

# Fresh Right Bundle Branch Block (RBBB) by Serial Electrocardiography Identifying Fatal Pulmonary Embolism

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## ABSTRACT

Considering the grave situation of the patient, in pulmonary embolism, imaging is often difficult and impractical. We identified pulmonary embolism with the presence of a new right bundle branch block in serial electrocardiographs which were taken of

a 65-year old critically ill woman, who was on DVT prophylaxis. Even with the improvement in the hospital practice over the decades, pulmonary embolisms still remain a silent and fatal threat to the critically ill, post surgical and bed bound patients the world over.

**Key Words:** RBBB, Electrocardiograph, Acute pulmonary embolism, Fresh RBBB

## INTRODUCTION

Pulmonary embolism is a major cause of sudden deaths in hospitalized patients [1]. Specific electrocardiographic patterns are described in pulmonary embolism [2, 3, 4]. We are reporting here a case of fatal pulmonary embolism in a 65-year old, which was identified from serial electrocardiographs which showed a fresh right bundle branch block and a change of axis. Electrocardiographic findings in appropriate clinical settings can raise or reinforce the suspicion of pulmonary embolism.

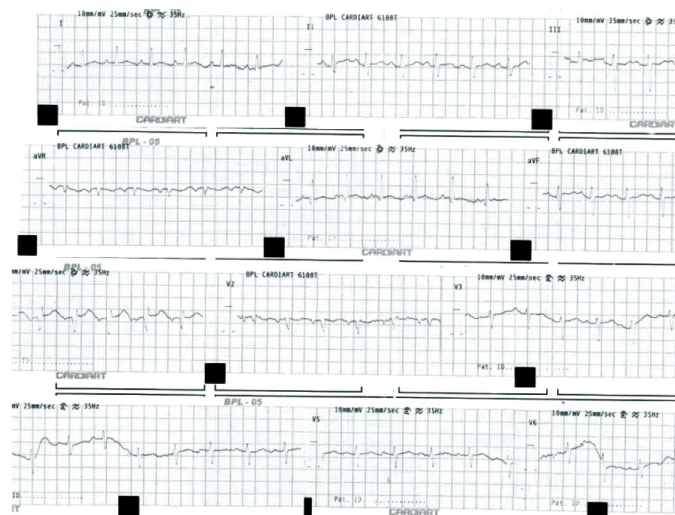
## CASE REPORT

A 65-year old, obese (diabetic and hypertensive) woman, with history of chronic obstructive lung disease, presented to us with tachypnoea, tachycardia and bilateral rhonchi in the lungs. The rest of the systemic examination was normal and there were no clinical signs of deep vein thrombosis. She was managed in the ICU with oxygen, bronchodilators, antibiotics and chest physiotherapy. Laboratory investigations and ECG which were done [Table/Fig-1] were normal. The patient showed good improvement in her clinical condition and was shifted to the ward. On the second day, she developed sudden breathlessness and collapsed. The ECG showed a new onset right bundle branch block [Table/Fig-2]. The changes and her clinical symptoms were suggestive of pulmonary embolism [4, 5, 6]. After her admission to the hospital, she was on DVT (deep venous thrombosis) prophylaxis with low molecular weight heparin. Despite the timely resuscitative measures, the patient could not be revived. The D-dimer and the FDP levels which were sampled prior to her death were suggestive of venous thrombosis.

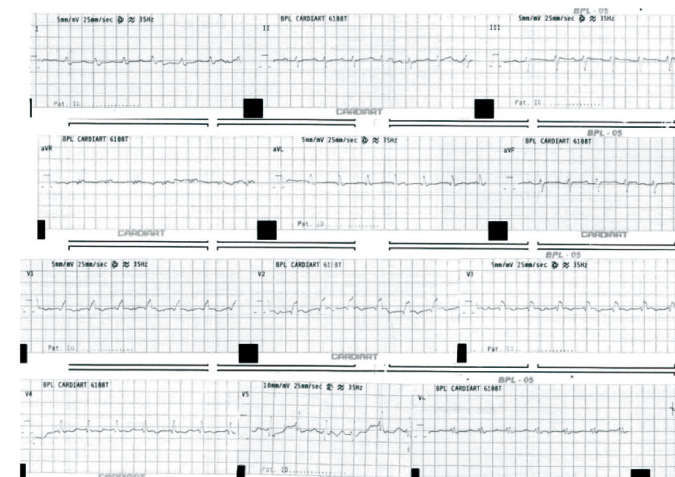
## DISCUSSION

Pulmonary embolism is a well anticipated complication in any critically ill, bedridden or post-surgical patient. Pulmonary embolism remains the primary diagnosis which has to be considered, if such patients develop acute respiratory distress [1]. With the use of anti-coagulants and physical therapy, the incidences have reduced over the years. Changes in the electrocardiographs along with the clinical features of acute onset respiratory distress can facilitate

an early diagnosis and appropriate treatment for this potentially life-threatening condition [2].



**[Table/Fig-1]:** ECG showing left axis deviation, QS pattern in lead V1-2



**[Table/Fig-2]:** ECG showing shift of axis to right as compared to earlier electrocardiogram, acute right bundle branch block and T inversions in chest leads

The various electrocardiographic features of pulmonary embolism which have been described in the literature [3, 5, 6, 7, 8] vary from alterations in the rhythm and conduction of the heart, alterations in the axis of the QRS complex, and alterations in the morphologies of the P wave, the QRS complex, the ST segment and the T wave. The classical manifestations of pulmonary embolism are  $S_1Q_3T_3$ , right bundle branch block, P pulmonale, or right axis deviation [2, 3, 4, 6]. Other rhythm changes like sinus tachycardia, atrial flutter, atrial fibrillation, atrial tachycardia, atrial premature contractions, nonspecific ST segment/T wave changes, T wave inversions in the right precordial leads, the rightward QRS complex axis shift and other axis changes are described in pulmonary embolism [3, 4, 6, 8].

The electrocardiograph in this patient, who collapsed suddenly due to acute breathlessness, showed a fresh right bundle branch block. Many published reports have highlighted the appearance of the acute right bundle branch block as a manifestation of pulmonary embolism [9, 10, 11]. Stein PD et al [8] studied the electrocardiographs of 90 patients with arteriographically proven pulmonary embolism and observed that only 26 percent of the patients had the classical manifestations of pulmonary embolism, like  $S_1Q_3T_3$ , right bundle branch block, p pulmonale, or right axis deviation. They concluded that electrocardiography alone could not diagnose pulmonary embolism and that most of the variations other than the T wave abnormalities reverted within two weeks of their occurrence. Fudello et al [12] observed a new right bundle branch block in 80% of the patients with massive trunk embolism, but in none with peripheral pulmonary arterial embolism.

The mechanism of these electrocardiographic changes in acute pulmonary embolism is multivariate. Catheterization studies have shown that the acute ventricular dilatation which occurs in pulmonary embolism, due to the elevated pulmonary arterial mean pressure and/or the right ventricular end-diastolic pressure could be the most possible mechanism behind this condition [12, 13].

This case report highlights that new onset of electrocardiographic changes can arouse the suspicion of pulmonary embolism in appropriate clinical settings and that these can be used to initiate the therapy.

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