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Case Report

# Left intraventricular dyssynchrony caused by a false tendon

Tadanobu Irie, MD[1], Koji Kurosawa, MD[1], Yoshiaki Kaneko, MD, PhD*, Tadashi Nakajima, MD, PhD, Rieko Tateno, MD, Masahiko Kurabayashi, MD, PhD

*Department of Medicine and Biological Science, Gunma University Graduate School of Medicine, 3-39-22 Showa-machi, Maebashi, Gunma 371-8511, Japan*

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ABSTRACT

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.



## 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 contracted during systole and relaxed during diastole, whereas the septum expanded during systole and contracted during diastole (Fig. 2A). Neither myocardial perfusion scintigraphy nor magnetic imaging revealed the presence of prominent myocardial injury or septal fibrosis. Septal-to-posterior wall motion delay, an index of intraventricular dyssynchrony, was increased to 403 ms (upper normal limit, 129 ms). CRT-D was implanted with leads placed at the right ventricular apex and in the posterolateral tributary of the coronary sinus. After achieving the best V–V delay of 0 mms based on the echographic measurements, the QRS width was shortened to 124 ms (Fig. 1B). The result of a speckle tracking analysis in apical 4-chamber view during CRT showed a nearly unchanged and normal LV lateral wall motion, as well as an unchanged, dyssynchronous, mid-septal 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 dyssynchronous, anteroseptal, and septal motions at the point of attachment of the false tendon, which was characterized by dyssynchronous 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 dyssynchronous 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.

* Corresponding author. Tel.: +81 27 220 8145; fax: +81 27 220 8158.
*E-mail address:* kanekoy@gunma-u.ac.jp (Y. Kaneko).
[1] These authors equally contributed to the manuscript.

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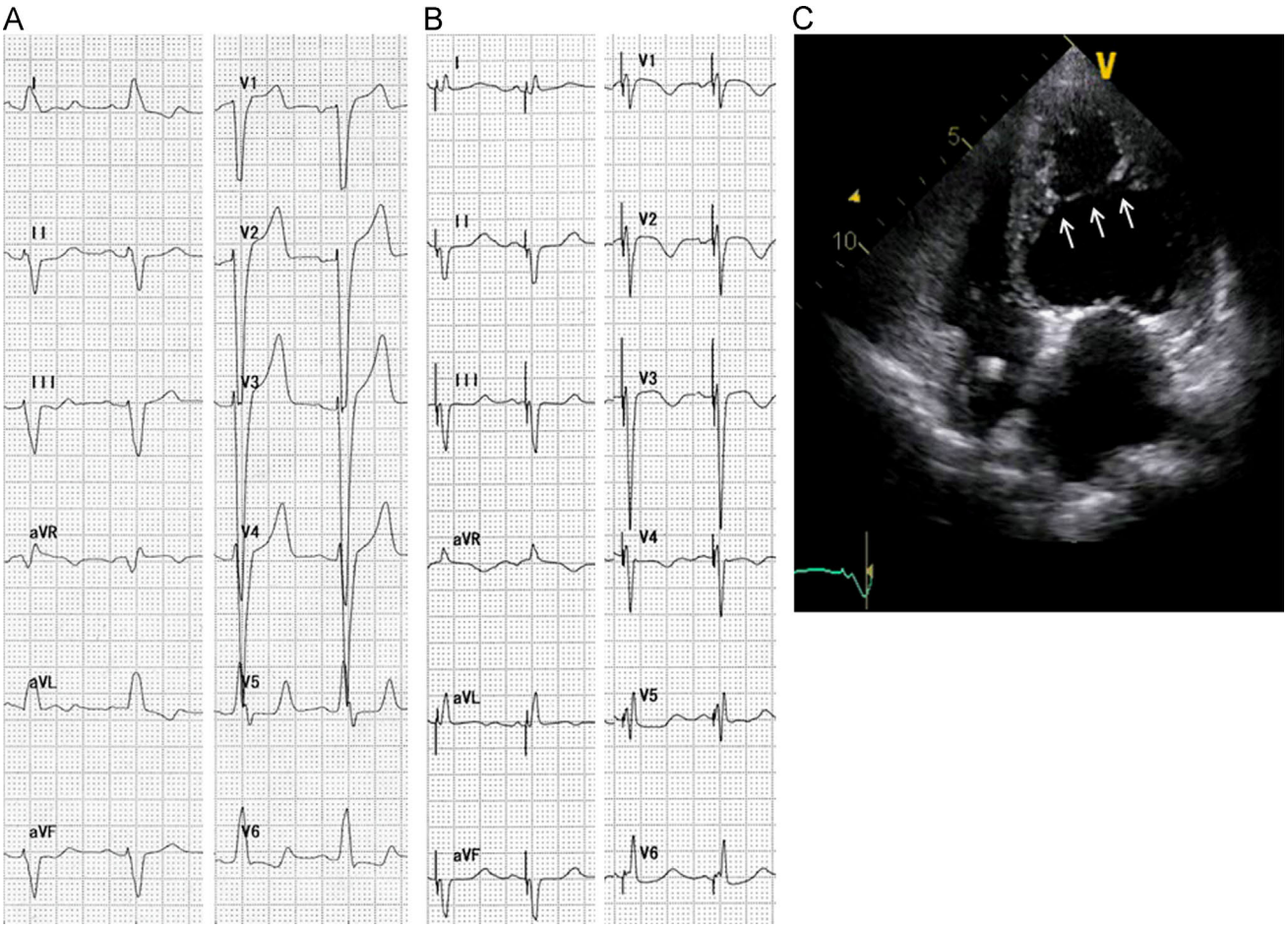


**Fig. 1.** The 12-lead electrocardiogram obtained during sinus rhythm before (A) and after cardiac resynchronization therapy (B), and the transthoracic echocardiogram in an apical 4-chamber view (C). The arrows indicate the false tendon between the mid-septal and mid-lateral walls.