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The Brugada type 1 electrocardiographic pattern is common among Filipinos

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Abstract

Objective: To measure the prevalence of the Brugada type 1 ECG pattern in the general population in the Philippines.

Study Setting and Design: Sudden unexplained death syndrome is rare in the West but is common among Southeast Asians. Ventricular fibrillation is the terminal event. The Brugada type 1 electrocardiographic (ECG) pattern with J point and coved ST elevation in right precordial leads, is a marker for sudden unexplained death syndrome. Its prevalence in the general population is unknown. A cross-sectional nationwide survey was performed in the Philippines in 2003 using a stratified multistage sampling design covering all the regions and provinces in the country. ECGs were performed in all adults surveyed. The prevalences of the Brugada type 1 ECG pattern (coved type) and any type Brugada ECG pattern were determined.

Results: The Brugada type 1 (coved) ECG pattern in the general population in the Philippines was found in 0.2% (95% Confidence Interval [CI] 0.03%−0.36%) of the population. Among males the prevalence was 0.3% (±0.1). The prevalence of any type Brugada ECG was 2% (95% CI 1.5%−2.6%).

Conclusion: The Brugada ECG pattern is common among Filipinos. There is a need to determine the risk of sudden death among individuals with this marker in the general population.

Keywords: SUDS; Brugada ECG pattern; Asian SUDS; Sudden unexplained death; ‘‘Bangungut’’; Sudden death

1. Introduction

Sudden cardiac death occurs most commonly in the setting of structural heart disease. As much as 80% of its victims suffer from coronary artery disease so that the epidemiology of sudden death in the Western world, to a great extent parallels that of coronary artery disease [1]. In some regions of the world, notably in Southeast Asia, sudden death among individuals with structurally normal hearts, also called sudden unexplained death syndrome (SUDS) accounts for as much as a third of sudden death victims [2]. In the Philippines, the incidence of SUDS is 0.043% in the 20−40-year-old age group [3]. This is in contrast to the West, where a mere 3%−5% of sudden death cases is unexplained [1].

Ventricular fibrillation is the final observable event among SUDS patients [4]. In the DEBUT study, implantable cardioverter defibrillators (ICDs) prevented sudden death by effectively converting ventricular tachyarrhythmias resulting in no deaths in the ICD arm [5]. In this group of patients, Nademanee and his group have identified an arrhythmogenic marker in Asian SUDS, consisting of J point and ST segment elevation in the right precordial leads, similar to that first described by Brugada et al. among SUDS patients worldwide [6,7]. Of the three Brugada ECG patterns described, the type 1 pattern is the most specific [4].

A longitudinal study performed on atomic bomb survivors in Nagasaki has shown that persons with this Brugada ECG pattern were 52.6 times more likely to die of sudden, unexplained causes [8]. However, this finding was not confirmed in a follow-up study spanning three decades of Japanese-American men in Hawaii with this ECG sign, in whom there was no increase in the total mortality or sudden

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What's new?

- The Brugada type 1 electrocardiographic (ECG) pattern with J point and coved ST elevation in right precordial leads, is a marker for Sudden unexplained death syndrome. This is the first measurement of the prevalence of the Brugada type 1 ECG on a countrywide scale using randomly selected samples from the general population
- In the Philippine general population: Brugada type 1 ECG is found in 2 per 1,000 and among males in 3 per 1,000.
- Assessing the predictive value for sudden death of the Brugada type 1 ECG pattern among all comers from the general population raises methodological and feasibility challenges.

death [9]. The absolute risk of sudden death among persons in the general population with this Brugada ECG marker remains unknown.

The objective of this study is to determine the prevalence of the Brugada ECG pattern in the general population in the Philippines.

Documenting the prevalence of the ECG marker, which thus far has been established to be the most important marker to predict the occurrence of SUDS, is important in assessing the proportion of the population at risk for SUDS.

2. Methods

2.1. National survey

This study involved a randomly selected sample from the general population of the Philippines. The 2003 Master Sample of the National Statistics Office for the 2003 Family Income and Expenditure Survey (FIES), which used a stratified multistage sampling design covering all the regions and provinces in the country, was used. The 6th National Nutrition Survey used a randomly selected sample, which corresponds to half of the FIES sampled households. The National Nutrition Health Survey then used a randomly selected sample, which corresponds to one-fourth of the 6th National Nutrition Survey sampled households.

The primary sampling units, which were described as *barangays* (villages) or a group of contiguous small *barangays* containing at least 500 households, were selected within a set of strata using probability proportional to estimated size sampling. The second stage was the selection of enumeration areas or contiguous areas in a primary sampling unit with at least 150–200 households. The third stage was the selection of households with equal probability in each sampled enumeration area. The detailed description of the sampling design is found in the National Nutrition Health Survey report [10].

3. ECG analysis

A total of 3,907 adults were randomly selected from the general population and underwent ECGs. These ECGs were read by Cardiologists or Internists.

3.1. Definitions

The Brugada-type ECG patterns were identified and classified based on the 2000 Consensus Report by the Arrhythmia Working Group of European Society of Cardiology (Table 1 and Fig. 1) [7]. Type-1 Brugada was characterized by coved ST elevation and T-wave inversion while types 2 and 3 Brugada were characterized by a saddleback ST elevation and upright T waves.

For our study, we determined the prevalence of type-1 Brugada pattern and any type Brugada pattern.

3.2. Measurement of crude prevalence

Crude prevalence was calculated using the following equation:

$$\frac{f}{\sum N}$$

where f is the number persons with the Brugada ECG marker counted and $\sum N$ is the sum of the numbers of residents in each of the sampled households during the study period.

3.3. Statistical adjustment of prevalence

Statistical adjustment of the prevalence was made based on the sampling weights and projected age distribution of the Philippine population for 2003.

3.4. Statistical analysis

The prevalence of Brugada and its corresponding 95% confidence interval (CI) were estimated. Descriptive statistics were used to for the age and gender distributions of type 1 or any type Brugada.

4. Results

4.1. Prevalence of Brugada type 1 ECG pattern

Of the 3,907 subjects, we identified seven (0.2%, 95% CI 0.03%–0.36%) ECGs with Brugada type 1 pattern

Table 1
Summary of ECG abnormalities in the Brugada type 1 ECG [7]

	Type 1	Type 2
J wave amplitude	⩾2 mm	⩾2 mm
T wave	Negative	Positive or biphasic
ST–T configuration	Coved type	Saddleback
ST segment (terminal portion)	Gradually descending	Elevated ⩾1 mm