de Cardiología, Hospital Universitario de Cruces, Baracaldo, Vizcaya, Spain*
[e]*Unidad de Arritmias, Servicio de Cardiología, Hospital Virgen del Rocío, Sevilla, Spain*

*Corresponding author:
E-mail address: ricardosalgadodoc@gmail.com (R. Salgado Aranda).

Available online 30 November 2020

REFERENCES

1. Rodríguez-Leor O, Cid-Álvarez B, Ojeda S, et al. Impacto de la pandemia de COVID-19 sobre la actividad asistencial en cardiología intervencionista en España. *REC Interv Cardiol.* 2020;2:82–89.
2. Toniolo M, Negri F, Antonutti M, Masè M, Facchin D. Unpredictable fall of severe emergent cardiovascular diseases hospital admissions during the COVID-19 pandemic: experience of a single large center in Northern Italy. *J Am Heart Assoc.* 2020. https://doi.org/10.1161/jaha.120.017122.
3. Migliore F, Zorzi A, Gregori D, et al. Urgent Pacemaker implantation rates in the Veneto region of Italy after the COVID-19 outbreak. *Circ Arrhythm Electrophysiol.* 2020;13:e008722.
4. Rodríguez-Padial L, Arias M&au. El riesgo competitivo puede explicar en gran medida la disminución de los ingresos por enfermedad cardiovascular aguda durante la pandemia de COVID-19. *Rev Esp Cardiol.* 2020;73:1084–1085.

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