

## Case Report

# Complex uninterpretable electrocardiogram and syncope

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### ABSTRACT

Electrocardiogram (ECG) is an essential component as diagnostic modalities in cardiovascular diseases. A wide spectrum of diseases can be diagnosed by ECG. Conduction disturbances manifest in ECG with characteristics manner. Sometimes these manifestations are not interpretable with the current concept of cardiovascular physiology. Here I have reported such an interesting ECG which is complex and difficult to interpret.

**Keywords:** Electrocardiogram, Atrioventricular conduction disturbances, Left anterior fascicular block, Right bundle branch block, Electrophysiology study

## INTRODUCTION

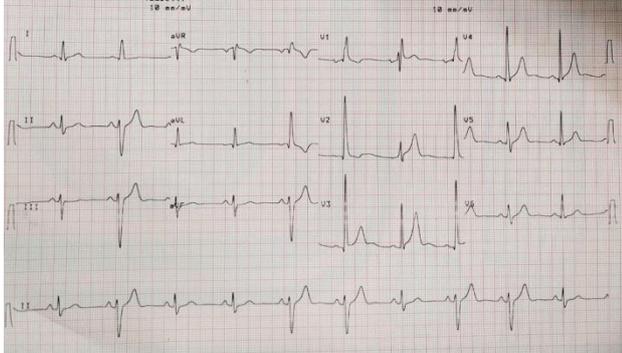
Electrocardiogram (ECG) has a long and fascinating history. Since the first description of morphological deflections in electrocardiogram by Einthoven over the time it has become an essential diagnostic modality in cardiovascular science.<sup>1</sup> From chest pain to palpitation all the spectrum of symptoms related to cardiovascular diseases can be diagnosed with the help of ECG. It has been a basic as well as confirmatory tool to diagnose certain diseases and to dictate the treatment for the same accordingly. Conduction disturbances manifests in the ECG with characteristics manner. Several diagnostic criterias has been laid down to diagnose conduction disorder.<sup>2</sup> Syncope which is often associated with underlying cardiovascular pathology, results from conduction disturbances. ECG can interpret these disturbances with certainty and helps in determining proper treatment for the same. But sometimes findings in ECG cannot be explained properly in spite of extensive knowledge and advancement in cardiovascular rhythm disorder. Here I have reported such an interesting ECG which is very difficult to interpret based on our current concept of cardiovascular physiology.

## CASE REPORT

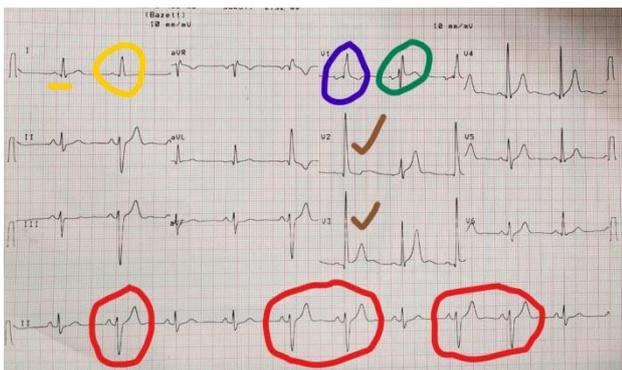
A 48 years old gentleman presented with repeated episodes of palpitations and one episodes of syncope few days back. He is non diabetic, non-hypertensives and was not on any regular medications for cardiovascular disease. He had no significant past history of any major illness nor any family history of such. His ECG has been depicted here in ECG 1 (Figure 1) and ECG 2 (Figure 2) (with markings). ECG revealed HR of 64/minutes, PR interval 154 ms, duration of P wave 104 ms, QRS duration 106 ms and QTc interval of 400 ms. Axis of P wave was found to be plus 63 degree and that of QRS complex axis is minus 8 degree. Incomplete right bundle branch block (RBBB) pattern (green coloured circle) along with small q and monophasic wide R complex (blue circle) seen in V1. Lead I show normal sinus rhythm (yellow line) with different QRS morphology in the 2nd beat (yellow circle). Long lead II shows multiple aberrant conduction (2nd, 5th, 6th, 7th, 9th red coloured circle) suggestive of left anterior fascicular block (LAFB) pattern. But several questions arise now.

**Questions?**

If it is considered that the same P wave is being conducted then it looks like LAFB. But why it is intermittent? Is it acceleration dependent or deceleration dependent block? Can it be a case of masquerading block?



**Figure 1: ECG 1: Showing ECG findings of the patient.**



**Figure 2: ECG 2 with markings of the same patient. Illustration of the markings has been done in the description.**

**DISCUSSION**

The whole findings cannot be explained by acceleration dependent block (ADB) (phase 3) or deceleration dependent (phase 4) block (DDB). Deceleration dependent block is less common than acceleration dependent block in medical literature. The first case of deceleration dependent block was reported by Dressler.<sup>3</sup> Criteria established by Masumi,<sup>4</sup> for DDB that includes five points has not been fulfilled here. ADB has been reported in the medical literature with and without associated left ventricular dysfunction, which often manifests as left bundle branch block pattern. Paroxysmal AV block in sinus node accelerated rate is not evident here in the ECG provided. Masquerading bundle branch

block and its types was described by Richman JL and Wolff.<sup>5</sup> Masquerading bundle branch block is thought to be caused by high grade LAFB with RBBB and underlying extensive disease of the left ventricle and hence the poor prognosis. The clinical spectrum, normal LV function and absence of typical pattern do not categorize this ECG as masquerading bundle branch block (neither standard nor precordial type). Thus, it is an unique ECG with questionable diagnosis. Every explanation has its own contradictions. The details of such questions can be answered by electrophysiological study. Therefore, it is an ECG which cannot be interpreted on the basis of current concept of conduction in present times. EP study is essential to reveal the underlying abnormality of aberrant conduction in such cases.

**CONCLUSION**

Interpretation of ECG sometimes poses difficulties due to various findings which cannot be explained by simple single etiology. In spite of advancement in understanding the pathophysiology of conduction disturbances bundle branch block with its various presentation in surface ECG may pose difficulties in interpretation. Electrophysiological study may become necessary to reveal abnormalities in the conduction system.

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