Case Report

Left intraventricular dyssynchrony caused by a false tendon

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A B S T R A C T
Left ventricular (LV) false tendons are usually benign, intraventricular myocardial structures, which may cause functional malfunction or deformation of the LV cavity due to mechanical stretching and dilatation of the LV wall. We present a case of non-ischemic cardiomyopathy complicated with intraventricular dyssynchrony that was caused by complete left bundle branch block and the mechanical pressure exerted by the stiff false tendon on the weakened mid-septum during systole.

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1. Case report

An 80-year-old woman with a history of acute myelocytic leukemia in remission was hospitalized to undergo cardiac resynchronization therapy (CRT) for refractory congestive heart failure due to doxorubicin-induced cardiomyopathy. Twelve-lead electrocardiography during sinus rhythm revealed a complete left bundle branch block (CLBBB) and a 156-ms QRS (Fig. 1A). The cardiothoracic ratio on chest radiography was 58%. Transthoracic echocardiography revealed diffuse left ventricular (LV) hypokinesis, an ejection fraction of 34%, a 55-mm end-diastolic diameter, and overt dyssynchrony. An inextensible false tendon, 3 mm in its widest diameter, was visible with a hyperechoic shadow between the mid-septal and mid-lateral walls (Fig. 1C). Two-dimensional speckle tracking-derived displacement curves showed that the lateral LV wall motion, as well as an unchanged, dyssynchronous, mid-systolic motion at the point of attachment of the false tendon, while a decrease to 100 ms in the septal-to-posterior wall motion delay was limited to the basal septum (Fig. 2B). Similarly, the result of a speckle tracking analysis in short-axial view during CRT showed normal LV anterior, lateral, posterior, and inferior wall motions, as well as dysynchronous, anteroseptal, and septal motions at the point of attachment of the false tendon, which was characterized by dysynchronous motion during mid and late systolic phases after a small synchronous motion during an early systolic phase (Fig. 3B). The shape and length of the false tendon remained fixed during the entire cardiac cycle, regardless of the presence or absence of CRT. However, a dysynchronous apical motion was not normalized during the CRT.

2. Discussion

False tendons are usually benign, intraventricular myocardial structures, which may cause a musical murmur [1], rate-dependent ventricular extrasystoles, functional mitral regurgitation, or deformation of the LV cavity due to mechanical stretch and dilatation of the LV wall [1,2]. False tendons are elastic, especially in young patients, though with aging, may become rigid due to fibrosis and calcification [3–5]. As in the present case, false tendons may be associated with a hyperechoic shadow on transthoracic echocardiography. Because of the unchanged mid-septal dyssynchrony near the end of the false tendon during CRT, in contrast with the mitigation of intraventricular dyssynchrony near the base, we hypothesized that in this case, intraventricular dyssynchrony was caused by the CLBBB and the mechanical pressure exerted by the stiff false tendon on the weakened mid-septum during systole.
Fig. 1. The 12-lead electrocardiogram obtained during sinus rhythm before (A) and after cardiac resynchronization therapy (B), and the transthoracic echocardiogram in an apical 4-chamber view (C). The arrows indicate the false tendon between the mid-septal and mid-lateral walls.
Fig. 2. The two-dimensional speckle tracking-derived displacement curves in an apical 4-chamber view before (A) and after the cardiac resynchronization therapy (B). Red, basolateral; green, mid-lateral near the end of the false tendon; blue, mid-septum near the end of the false tendon; and yellow, basal septum. The positive and negative values indicate the location (inside or outside the cavity) of each sample relative to the baseline values.
Conflicts of interest

The authors have no conflicts of interest to disclose.

References


Fig. 3. The two-dimensional speckle tracking-derived displacement curves in a short axial view at the level of the papillary muscle before (A) and after the CRT (B). The false tendon did not travel across the center of the left ventricular cavity, and both ends of the false tendon attached at the midportion between the mid-anteroseptum (yellow) and mid-septum (red), and the mid-anterior wall (light blue). Green, mid-lateral; pink, mid-posterior; and blue, mid-inferior. The scale used in the graph is similar to that used in Fig. 2.