Case study

Unmasking Brugada syndrome with oral flecanide provocation. A case series of three patients.

Abstract

The present case series discuss three patients who had brugada type 2/ type 3 like ECG pattern that was converted to type 1 pattern with oral flecanide challenge test. Brugada syndrome is associated with a high incidence of sudden cardiac death, typical ECG pattern being ST-segment elevation in the right precordial leads with T wave inversion. Pharmacological provocation should only be performed when the baseline ECG is not diagnostic of Brugada Syndrome. PR prolongation in the baseline ECG is also a contraindication because of the risk of inducing AV block. Drug challenge is performed under strict monitoring of BP and 12-lead ECG and facilities for cardio version and resuscitation are available. Atypical RBBB pattern/type 2/3 Brugada pattern on ECG in patients of syncope or family history of sudden cardiac arrest is commonly encountered by a cardiologist. This can be performed to provoke type 1 brugada pattern on ECG. Diagnosed cases of Brugada may be treated with ICD with proper indication if needed and thus prevent sudden cardiac death.

Keywords: Brugada syndrome, AV block, oral flecanide, Coronary Angiography

Introduction

Brugada syndrome is associated with a high incidence of sudden cardiac death, typical ECG pattern being ST-segment elevation in the right precordial leads with T wave inversion. Many subjects in community have non-type 1 Brugada pattern ECG with atypical symptoms, relevance of which is not clear. Provocative tests to unmask type 1 Brugada pattern in these patients would help in diagnosing Brugada Syndrome. In the present case series we will discuss three patients who had brugada type 2/ type 3 like ECG pattern that was converted to type 1 pattern with oral flecanide challenge test.

Case report

We report case series of three persons, all of them tested positive for Flecanide provocation test.

Case 1 - A 40 year old male presented to emergency room with retrosternal chest pain from 2 days and intermittent palpitations with past history of syncope .His Ekg (fig 1 a) was recorded and showed sinus rhythm rate of 64 min with a ORS axis of 60 degrees. Lead V1 showed atypical incomplete RBBB pattern and QRS duration of 100 milliseconds with less than 2 mm elevation of J point The QTc was 390 milliseconds. Echocardiography was normal, his cardiac enzymes were borderline positive so a Coronary Angiography was planned for which revealed normal coronaries. Since patient had past history of syncope and baseline RBBB with type 2 brugada like pattern it was decide to carry out Flecanide test.

Case 2- Second patient who was a medical student, had a history of syncope in Operation theater with no other symptoms. There was significant positive family history of sudden cardiac death of paternal uncle at the age of 38 years was present. Ecg (fig no 2a) recorded showed sinus rhythm with qrs axis being 60 degree and QTc being 380 milliseconds. Atypical RBBB pattern with slight elevation of J point was seen in lead V1. It was decided to perform provocation test with him as well.

Case 3 – A 46 year old male patient was admitted to emergency ward with history of palpitation but no syncope.He had history of sudden cardiac death of father 8 years back. ECG (fig no 2a) recorded was suggestive of sinus rhythm with heart

rate of 72 minute with RBBB and J point elevation of less than 2 mm, QTc being 398 milliseconds with normal axis of 50 degrees.

We subjected all the three patients with oral loading dose of 400 mg of flecanide , since the i/v formulation is not available in our country, then serial ECG were done at every 5 minutes for first 30 min and then at every 30 min for next 6 hours. The QRS duration and PR intervals and the QT – T pattern were observed . All the three patients developed typical type 1 brugada pattern on flecanide provocation test with J point elevation more than 2 mm with downsloping /descending ST segment(fig no 1b,2b,3b) which latter returned to normal as base line Ecg making it positive test. None of the patient developed Ventricular tachycardia though one patient showed run of NSVT.

Discussion

Brugada syndrome is associated with a high incidence of sudden cardiac death, typical ECG pattern of J point elevation greater than 2 mm with elevated, coved and descending ST segment followed by T wave inversion in the right precordial leads (V_1–V_3)[(1)]. Intensive screening among patients with aborted sudden death or syncope resulting from polymorphic ventricular tachycardia has increased the number of patients since the first report by Brugada et al[(3)]. The penetrance and expressivity of disorder is highly variable ranging from lifelong asymptomatic to SCD in infancy. Brugada is mainly caused due to loss of function mutation of SCNa 5 channels [(2)] .Pharmacologic challenge with intravenous administration of sodium channel blockers has been suggested to unmask the ECG pattern in patients with Brugada syndrome.[2,3]

Brugada Syndrome causes predominance of early depolarization currents which results in loss of action potential dome and shortening of action potential in RVOT region causing ST segment elevation and arrhythmic manifestations. Another theory suggests that an outward shift in balance of currents leads to phase 2 re-entry and generation of coupled premature beats and VT/ VF. [(3).]

A variety of drugs, such as flecanide, ajmaline, procainamide, reportedly provoke typical ST-segment elevation [3-8] because of their sodium channel blocking property. However recently Prasad et al [10] used flecanide both oral and iv for provocation testing in Brugada syndrome. We in present study used oral flecanide for provocation testing. It is FDA approved for treating life threatening ventricular arthymias. Flecanide which is class Ic anti arrhythmic causes reduction in depolarizing Na current and thus may unmask underling ECG changes. Dose [1], [8] IV: 2 mg/Kg for 10 min as infusion max 150 mg and oral: 400 mg in stat doses. The sensitivity and specificity of flecanide test in SCN5A mutation-positive probands and their families has been reported as 77% and 80%, respectively [4]. ECG monitoring (apart from continuous bed side telemetry) with normally placed 12 lead ECG and one space above right sided leads is carried out with ECGs done every 5 min for first 30 min, and then at 30 min interval till 6 h or till abnormalities revert. Plasma half-life of flecanide is 20 hours so patients must be monitored for 24 to 48 hours post drug administration. Since only oral preparations are available in India we performed the test with oral agents Inducible Type 1 Brugada pattern in at least 2 right sided leads were considered as positive provocation test. [4-8]

Pharmacological provocation should only be performed when the baseline ECG is not diagnostic of Brugada Syndrome. PR prolongation in the baseline ECG is also a contraindication because of the risk of inducing AV block. Drug challenge is performed under strict monitoring of BP and 12-lead ECG and facilities for cardio version and resuscitation are available. Isoprenaline infusion may be employed to counteract if serious ventricular arrhythmias develop. [9]

A similar study carried out on 29 patients by Prasad et al from India with non type 1 Brugada syndrome or with aborted sudden cardiac history was subjected to flecanide provocation test and 55 % of patients developed type 1 like pattern [10] which is very much similar to our current study but we selected patients that were type 2 and type 3 brugada syndrome instead and our result was positive in all three cases.

Conclusion - Atypical RBBB pattern/type 2/3 Brugada pattern on ECG in patients of syncope or family history of sudden cardiac arrest is commonly encountered by a cardiologist. This must be taken seriously and flecanide provocation should be

carried out which is a simple and cheap modality for risk stratification. This can be performed to provoke type 1 brugada pattern on ECG. Diagnosed cases of Brugada may be treated with ICD with proper indication if needed and thus prevent sudden cardiac death.

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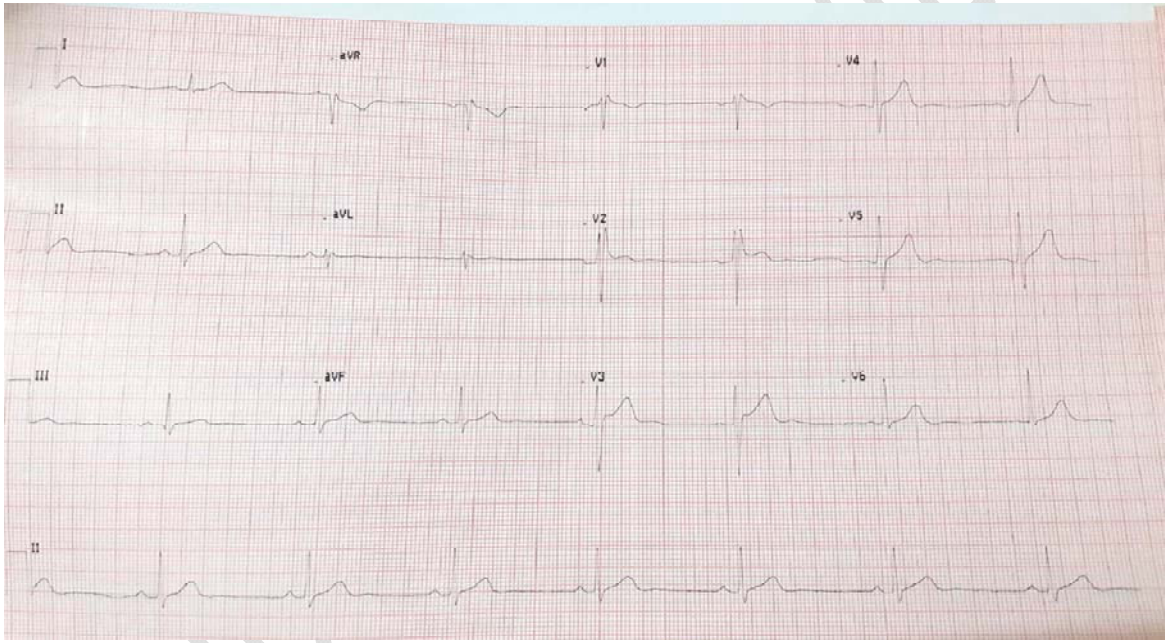

Figure 1a : Case 1 Pretest ECG showing type II

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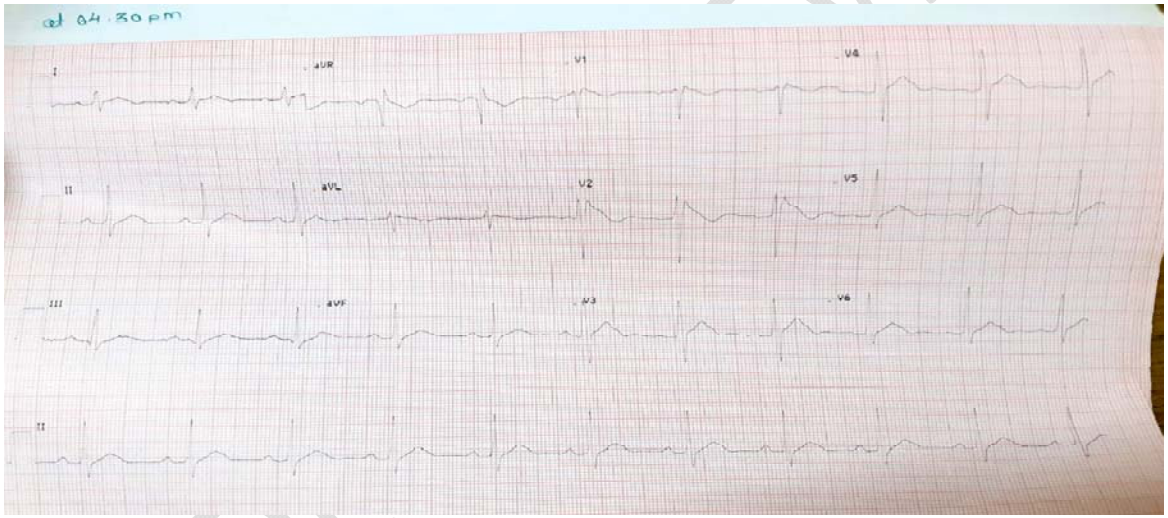

Figure 1b : Case 1 Post flecanide test ECG showing conversion to type I pattern J point elevation more than 2 mm with downsloping ST segment

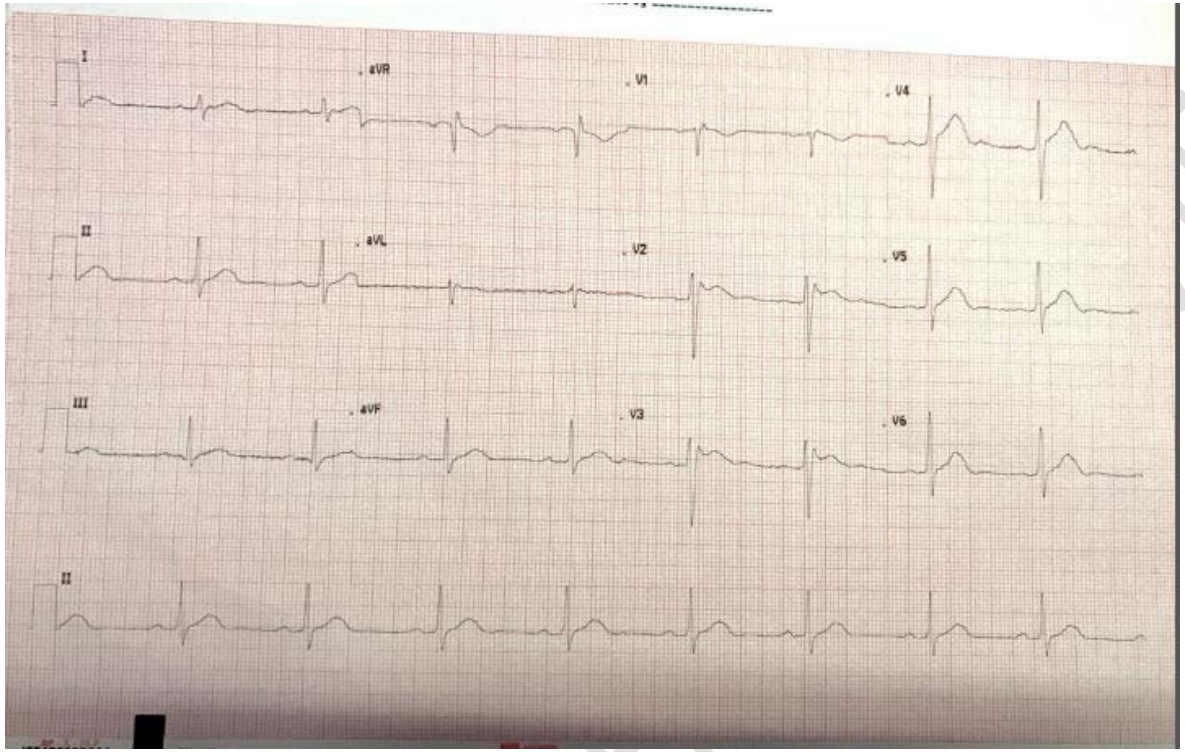

Figure 2a : Case 2 Pretest ECG showing type II

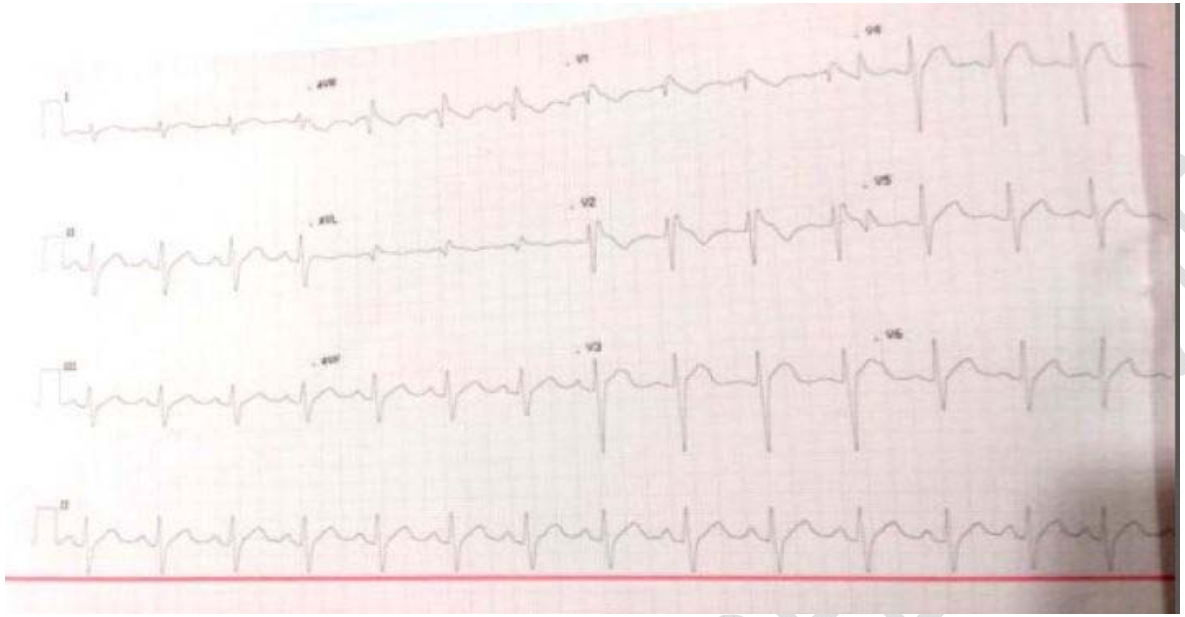

Figure 2b : Case 2 Post flecanide test ECG showing conversion to

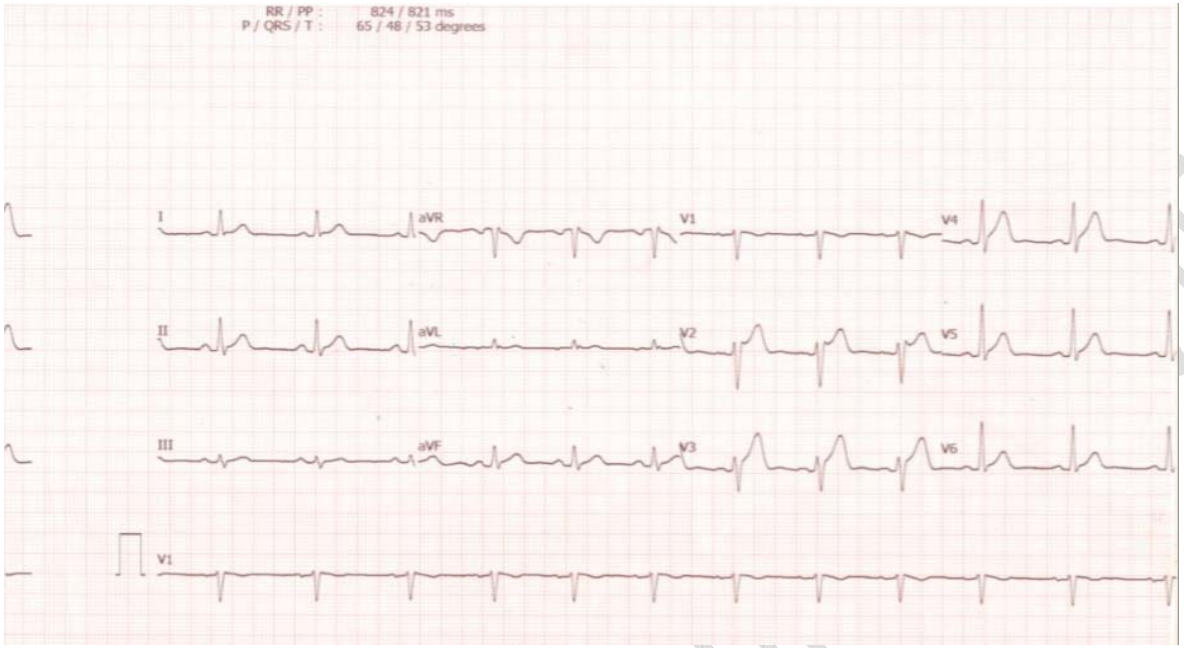

Figure 3a : Case 3 Pretest ECG showing type III

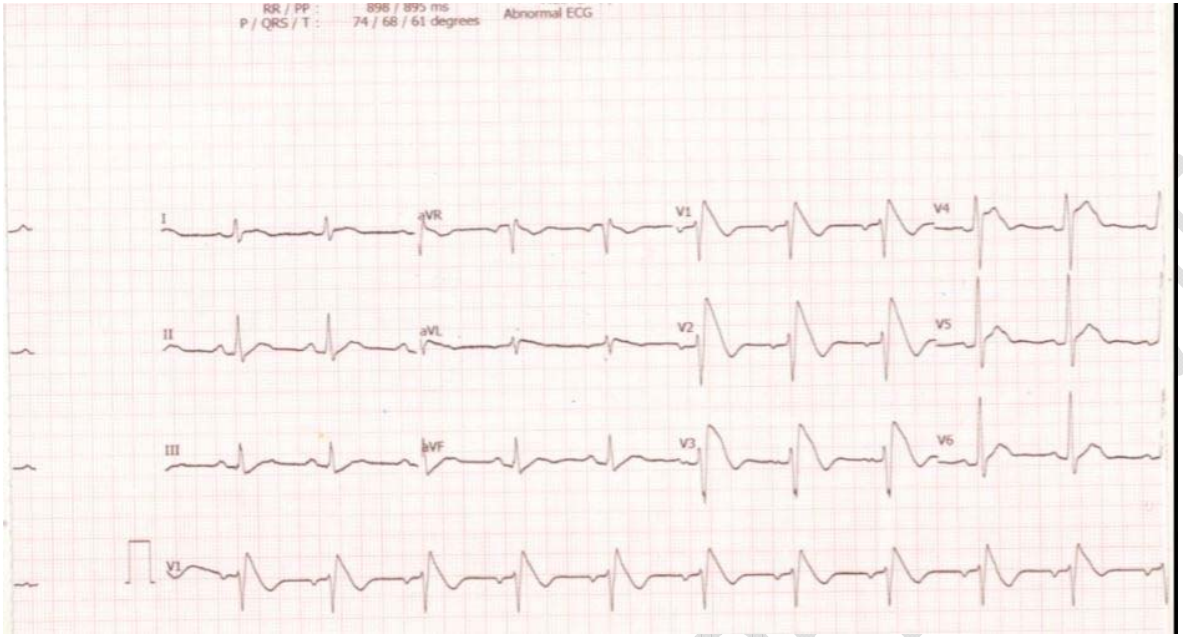

Figure 3b : Case 3 Post flecanide test ECG showing conversion to type I