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Prevalence of J-Wave Syndrome Electrocardiographic Patterns in a Sample of Azerbaijan's General Population

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Abstract

Objective: To this date there is no information regarding the prevalence of neither the Early Repolarization Syndrome (ERS) nor the Brugada Syndrome (BrS) electrocardiographic patterns in Azerbaijan.

Study design and setting: This is a retrospective study of electrocardiographic recordings obtained between 2011 and 2012 in one clinical center in Baku, Azerbaijan, during routine check-ups of 1,079 males and females of the general population with an age range between 23 and 78 years (mean age 44 years). The presence of a J-wave in lateral, inferior/inferolateral, right precordial or all leads was evaluated by two independent cardiologists.

Results: The J wave electrocardiographic pattern was present in 66 subjects (6.12%). The ERS pattern was present in 63 subjects (5.84%), more specifically 1.4% ERS type 1, 4.4% ERS type 2 and 0% ERS type 3. The BrS pattern was present in 3 subjects (0.27%), all of which had a type 2 pattern.

Conclusion: The J wave syndrome electrocardiographic pattern is not rare in Azerbaijan's general population. The prevalence of both the ERS and the BrS pattern is similar to existing reports from other countries.

Keywords: Early repolarization; Brugada syndrome; J wave syndromes; J point elevation; Sudden cardiac death

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Introduction

There is an abundance of scientific material regarding the presence of a J-point elevation on the surface electrocardiogram. The Early Repolarization Syndrome (ERS) and the Brugada Syndrome (BrS) are electrophysiologic entities that are both characterized by prominent or elevated J-waves (among other features) in particular leads of the 12 lead electrocardiogram and although initially considered to be benign variants, nowadays it is recognized that they do indeed carry malignant potential and are associated with ventricular tachyarrhythmias and sudden cardiac death. The prevalence of these ECG patterns in Azerbaijan's population is unknown, so we decided to undertake a clinical study to determine that.

Methods

Study population

We retrospectively examined the ECG recordings of 1,079 healthy Azerbaijani subjects undergoing annual routine medical examinations between January 2011 and May 2012. Obtaining an informed consent was technically not feasible, so that we resorted to using anonymized ECG files for our investigation. The age and gender of the 1,079 subjects was provided to us also in an anonymous fashion from the staff of the archive department that was otherwise not involved in any way in the composition of this report. Among the subjects, there were 68% males and 32% females, aged between 23 and 78 years (mean age 44 years). The analyzed ECG's were 12 lead recordings obtained in a supine position at a paper speed of 25 mm/sec and amplitude of 10 mm/mV (ECG recorder Cardioline ar2100 view, Italy). The ECG's were then evaluated by two experienced cardiologists for the presence of J wave syndrome patterns, according to the following criteria: For the ERS pattern a J-point elevation of ≥ 0.1 mV in at least 2 of the lateral (ERS type 1) or inferior/inferolateral (ERS type 2) or all leads (ERS type 3, global), as classified by Antzelevitch and Yan

[1], with QRS slurring or notching and for the BrS pattern a J-point elevation of ≥ 0.2 mV with a concomitant coved pattern (type 1) or saddle-back pattern (type 2) ST-elevation in at least 2 right pre-cordial leads (V1-V3). The BrS ECG pattern was based on the latest consensus report on the electrocardiographic criteria for diagnosis of the Brugada pattern from 2012 [2] and thus divided in BrS pattern type 1 and type 2.

Electrocardiographic exclusion criteria included any brady- or tachyarrhythmia at the time of the ECG recording, complete right or left bundle branch block and signs of previous or current myocardial infarctions in the sense of pathologic Q waves and/or ST-segment elevations in infarction-typical localizations.

Statistical analysis

To minimize errors in the evaluation process, ECG's were assessed for inter-observer variability using "Cohen's Kappa coefficient". The Kappa value was 0.855 (95% confidence interval: 0.794 to 0.915; Kappa: 0.8 to 1.0=almost perfect). There was high statistical agreement between the observers [Agreement: 98.1% (Asymp. Std. Error: 0.031)]. The statistical analysis was performed using the Statistical Package for Social Studies (SPSS version 20.0 USA).

Results

A J wave syndrome ECG pattern was present in 66 (6.12%) of 1,079 subjects. Of the 66 subjects with an abnormal ECG, 87% were male and 13% female.

The ERS pattern was observed in 63 (5.84%) and the BrS pattern in 3 (0.27%) of the 1079 subjects. The ERS was found in lateral leads (ERS type 1) in 15 (1.4%), in inferior/infero-lateral leads (ERS type 2) in 48 (4.4%) and in all leads (ERS type 3) in 0 of 1,079 subjects. The BrS pattern was found in 3 of 1079 subjects, of which all 3 represented a type 2 pattern. Typical ECG examples of both ERS and BrS found in the studied population are displayed below, in Figure 1.

Discussion

The prevalence of the J wave syndrome ECG patterns in the studied population was found to be 6.12%, so relatively similar to previous population based reports [3,4]. We also found a very strong male predominance, with 87% of the J wave positive ECG recordings belonging to male subjects. However, we already know that both the ERS and the BrS pattern are far more common in men than in women and the reason for this gender predilection might be the more prominent transient outward potassium (Ito) current in males [5].

The reported prevalence of the ERS ECG pattern varies from 1.75% to 13.8% depending on the characteristics of the studied population [6,7] (age, gender, ethnicity, etc). In certain population collectives these numbers change dramatically. For example, in Cameroon the prevalence of the ERS pattern is 20% [8], among children with ADHD the prevalence of ERS is 32% comparing to 13% in healthy control children [9], in patients presenting with 'idiopathic VF' it is present in 31% [10] and in athletes it is present in about 30% to 44% [11].

The BrS ECG pattern on the other hand is rarer than the ERS pattern, ranging between 0,012% and 2% [12,13]. However, in particular patient groups it is seen more frequently, like for example at a Heart Rhythm Clinic in Singapore, where the prevalence of the BrS ECG pattern among people who presented with presyncope, syncope and/or palpitations was found to be a massive 7.1% [14].

Regarding the prevalence of J wave ECG patterns as such, Fuyuta et al. [6] reported a 2.03% in a hospital in Japan while Kui et al. [3] reported a higher prevalence of 7.26% in healthy Chinese subjects, which is closer to our own findings in Azerbaijan. In the study by Kui et al. [3] the most frequent finding was an ERS type 2 pattern (inferior/inferolateral) with 4.56% followed by an ERS type 1 pattern (lateral) with 2.2% and the BrS patterns with 0.5%, results which are very similar to ours (4.4%, 1.4% and 0.27% respectively). Interestingly, Tikannen et al. [4] also found a similar prevalence for the ERS type 2 and ERS type 1 patterns in Finland with 3.6% and 2.4% respectively.

Such similarities are not all that surprising and might stem from genetic relationships among Eurasian populations.

In conclusion, despite the relatively small size and single center methodology, our study is the first to report the prevalence of J wave syndrome ECG patterns in Azerbaijan, with findings similar to previously published studies from other countries.

Considering the arrhythmogenic potential and the risk of sudden cardiac death that these syndromes can carry with them, it is important to continue research in order to better determine the prevalence, better understand the mechanisms and better estimate the risks associated with them.

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References

1. Antzelevitch C, Yan GX. J wave syndromes. Heart Rhythm. 2010;7(4):549-58.
2. Bayes de Luna, Brugada J, Baranchuk A, Borggrefe M, Breithardt G, Goldwasser D, et al. Current electrocardiographic criteria for diagnosis of Brugada pattern: A consensus report. J Electrocardiol. 2012;45(5):433-42.
3. Kui C, Congxin H, Xi W, Yan-hong T, Okello E, Salim M, et al. Characteristic of the prevalence of J wave in apparently healthy Chinese adults. Arch Med Res. 2008;39(2):232-5.
4. Tikkanen JT, Anttonen O, Junttila MJ, Aro AL, Kerola T, Rissanen HA, et al. Long-term outcome associated with early repolarization on electrocardiography. N Engl J Med. 2009;361(26):2529-37.
5. Di Diego JM, Cordeiro JM, Goodrow RJ, Fish JM, Zygmunt AC, Perez GJ, et al. Ionic and cellular basis for the predominance of the Brugada syndrome phenotype in males. Circulation. 2002;106(15):2004-11.
6. Fuyuta M, Nakao S, Kitaura A, Iwamoto T, Hamasaki S, Iwasaki S, et al. Preoperative prevalence of J-wave syndrome electrocardiographic patterns and their association with perioperative cardiac events. J Cardiothorac Vasc Anesth. 2015;29(6):1533-6.
7. Vinsonneau U, Pinon B, Paleiron N, Rohel G, Piuemal M, Desideri-Vaillant C, et al. Prevalence of early repolarization patterns in a French military population at low cardiovascular risk: Implications for preventive medicine. Ann Noninvasive Electrocardiol. 2013;18(5):436-40.
8. Bonny A, Noah DN, Amougou NS, Saka C. Prevalence and significance of early repolarization in a black African population: Data of 246 individuals with cardiovascular morbidity. Cardiovasc J Afr. 2013;24(7):280-5.
9. Nahshoni E, Sclarovsky S, Spitzer S, Zalsman G, Strasberg B, Weizman A. Early repolarization in young children with attention-deficit/hyperactivity disorder versus normal controls: A retrospective preliminary chart review study. J Child Adolesc Psychopharmacol. 2009;19(6):731-5.
10. Haissaguerre M, Derval N, Sacher F, Jesel L, Deisenhofer I, de Roy L, et al. Sudden cardiac arrest associated with early repolarization. N Engl J Med.

2008;358(19):2016-23.

11. Tikkanen JT, Junttila MJ, Anttonen O, Aro AL, Luttinen S, Kerola T, et al. Early repolarization: Electrocardiographic phenotypes associated with favorable long-term outcome. Circulation. 2011;123(23):2666-73.

12. Patel SS, Anees S, Ferrick KJ. Prevalence of a Brugada pattern electrocardiogram in an urban population in the United States. Pacing Clin Electrophysiol. 2009;32(6):704-8.

13. Gervacio-Domingo G, Isidro J, Tirona J, Gabriel E, David G, Amarillo ML, et al. The Brugada type 1 electrocardiographic pattern is common among Filipinos. J Clin Epidemiol. 2008;61(10):1067-72.

14. Sidik NP, Quay CN, Loh FC, Chen LY. Prevalence of Brugada sign and syndrome in patients presenting with arrhythmic symptoms at a Heart Rhythm Clinic in Singapore. Europace. 2009;11(5):650-6.