

## Brugada-pattern ECG in a Survived case of Aluminium-Phosphide Poisoning

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### ABSTRACT

The *Brugada syndrome* refers to atypical right bundle branch block pattern in the electrocardiogram occurring as familial tendency and the pattern is associated with sudden death. The same electrocardiographic pattern can occur in patients with intoxication by various agents. Tricyclic antidepressant poisoning is a known cause of this pattern. We hereby report a case where the *Brugada* pattern of ECG was seen in a young male patient with aluminium phosphide poisoning. The changes reverted back to normal after successful treatment.

**Keywords :** atypical right bundle branch block; pesticide; phosphine

### INTRODUCTION

The *Brugada syndrome* refers to atypical Right Bundle Branch block pattern in the electrocardiograph (ECG) seen as a familial tendency and is associated with sudden cardiac death.<sup>1</sup> The same ECG pattern can also be seen secondary to various other causes including poisoning. Tricyclic antidepressant poisoning is a known cause of this pattern.<sup>2</sup> Aluminium phosphide (ALP) is a pesticide commonly used by agriculturists all over India. Due to easy availability suicidal poisoning by this agent is common. ALP has direct toxic effects on all major organs and cardiovascular involvement leads to myocarditis. Various ECG changes such as atrial fibrillation, premature supraventricular and ventricular contractions, bundle branch blocks, sinoatrial blocks are known to occur as a result of ALP induced myocarditis.<sup>3-6</sup> Aluminium Phosphide has also been implicated as a cause of *Brugada* like pattern in ECG in a few reports.<sup>7,8</sup> We hereby report a case where the *Brugada* pattern was observed in a patient with ALP poisoning.

### CASE-REPORT

A 28 year old male was brought to the emergency department with a history of deliberate consumption of one tablet of aluminum phosphide tablets two hours prior to presentation. He had vomiting and pain abdomen. He did not have any chest pain or palpitations. On

examination he was conscious and oriented. Pulse-110bpm, B.P-110/70 mm Hg. Systemic examination was normal. ECG on admission was normal. Gastric lavage was done with potassium permanganate and he was shifted to intensive care unit. N-Acetyl Cysteine (150 mg/kg over 1 hour then 50 mg/kg over 4 hours followed by 100mg/kg over 16 hours) and Magnesium Sulphate (1 gm in 100 ml NS over 1 hour, hourly for first 4 hours then 1 gm in 100 ml NS over 1 hour every 4th hourly for next 20 hours) were started. The patient was stable thereafter. However he reported palpitations and fatigue the next day. And examination revealed hypotension with a BP of 80/60 mm Hg. ECG taken at that time showed right bundle branch block with down-sloping ST elevation in V<sub>1</sub>-V<sub>3</sub> with an appearance suggestive of the *Brugada* pattern. (**Figure1**).

The Troponin-T was elevated to the cardiac injury range (0.06 Units. The normal range being 0.01 to 0.0248 Units). The Patient was put on inotropic support. On the second day there was reduced urine output. Renal parameters revealed acute kidney injury with blood urea of 277mg/dl and serum creatinine of 4.7mg/dl. His condition improved with dialysis and supportive treatment. ECG on subsequent days showed reduction of the ST segment elevation. At the time of discharge on the 5th day the ST elevation had reverted back to normal (**Figure2**).

### DISCUSSION

*Brugada syndrome* described by *Brugada* and *Brugada* in 1992 is a condition characterised by i) ST segment elevation in right precordial leads V<sub>1</sub> V<sub>2</sub> and V<sub>3</sub> in the absence of acute coronary syndrome, ii) right bundle branch block, iii) susceptibility to ventricular tachycardia and iv) a structurally normal heart. It is common in Southeast Asians with a male to female ratio of 8:1. Clinical manifestations include syncope or cardiac arrest because of arrhythmia, the most typical being rapid polymorphic VT that can degenerate into ventricular fibrillation.<sup>1</sup>

Three types of ECG patterns have been identified, namely type I (coved type ST segment elevation in precordial

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leads V<sub>1</sub>, V<sub>2</sub> and V<sub>3</sub>), type II (saddle-back type) and type III (right precordial saddle back type ST segment with minor deviation from the isoelectric segment). Of these the “coved” ST segment elevation or type 1 is presently considered diagnostic for Brugada syndrome.

The Brugada Pattern has also been noted to occur due to various other causes such as drug intoxications. Kiran et al from our institution has reported the occurrence of Brugada -pattern in Dothepin overdose.<sup>2</sup> Brugada ECG pattern has been recognised to be an indicator of poor prognosis with an increased susceptibility to life threatening arrhythmias.

Aluminium phosphide (ALP) poisoning is on the rise in India and easy availability is a factor. ALP gets converted in the stomach to phosphine which acts by blocking cytochrome oxidase and mitochondrial oxidative phosphorylation. Myocarditis causing cardiogenic shock is the commonest cardiovascular manifestation. Among the reports of ECG abnormalities in aluminum phosphide poisoning. Mathur<sup>3</sup> reported sinus tachycardia and

complete heart Chugh<sup>4</sup> reported conduction disturbances, ischemic changes, early repolarisation, bradycardia tachycardia syndrome and electrical alternans. Increased PR interval was described in the report by Raman<sup>5</sup> and Alexandraare<sup>6</sup> SA Block has been reported by Nayyar.<sup>7</sup> In the case report by Devender Singh<sup>8</sup> hypomagnesaemia was implicated in the unmasking of the *Brugada* pattern.

### CONCLUSION

Physicians managing patients with Aluminium Phosphide Poisoning should be aware of the protean cardiovascular and ECG manifestations including the rarer Brugada Type ST elevation pattern and a careful monitoring of ECG changes should be practiced.

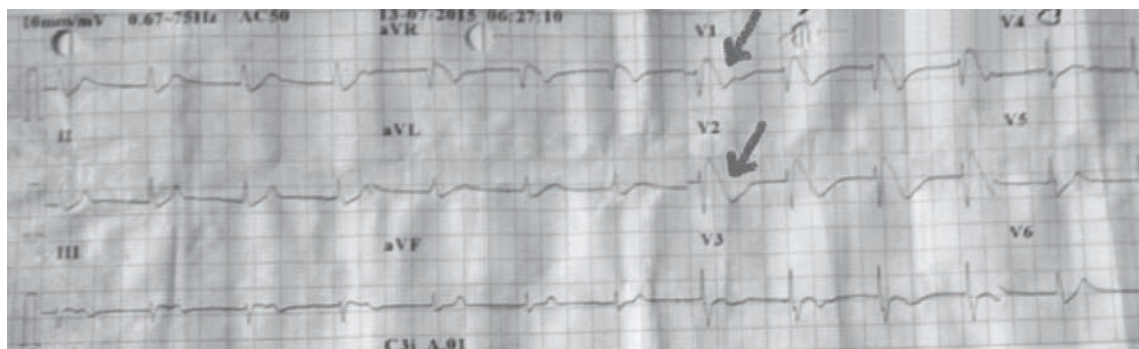
### ACKNOWLEDGEMENTS

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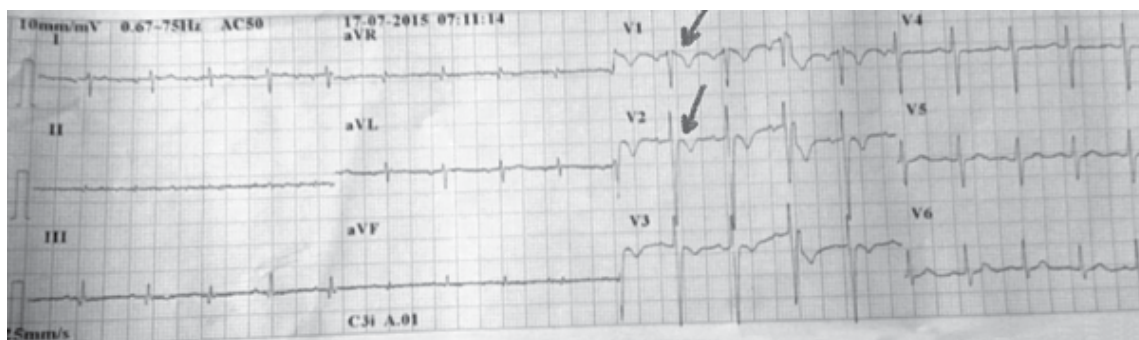
### CONFLICT OF INTEREST

Declared None.

**Fig 1:** ECG showing RBB morphology with ST elevation (red arrow) characteristic of Brugada Pattern.



**Fig 2:** ECG on the 5th day showing return of ST-segment to baseline (red arrow)



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