Case Report

Masquerading bundle branch block as a marker of poor prognosis

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A B S T R A C T

Masquerading bundle branch block is a rare and unique finding on a 12-lead electrocardiogram, consisting of the pattern of right bundle branch block in the precordial leads and left bundle branch block in the limb leads. We experienced a 77-year-old woman with masquerading bundle branch block. She had been well, but died suddenly 9 months after the diagnosis of masquerading bundle branch block. The presence of masquerading bundle branch block indicates severe degeneration of the conduction system, leading to a poor outcome.

Learning objective: Masquerading bundle branch block is a rare and unique finding on a 12-lead electrocardiogram, consisting of the pattern of right bundle branch block in the precordial leads and left bundle branch block in the limb leads. The presence of masquerading bundle branch block indicates severe degeneration of the conduction system, leading to a poor outcome. Close follow-up is mandatory in patients with masquerading bundle branch block even if they do not have any symptoms.

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Introduction

Masquerading bundle branch block, established in 1954 by Richman and Wolff [1], is a rare electrocardiographic finding consisting of the pattern of right bundle branch block and left bundle branch block on a 12-lead electrocardiogram [2]. We report a patient with heart failure who died suddenly 5 months after the diagnosis of masquerading bundle branch block.

Case report

A 77-year-old woman was admitted to our hospital because of shortness of breath. She had been well until approximately a month earlier, when dyspnea developed upon exertion and her appetite decreased with a body weight increase of more than 3.0 kg. Several days before admission, she saw her physician. A chest radiograph reportedly showed cardiomegaly with pulmonary congestion. Furosemide was prescribed for a provisional diagnosis of heart failure. Her symptoms had improved to some degree and body weight had returned to baseline.

The patient had undergone laminecstomy for lumbar spinal stenosis at the age of 69 years and had undergone surgery for early esophageal cancer at the age of 71 years, without any complications or recurrence. She had a more than 10-year history of hypertension that had been well controlled at least for a few years with arotinolol hydrochloride (20 mg daily), nifedipine (60 mg daily), enalapril maleate (10 mg daily), losartan potassium (50 mg daily), and doxazosin mesilate (5 mg daily). She had no known allergies and had never smoked, used illicit drugs, or drunk alcohol.

On examination, the patient was alert. Her temperature was 36.4 °C, blood pressure was 158/78 mmHg, pulse was 90 beats per minute and regular, respiratory rate was 18 breaths per minute, and oxygen saturation was 96% while she was breathing ambient air. The conjunctivae were not pale; the jugular veins were slightly distended; no heart murmur was audible without the third or fourth sounds; the respiratory sound was clear throughout both lung fields; and pretibial edema was not present.

A chest radiograph showed a cardiothoracic ratio of 50% and slight pulmonary congestion without pleural effusion. The blood level of brain natriuretic peptide was elevated to 336.0 pg/ml (reference range, < 18.4 pg/ml) and the creatinine level was 1.81 mg/dl (reference range, 0.45–0.81 mg/dl). The complete blood count and blood levels of electrolytes, glucose, alkaline phosphatase, creatine kinase, amylase, lipase, total protein, and albumin were normal, as were tests of liver function and a urinalysis. An electrocardiogram showed a normal sinus rhythm and a rate of 78 beats per minute, with left axis deviation, prolonged PR interval, and right bundle branch block, indicating trifascicular block (Fig. 1). Interestingly, absent S waves in leads I and aVL and absent septal Q waves in V5 and V6 resembled a left bundle branch block pattern, features thought to be consistent with masquerading bundle branch block. Previous electrocardiograms were available in this hospital, which showed right bundle branch block 8 years earlier (Fig. 2) and right
bundle branch block with prolonged PR interval 6 years earlier. An echocardiogram revealed left ventricular hypertrophy (almost 13 mm), left ventricular ejection fraction of 63%, mild mitral-valve regurgitation, and mild aortic-valve regurgitation; transmittal E wave velocity was 0.99 ms with the ratio of the E wave to the A wave being 0.86.

The patient was diagnosed as having heart failure with preserved ejection fraction, accompanied by masquerading bundle branch block. Her symptoms completely disappeared after control of blood pressure with diuretics but the unique electrocardiographic finding of masquerading bundle branch block did not change. Maximal symptom-limited exercise testing with myocardial scintigraphy showed no perfusion abnormalities with good exercise tolerance. The patient returned to her physician in a stable condition but died suddenly 5 months later. Her family refused permission to conduct an autopsy.

Discussion

Masquerading bundle branch block has been reported to be associated with various heart diseases [2–7], for example, coronary heart disease, ventricular hypertrophy, cardiomyopathy, Chaga’s myocarditis, and idiopathic degeneration of the conduction system such as Lenegre’s disease and Lev’s disease. Among them, left ventricular hypertrophy was observed in our patient. In general, masquerading bundle branch block is classified into 2 types [4,5,8]: standard type characterized by the masquerade in the limb leads (i.e. right bundle branch block in the right precordial leads and left bundle branch block pattern in the limb leads without S wave in lead I) and precordial type characterized by the masquerade in the precordial leads (i.e. right bundle branch block in right precordial leads and left bundle branch block pattern in the left precordial leads without wide and deep S waves in leads V5 and V6). Our patient was characteristic of the standard type of masquerading bundle branch block.

The essential feature of masquerading bundle branch block is considered to be right bundle branch block with modifications of the QRS vectors for various reasons. Some mechanisms have been proposed for the standard type of masquerading bundle branch block [4,5,8], such as concomitant left anterior parietal block, left ventricular hypertrophy, or a very high degree of left anterior hemiblock. On the other hand, a focal block in the anterior parietal wall of the left ventricle, left anterior hemiblock with a relatively high position of the left precordial electrodes, and left anterior hemiblock...
with a vertical heart have been suggested as underlying mechanisms of the precordial type of masquerading bundle branch block [4,5,8]. In our patient, a high degree of left anterior hemiblock associated with right bundle branch block and QRS forces oriented to the left due to left ventricular hypertrophy may have produced wide and deep S waves in leads II and III and an absence of S waves in leads I and aVL, although no pathologic specimens were obtained from the patient.

Masquerading bundle branch block in the present case was accompanied by trifascicular block, which is generally defined as right bundle branch block with alternating left hemiblock, alternating right and left bundle branch block, or bifascicular block with prolonged PR interval [4]. Previous reports showed that patients with trifascicular block often develop complete heart block [9,10]. Similarly, regardless of the presence or absence of trifascicular block, masquerading bundle branch block seems to indicate severe degeneration of the conduction system, leading to a poor outcome. Gómez Barrado et al. [11] followed 22 patients with masquerading bundle branch block for 3 years, and found that 59% of patients developed a high degree atroventricular block, with 4 deaths. Our patient did not undergo electrophysiological study and the cause of her death was not elucidated, but cardiac arrest due to complete heart block that developed from masquerading bundle branch block is the most likely cause. Close follow-up is mandatory in patients with masquerading bundle branch block even if they do not have any symptoms.

**Conflict of interest**

Authors declare no conflict of interest.

**References**


