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SCIENTIFIC LETTER

Survey of the current situation of the electrostimulation therapy in the Intensive Care Units in Spain☆

Encuesta de situación en electroestimulación cardíaca en las unidades de cuidados intensivos en España

Dear Editor:

In Spain, the management of arrhythmias falls within the competence of the specialty of Intensive Medicine.[1] Some of our specialists are devoted to the management of definitive devices of cardiac pacing, and are responsible for 30%–40% of the therapies performed in our country each year.[2,3] At national level, the Spanish Pacemaker Registry, elaborated with information from the European cards of pacemaker carriers submitted by the centers themselves, is not very much represented in the intensive care unit (ICU) setting, picking up just a few indirect parameters of healthcare quality.[3] Since 1995, the Cardiological Intensive Care and Cardiopulmonary Resuscitation Working Group of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC) has been studying the activity developed in this field through the MAMI (Database on definitive pacemakers in Intensive Medicine) registry. However, the progression of life expectancy and the diseases that benefit from these devices have induced changes of therapies and an increased use,[3,4] which is indicative of the need to remodel the registry adapting it to contemporary reality so that it still remains a useful tool of activity and quality control.[5,6]

This study primary endpoint is to know the percentage of ICUs that are active in definitive cardiac pacing to quantify their importance and know what percentage of these ICUs would benefit directly from the registry. The study secondary endpoint is to describe these ICUs activity to know exactly towards what cardiac pacing settings should these changes point at. This was an observational study where the ICUs registered in the SEMICYUC database were submitted an online survey with variables on implantation, follow-up, and training during 2018. The list including all cardiac pacing implantation-capable units provided by the medical providers of cardiac pacing devices was contacted individually to confirm that the survey had been received. *Cardiac pacing implantation-capable units* were considered those that said so in the survey while *cardiac pacing implantation-non capable units* were considered the rest of them. *Large* hospitals were those with over 500 beds, *medium-sized* hospitals those between 500 and 200 beds, and *small* hospitals those with less than 200 beds. A descriptive analysis was performed using the SPSS 19 statistical package software. Qualitative variables were expressed as count and percentage, and quantitative variables as mean and standard deviation. Since this was an observational study without drugs where overall figures from administrative registries instead of data from patients were used, no assessment from any clinical research ethical committee was requested. Each center gave its informed consent before the publication of data.

Overall, the survey was submitted to 212 ICUs and was responded by 91 ICUs (42.9%); 75 ICUs (35.4%) performed some type of definitive cardiac pacing activity. Centers were mostly public (n = 67; 89.3%) and medium-sized (n = 37; 49.4%) with teams of 3.5 ± 1.5 people and an irregular geographic distribution: the autonomous communities with more centers were Andalusia (n = 19; 25.3%), and Valencian Community (n = 18; 24%) (Fig. 1). In 4 of the cardiac pacing implantation-capable ICUs (5.7%) this activity is shared with the Cardiology unit.

Table 1 describes the centers found and the activity performed there. Out of the 75 hospitals with some type of cardiac pacing activity, 5 (6.7%) only do follow-up and no implantation; only 70 hospitals do implant devices. Of these, 64 (85%) have units capable of performing not only the implantation by also the follow-up of the devices. Regarding the activity developed, 55 centers (78.6%) only implant pacemakers with an annual number of implantations >100 procedures. A total of 11 centers (15.7%) are also capable of implanting implantable cardioverter-defibrillators (ICD), and 8 of them (11.5%) cardiac resynchronization therapy devices. A total of 30 (43.47%) out of the 69 centers that did the follow-up handle over 400 annual appointments. These figures are close not only to what the Spanish registry of 2018 reported on, but also to the data from 2018 provided by Farmaindustria both in the volume and type of devices implanted.[3]

A tendency towards the use of more techniques associated with more physiological cardiac pacing, more

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Table 1 Hospitals with intensive care units capable of administering definitive cardiac pacing therapies grouped by autonomous community.

Autonomous community	Center	Size of each center	Services provided			
			PM	ICD	CRT	Consultation
Andalusia	Hospital Público Comarcal La Inmaculada	S	YES	NO	NO	YES
	Hospital de Jerez de la Frontera	L	YES	YES	NO	YES
	Hospital Universitario Virgen de la Victoria	L	YES	NO	NO	YES
	Hospital Regional de Málaga	L	NO	NO	NO	YES
	Hospital San Juan de la Cruz	M	YES	NO	NO	YES
	Hospital San Agustín de Linares	M	YES	NO	NO	YES
	Complejo Hospitalario de Jaén	L	YES	NO	NO	YES
	Hospital Comarcal La Línea de la Concepción	S	YES	NO	NO	YES
	Hospital Punta Europa	M	YES	NO	NO	YES
	Hospital Infanta Elena	M	YES	NO	NO	YES
	Hospital Río Tinto	S	YES	NO	NO	YES
	Hospital de Motril	S	YES	NO	NO	YES
	Hospital de Antequera	S	YES	NO	NO	YES
	Hospital Comarcal de Melilla	S	YES	NO	NO	YES
	Hospital Universitario de Ceuta	M	YES	NO	NO	YES
	Hospital de Baza	S	YES	NO	NO	YES
	Hospital Comarcal de la Axarquía	S	YES	NO	NO	YES
	Hospital Comarcal de Riotinto	S	NO	NO	NO	YES
	Hospital de Poniente	M	YES	NO	NO	YES
Aragon	Hospital Royo Villanova	M	YES	NO	NO	NO
	Hospital General San Jorge (Huesca)	M	YES	NO	NO	NO
Balearic Islands	Hospital General Mateu Orfila	S	YES	NO	NO	YES
	Hospital Son Llátzer	M	YES	NO	NO	YES
Canary Islands	Hospital General de La Palma	S	YES	NO	NO	YES
	Hospital Insular de Las Palmas	L	NO	NO	NO	YES
	Hospital Dr. Negrín	L	YES	YES	YES	YES
	Hospital General de Fuerteventura	S	YES	NO	NO	YES
Castile and León	Hospital General de Segovia	M	YES	NO	NO	YES
	Hospital Universitario Del Río Hortega (Valladolid)	L	NO	NO	NO	YES
	Hospital Provincial de Ávila	M	YES	NO	NO	YES
	Hospital Río Carrión (Palencia)	M	YES	YES	NO	YES
	Hospital del Bierzo (Ponferrada)	M	YES	NO	NO	YES
	Hospital Complejo Asistencial de Soria	M	YES	NO	NO	YES
Castile La Mancha	Hospital Universitario Virgen de la Salud	L	YES	NO	NO	YES
	Hospital Quirón Salud Ciudad Real	S	YES	YES	YES	YES
	Hospital General La Mancha Centro (Alcázar de San Juan)	M	YES	NO	NO	YES
	Hospital de Talavera de la Reina	M	YES	NO	NO	YES

Table 1 (*Continued*)

Autonomous community	Center	Size of each center	Services provided			
			PM	ICD	CRT	Consultation
Catalonia	Hospital Parc Taulí	L	YES	YES	YES	NO
	Hospital Verge de la Cinta (Tortosa)	M	YES	NO	NO	NO
	Consorci Sanitari Terrasa	M	YES	NO	NO	YES
	Hospital Mutua Terrasa	M	YES	NO	YES	YES
Extremadura	Hospital Comarcal Don Benito-Villanueva	L	YES	NO	NO	YES
	Hospital de Mérida	M	YES	YES	NO	YES
	Hospital Universitario de Badajoz	M	YES	NO	NO	YES
Galicia	Complexo Hospitalario Universitario de Ourense	L	YES	YES	YES	YES
Community of Madrid	Hospital Universitario de Móstoles	M	YES	NO	NO	YES
	Hospital Universitario del Tajo	S	YES	NO	NO	YES
	Hospital Universitario Príncipe de Asturias (Alcalá de Henares)	L	YES	NO	NO	YES
	Hospital Universitario Infanta Cristina	S	YES	NO	NO	YES
	Hospital Clínico Universitario San Carlos	L	NO	NO	NO	YES
	Hospital Quirónsalud Sur	S	YES	NO	NO	NO
Murcia	Hospital General Universitario Los Arcos del Mar Menor	S	YES	NO	NO	NO
	Hospital General Universitario Santa Lucía (Cartagena)	L	YES	YES	YES	YES
	Hospital Rafael Méndez (Lorca)	M	YES	YES	YES	YES
	Hospital Quironsalud Murcia	S	YES	NO	NO	YES
Navarre	Clínica San Miguel Pamplona	S	YES	YES	NO	YES
Basque Country	Hospital Universitario Donostia	L	YES	YES	YES	YES
Valencian Community	Hospital General Universitario de Elda	M	YES	NO	NO	YES
	Hospital General de Castellón	L	YES	NO	NO	YES
	Hospital General Universitario de Elche	M	YES	NO	NO	YES
	Consorcio Hospitalario Provincial de Castellón	M	YES	NO	NO	YES
	Hospital Manises	M	YES	NO	NO	YES
	Hospital Universitario de la Plana	M	YES	NO	NO	YES
	Hospital Universitario de Torrevieja	M	YES	NO	NO	YES
	Hospital de Sagunto	M	YES	NO	NO	NO
	Hospital Universitario Doctor Peset	L	YES	NO	NO	YES
	Hospital de Vinalopó	M	YES	NO	NO	YES
	Hospital de Dénia	M	YES	NO	NO	YES
	Hospital Comarcal Francesc de Borja	M	YES	NO	NO	YES
	Hospital Comarcal de la Vega Baja (Orihuela)	M	YES	NO	NO	YES
	Hospital Público Virgen de los Lirios	M	YES	NO	NO	YES
	Hospital Público Lluis Alcanyis de Xátiva	M	YES	NO	NO	YES
	Hospital General de Requena	S	YES	NO	NO	YES
	Hospital Marina Baixa-Villajoyosa	M	YES	NO	NO	YES
	Hospital Clínica Benidorm	S	YES	NO	NO	YES

ICD, implantable cardioverter-defibrillators; CRT, cardiac resynchronization therapy; L, large; M, medium-sized; PM, pacemaker; S, small.

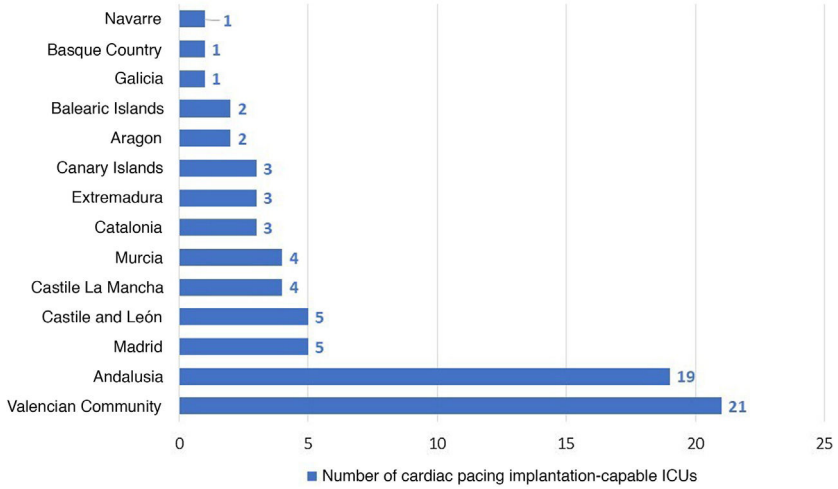

Figure 1 Distribution by autonomous communities of the intensive care units that remain active in definite cardiac pacing device implantation. Each bar represents the number of intensive care units that remain active administering definitive cardiac pacing therapies in each autonomous community. ICU, intensive care unit.

atrioventricular synchrony, less atrial fibrillation and pacemaker syndrome like sequential pacing (54.4% in 2010 vs 84.5% in 2018), and active-fixation electrodes has been reported.[3,6,7] In our series, the latter are used as a single model in 37.8% of the ICUs (n = 28), and as a predominant model in 89.2%, which is similar to the 88% rate published in the Spanish registry.[3] The dual chamber sequential cardiac pacing was the most widely used pacing mode (84.2% of our centers) preferably using 2 wires (DDDR). If we compare the last results of the MAMI registry with the Spanish registry of the same year, we will see similar rates (DDDR 40.2% vs 43.6%, respectively) although somehow lower than the current ones (47.2%)[3].

Echocardiography prior to implantation was always indicated in 54.3% of the centers (n = 38), in selected cases in 28.6% (n = 20), and was not performed at all in 21.4% (n = 15). It is possible that the percentage of patients without echocardiography has been overestimated if the echocardiographies performed in different units or services have not been taken into consideration. However, a review for the implementation of echocardiography would be the thing to do no since knowing the cardiac structure and the ventricular function bring understanding allow us to adjust the therapy to clinical practice guidelines, and optimize the decision-sharing process and clinical results.[8,9]

Back in 2014, and in an attempt to recognize competence and training capabilities in cardiac pacing SEMICYUC proposed a system of accreditation and training based on self-evaluation and further external auditing of specialists and units.[10] According to our survey, 32 ICUs (45.7%) currently are holders of the SEMICYUC accreditation. Access to this accreditation may be limited by the lack of hospital infrastructures or for not having specific competences implemented in all the centers such as not doing any follow-ups (which discards 30.6% of the hospitals) or not having training capabilities (which discards 47.2% of the hospitals). The SEMICYUC accreditation also proposes targeted training with a specific program to homogenize training in cardiac pacing. According to our survery, this training plan was developed in 52.8% (n = 37) of the cardiac pacing implantation-capable units.

Since this analysis tried to capture the big picture of the activity going on in these centers, it never registered any healthcare quality parameters aside from those coming from the routine practices described above. Regardless of this, our results show that cardiac pacing is included in the services provided by a significant number of ICUs in our country. Also, that these ICUs perform a high volume of procedures and office consultations being pacemakers the most common devices of all. We should not forget that a fourth of all cardiac pacing implantation-capable units are also involved in the management of other devices. Based on these conclusions, we should say that keeping the activity of the registry going and adapted to the clinical reality described above can still be useful for a wide array of intensive care units. Having information from the registry available would allow us to analyze the quality of the entire process, make comparative assessments with other registries, and develop actions to improve healthcare that would be similar to the Zero projects born within the ENVIN registry.

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Conflicts of interest

None reported.

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C. Salazar Ramírez[a,*], M. Nieto González[a], J.A. Fernández Lozano[b], J. Muñoz Bono[b], R. Gómez-López[c], M.C. Martín Delgado[d], Cardiological Intensive Care and Cardiopulmonary Resuscitation Working Group of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC)

[a] *Unidad de Estimulación Cardiaca de UCI, Servicio de Cuidados Críticos y Urgencias. Hospital Virgen de la Victoria de Málaga, Málaga, Spain*
[b] *Unidad Coronaria, Servicio de Medicina intensiva, Hospital Regional de Málaga, Málaga, Spain*
[c] *Servicio de Medicina Intensiva, Hospital Quironsalud Miguel Domínguez, Pontevedra, Spain*
[d] *Servicio Medicina Intensiva, Hospital Universitario de Torrejón, Torrejón de Ardoz (Madrid), Spain*

* Corresponding author.
E-mail addresses: cristinasweb@gmail.com (C. Salazar Ramírez), rociogmzlpz@gmail.com (R. Gómez-López).

Innate cell response in severe SARS-CoV-2 infection in children: Expression analysis of CD64, CD18 and CD11a

Respuesta de celular innata en infeción pediátrica grave por SARS-CoV-2: análisis de expresión de CD64, CD18 y CD11a

Dear Editor,

In January 2020, a new coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was described in Wuhan, China. The virus, which produces coronavirus disease 2019 (COVID-19), has been declared a global health emergency and pandemic by the World Health Organization. Spain is one of the more severely affected countries.[1]

The immune response to SARS-CoV-2 infection appears to be a critical factor in the development and prognosis of COVID-19 patients.[2] In children, severe forms of the disease like the pediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 appears to be related with some immune dysregulation.[3] So, increase knowledge about the innate cellular immune response to SARS-CoV-2 is of great interest. To this, the study by flow cytometry (FC) may provide critical data and further understanding of this novel disease.[3]

In this paper, we study three molecules which are part of the innate cellular response to infection: CD64, CD18 and CD11a. The CD64 is a type I high-affinity receptor for the Fc fraction of the immunoglobulin G. It is located on monocytes, macrophages, dendritic cells, and neutrophils. The CD64 density on the cell surface is related to the stimulation received by inflammatory cytokines[4]. The CD18, also known as integrin beta-2, participates in leukocyte adhesion and signaling. The CD11a associates with CD18 to form the lymphocyte function-associated antigen 1, or LFA-1. This LFA-1 on leukocytes plays a central role in leukocyte cell-cell interactions and lymphocyte stimulation.

We study in this report three children with severe SARS-CoV-2 infection. Also, we compare them with a healthy control, a case of severe influenza infection and a case of Neisseria meningitidis sepsis. All cases