ABSTRACT. Masquerading bundle branch block (MBBB) is a rare ventricular conduction disturbance characterized by right bundle branch block and left anterior fascicular block with a reorientation of the terminal forces of the QRS complex. Unfortunately, large clinical trials have not characterized the hemodynamic impact of cardiac resynchronization therapy in patients with MBBB. Here, we characterize the mechanical activation sequence in a patient with MBBB applying gated-SPECT (single photon emission computed tomography) phase analysis, a novel technique that could expand the knowledge about electromechanical coupling in uncommon ventricular conduction disturbances.

KEYWORDS. Masquerading block, phase analysis.

Introduction

The masquerading bundle branch block (MBBB) is a rare ventricular conduction disturbance characterized by right bundle branch block and left anterior fascicular block with a reorientation of the terminal forces of the QRS complex towards the left and upwards, in such a way that slurred S waves in lead I become smaller or even disappear.¹ The true prevalence of MBBB and its representation in the whole figure of ventricular conduction disorders is unknown; data provided by the scientific literature are referred to as isolated case reports and small case series. As a consequence of distal (peripheral) damage of the His–Purkinje system, MBBB is frequently associated with severe ventricular enlargement and/or fibrotic block in the anterolateral wall of the left ventricle. Previous large clinical trials did not characterize the hemodynamic impact of cardiac resynchronization therapy (CRT) in patients with MBBB, probably as they were included as non-specific conduction disorders.²

Case summary and imaging

A 68-year-old hypertensive and dyslipidemic man complaining of longstanding dyspnea and chest pain was referred for dipyridamole stress ⁹⁹ᵐTc-MIBI myocardial perfusion scintigraphy. The baseline electrocardiogram showed sinus rhythm at 70 bpm, superior axis, and MBBB pattern (right bundle branch block with left anterior fascicular block with no S wave in leads I and aVL). Gated-SPECT images evidenced an anterior myocardial scar extending to the apex and mild peri-infarct ischemia, with a left ventricular ejection fraction of 27%. Abnormal peak amplitude (175.00°), standard deviation (71.65°), and bandwidth (241.00°) were obtained from a phase histogram at rest (SyncTool of Emory Cardiac Toolbox, Syntermed, Atlanta, GA). A snapshot of resting contractile expansion in a 17-segment polar map during early systole detected a fully distorted mechanical contraction expanding from the posterolateral region to the anterolateral segments of the left ventricle (Figure 1). This image represents an innovative characterization of the mechanical activation sequence.
in MBBB applying gated-SPECT phase analysis. We have just reported a fully distorted site of onset of mechanical contraction through this technique in a patient with advanced ischemic heart disease and left ventricular ejection fraction of 42%.3

Gated-SPECT phase analysis is a valid method that reports on all three-dimensional ventricular mass, correlates strongly with tissue Doppler, and provides an automated processing with low inter- and intra-examiner variability.4 A novel imaging approach applying this technique could provide new information about the comprehension of the left ventricular contractile sequence in advanced ischemic heart disease, including the timing of septal activation. However, a broad clinical validation of gated-SPECT phase analysis to assess mechanical, clinical, and functional response to CRT in different ventricular conduction disturbances must be evaluated.

References


Figure 1: Phase analysis at rest in masquerading bundle branch block. Masquerading bundle branch block at baseline electrocardiogram (a). Gated-SPECT images after vasodilator stress (b) and at rest (c) show an extensive anterior scar (summed rest score = 17). Phase analysis at rest (non-attenuation corrected images) found a multisite onset of mechanical contraction expanding through basal septum and lateral wall of the left ventricle (white arrows in d, see video and Figure 2 of Supplementary Data) and several indexes of severe dyssynchrony (e).