



# Clinical Quiz

## Answers

1. Brugada syndrome.
2. Familial, displaying autosomal dominant inheritance with incomplete penetrance
3. ST-segment elevation in the right precordial leads followed by negative T-waves or rapid polymorphic ventricular tachycardia (VT), unrelated to ischemia and structural heart disease.
4. Implantable cardioverter-defibrillators.

## Discussion

Brugada syndrome (BS) is a familial syndrome, which displays autosomal dominant inheritance with incomplete penetrance, and the incidence ranges between 5 and 66/10,000.<sup>1</sup> It is now recognized with increased frequency worldwide, and its highest prevalence appears in southeast Asia.<sup>2</sup> It has a male predominance (male:female ratio 8:1), and arrhythmic events usually appear. It is a relatively new disease. In 1986, the first case referred to the Brugada brothers was a 3-year-old boy with recurrent episodes of syncope.<sup>2</sup> His ECG showed elevations of the ST-segment in the right precordial leads (V1 - V3). His sister, having also displayed syncopal attacks and ECG abnormalities, had died at the age of 2. It only became known as BS in the early nineties, and immediately received international attention because of its relation with sudden cardiac death (SCD). The typical ECG abnormalities of BS are: 1. Attenuated J-wave mostly in the precordial leads (V1 - V3), which takes the form of ST-segment elevation and is often followed by negative T-wave; 2. Very closely coupled extrasystoles; 3. Rapid polymorphic VT (at times very similar to ventricular fibrillation), all these changes must be unrelated to ischemia, electrolytic imbalances or structural heart disease;<sup>3</sup> 4. History of SCD of relative (age <45 years); 5. Syncopal episodes or nocturnal agonal respiration, or both.<sup>1</sup> Of note, 3 out of the 6 male patients, presented as case-series by the Brugas, had prolonged QTc.<sup>1,4</sup> The genetic research has identified one gene (SCN5A), encoding for the  $\alpha$ -subunit of the sodium channel, as responsible for the BS.<sup>1</sup> Therefore, it seems logical that medications with potent sodium channel-blocking activity such as flecainide and procainamide, can be used in drug challenge tests to elicit the ECG phenotype of BS in patients with intermittently normal ECG, but with appropriate clues from the patient's history. Obviously, due to the increased risk of precipitating ventricular arrhythmia, challenge tests should always be performed with the patient under continuous monitoring and resuscitation facilities at hand distance.<sup>1</sup>

The differential diagnosis of BS is extensive, and includes mostly diseases and factors that can lead to ST-segment elevation in the right precordial leads. With these, it is worth mentioning the arrhythmogenic right ventricular cardiomyopathy, which can present with the same ECG phenotype as BS, and its structural heart abnormalities may only be found at the time of the autopsy.<sup>1</sup> Implantable cardioverter-defibrillators, together with a high level of clinical suspicion is necessary for the diagnosis, and still represents as the only effective mode of dealing with BS.<sup>3</sup>

**Acknowledgment:** We thank Dr. S. Bhat for his invaluable support with the images of the article.

## References

1. Wilde AA, Antzelevitch C, Borggrefe M, Brugada J, Brugada R, Brugada P, et al. Proposed diagnostic criteria for the Brugada syndrome. *Eur Heart J* 2002; 23: 1648-1654.
2. Hong K, Antzelevitch C, Brugada P, Brugada J, Ohe T, Brugada R. Brugada syndrome: 12 years of progression. *Acta Med Okayama* 2004; 58: 255-261.
3. Antzelevitch C, Brugada P, Brugada J, Brugada R, Shimizu W, Gussak I, et al. Brugada syndrome: A decade of progress. *Circ Res* 2002; 91: 1114-1118.
4. Brugada P, Brugada J. Right bundle branch block, persistent ST segment elevation and sudden cardiac death: a distinct clinical and electrocardiographic syndrome. A multicenter report. *J Am Coll Cardiol* 1992; 20: S1391-1396.