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Editorial

Electrocardiographic Markers of Sudden Death: More Frequent Than Suspected

Marcadores electrocardiográficos de muerte súbita: más frecuentes de lo que pensamos

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Sudden cardiac death has serious consequences for the patient's relatives and for society. Each year in Europe and the USA, around 350 000 people, or around 0.1% of the general population, have an out-of-hospital cardiac arrest,[1–3] of which only a small percentage survive with no sequelae.

Although current knowledge allows identification of the most vulnerable patients, most sudden deaths occur in patients with no existing diagnosis or who are considered low-risk.[4] Identification and quantification of these individuals is key to reducing the incidence of sudden death and taking timely measures to improve prognosis.

The etiology of sudden death has been extensively studied at a population level. Ischemic heart disease occupies a prominent position and is responsible for up to 70% of these deaths; other structural heart diseases make up 10%, and primary arrhythmias cause a further 10%.[5]

In young patients (< 35 years), in whom the incidence of sudden death is 100 times lower than in the general population, arrhythmic etiology in the absence of structural heart disease is much more common[3] and is the predominant cause of sudden death in patients aged between 14 and 25 years. In patients older than 35 years, ischemic etiology is more common, and primary arrhythmias form a minority. However, it is at this age that this type of disease can be most relevant: for example, most sudden deaths in patients with Brugada syndrome occur in the fourth decade of life.[6]

Early identification is particularly important in patients with a primary arrhythmia who remain asymptomatic, for several reasons. First, sudden death may be the first manifestation of the disease, with no previous warning symptoms. In addition, we must remember that when we diagnose a patient with a hereditary disease, we also diagnose their family. Identification of an individual with this condition must be accompanied by meticulous familial screening. It is true that in these diseases the risk of sudden death decreases with age, but even a diagnosis in an elderly patient is relevant, as it allows identification of the disease in relatives and their appropriate work-up.[7]

In an article in *Revista Española de Cardiología*, Awamleh García et al.[8] present a pioneering study with significant practical implications. In a representative sample of the Spanish population older than 40 years old, these authors found that the prevalence of electrocardiographic patterns of Brugada syndrome or QT interval abnormalities was 0.6% to 1.1%. In the case of Brugada syndrome, the weighted prevalence of type 1 pattern was 0.01%, and of type 2, 0.17%. The weighted prevalence of long-QT was 1.01% and that of very long QT was 0.42%. It is interesting to note that 8.3% of the population had a borderline prolonged QT interval. The weighted prevalence of short QT was 0.18%.

The importance of this study lies in several aspects. First of all, it is the first to quantify the presence of electrocardiographic markers of sudden death in Spain. These abnormalities were found in 0.6% to 1.1% of the population, and in this population group the main cause of sudden death was ischemic heart disease, making this figure even more relevant. Most of the population-based studies that have investigated this type of marker have been limited to young populations or the entire population. To study these patterns in a population in whom sudden death is almost exclusively secondary to ischemic heart disease and to find that around 1% of individuals not identified had a risk marker is interesting and underscores the importance of minimum screening for these diseases.

The findings on Brugada syndrome allow several reflections. The prevalence of Brugada patterns on ECG was 0.13%, and such figures are in line with the medical literature. Two cases of spontaneous type 1 pattern were detected, with a weighted prevalence of 0.01%, and 10 cases of type 2 pattern were detected, with a weighted prevalence of 0.12%. These figures are significant. First, as already mentioned, it is known that sudden death in patients with Brugada syndrome usually occurs in the fourth decade of life and, therefore, these patients are at the time of greatest risk. However, we must not forget that the presence of a type 2 pattern is not the same as a diagnosis of the syndrome: a pharmacological test must be completed and there may not be an associated increased risk. Therefore, the percentage of patients at risk may be overestimated.[9] Another interesting finding is that, in more than a third of patients, the pattern was detected in patients

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older than 80 years. It is known that the risk of sudden death in this population is extremely low and that they probably do not require stratification[7]; however, their diagnosis is of great relevance for relatives, as it allows them to be investigated and the risk of sudden death to be established. We must point out that the diagnosis of Brugada pattern was made using the 2001 criteria, which stated that the pattern had to be present in more than 1 lead, and that leads positioned in high intercostal spaces were not to be used. Currently, it is known that patients who have the pattern in just 1 lead, whether the leads are positioned in the fourth intercostal space or above, have a similar prognosis to those who have the pattern in more than 1 lead.[10–12] Consequently, with the most recent criteria, a prevalence figure of 1.1% may be an underestimation.

An interesting finding was that half of the Brugada patterns were found in women, and of note, the 2 patients with a recording of a type 1 pattern were female. Classically, Brugada syndrome has been described as a disease that predominantly affects men. This distribution exists in the large registries of the syndrome.[13,14] However, in our experience, almost half of the diagnoses made are in women.[15] This study corroborates this experience and shows that the clinical presentation of the syndrome has evolved significantly since its initial description.

In this study approximately 1.5% of the population had a long or very long QT interval, and 8.3% had a borderline QT interval. These findings are important because they confirm and support the results of other European studies.[16,17] Although the study characteristics do not allow the true risk for these patients to be established, it would be unsurprising if it were similar to that of other populations from the same area. Following this percentage of abnormalities, we found 2 different subpopulations: 1 group of patients with congenital long QT and a second group in which prolongation was secondary to medications. It is likely that most abnormalities are due to this second reason, and, as stated by the authors, having this information would have been interesting and helped establish the true relevance from a prognostic point of view. This would have particular practical importance in those patients with a borderline QT interval. The diagnosis of congenital long QT is important and has practical implications similar to the diagnosis of Brugada syndrome.[18] However, the diagnosis of QT prolongation secondary to medications is probably more relevant because it is more common. Extreme QT prolongation is common, at almost 1.4% of the population studied, but borderline prolongation was extraordinarily common, at 8% of the population. A modest QT prolongation may go unnoticed or be considered irrelevant. However, it is known that slight QT prolongation is associated with increased mortality.[19] It is likely that this relationship is not causal, but is rather a marker of underlying cardiovascular disease.

The study by Awamleh García et al.[8] marks a further step in understanding the risk of sudden death in the Spanish population. It confirms that the distribution of these abnormalities is similar to those of other surrounding countries and allowed quantification of at-risk individuals. The high estimated frequency of these abnormalities must command our attention, and thereby prevent people at potential risk from going unnoticed in consultations.

CONFLICTS OF INTEREST

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