

Differences in 12-Lead Electrocardiogram Between Symptomatic and Asymptomatic Brugada Syndrome Patients

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Brugada syndrome (BrS) is an inherited channelopathy that predisposes some subjects to sudden cardiac death (SCD). BrS is characterized by a coved type J-point and ST-segment in more than one right precordial lead (V1-3) in 12-lead electrocardiogram (ECG). This ECG abnormality is also known as the "Brugada sign" or type 1 Brugada ECG. It is not well established which BrS patients are at risk of severe arrhythmias. The aim of this study was to find out whether standard 12-lead electrocardiogram (ECG) would give useful information for this purpose.

The study included 200 BrS probands (142 male, 62%; mean age 42, 16 years follow up). Symptoms related to BrS were defined as syncope, documented ventricular tachyarrhythmia, or SCD. The authors determined PR, QRS, QTc, Tpeak, and Tend interval from leads II and V2 and QRS from lead V5, R/S ratio from lead aVR (aVR sign), QRS axis, and J-point elevation amplitude from right precordial leads from the baseline ECGs. SCN5A gene was screened in 51 subjects (26% from original population) and a mutation was detected in 25 subjects (50% from screened population)

Results: Sixty-six subjects (33%) had experienced symptoms related to BrS. The only significant difference between the symptomatic and asymptomatic BrS subjects was the **QRS**

duration measured from lead II or lead V2, (for example, the mean QRS in V2 was 115 ms in symptomatic versus 104 ms in asymptomatic patients ($P < 0.001$). The optimized cut-off point of V2 **QRS = 120 ms** gave an odds ratio (OR) of 2.5 (95% CI: 1.4–4.6, $P = 0.003$) for being symptomatic.

Basically, BrS is characterized by abnormal repolarization, which has been shown to increase the arrhythmia vulnerability. In addition to altered repolarization, prolonged QRS duration in BrS has been previously described and mentioned as one of the features related to BrS. Thus, BrS is also associated with abnormal depolarization and impulse conduction. The present data show that this conduction abnormality may also be important in the genesis of clinical arrhythmias in BrS. The reasons why prolonged QRS duration is associated with symptoms and vulnerability to ventricular tachyarrhythmias in BrS are speculative. In approximately 20% of BrS subjects, the decreased sodium current is directly due to the mutation of the SCN5A gene that encodes the pore-forming region of the sodium channel, but in the rest the genetic background is still unknown. It is possible that more marked abnormality in the INa current results in prolonged depolarization, in addition to repolarization abnormality, and thereby increases the risk of arrhythmias.

Conclusion: Prolonged QRS duration, measured from standard 12-lead ECG, is associated with symptoms and could serve as a simple noninvasive risk marker of vulnerability to life-threatening ventricular arrhythmias in BrS. The aVR sign, TpTe, or any other standard ECG measure did not differ significantly between the symptomatic and asymptomatic patients.



Comment on the paper:

Juntilla M Juhani, Brugada Pedro, Hong Kui, Det M et al – Differences in 12-Lead Electrocardiogram Between Symptomatic and Asymptomatic Brugada Syndrome Patients, *J Cardiovasc Electrophysiol* 2008;19(4) :380-383.