

Left Ventricular Anomalous Muscle Band and Electrocardiographic Repolarization Changes in a 5 Year Old Girl

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ABSTRACT

We report here on a previously healthy 5-year-old girl with significant electrocardiographic repolarization abnormalities and a left ventricular mass. After the clinical evaluation, a large muscular false tendon was found within the left ventricular cavity. (*Korean Circulation J* 2005;35:934-936)

KEY WORDS : Left ventricular muscle band ; Electrocardiographic repolarization abnormalities.

Introduction

Electrocardiographic (ECG) repolarization abnormalities in children usually indicate the presence of an anomalous coronary artery, ventricular hypertrophy with strain, an intramyocardial tumor or cardiomyopathy. A left ventricular false tendon is an anomalous fibrous or fibromuscular band stretching across the left ventricle. The false tendon may be related to the generation of innocent murmurs, cardiac rhythm disorders or left ventricular dysfunction. A large muscular band as the left ventricular false tendon is a very unusual finding and this is associated with ECG abnormalities. It is generally a benign unrecognized syndrome in adult patients.¹⁾ To the best of our knowledge, only one report has been published on this condition in children.²⁾ We report here on a child with a large muscular mass within the left ventricular cavity that was associated with ECG repolarization abnormalities. The final diagnosis was a large muscular false tendon in the left ventricle.

Case

A 5-year-old girl was referred to the Pediatric Cardiology Clinic of Chonbuk National University Hospital for an evaluation of her abnormal ECG findings on a routine ECG examination. The patient had no

cardiac symptoms and she was a normally developed 5-year-old child. There was a variable grade 2/6 systolic murmur along the left sternal border. There were no signs of tuberous sclerosis. The chest radiograph showed mild cardiomegaly and normal pulmonary vascular markings. The ECG showed normal sinus rhythm with T wave inversion on leads I, II, aVF and V3-6 (Fig. 1A). The QT interval was prolonged (QT/QTc: 350/456 ms) (Fig. 1B). The cross-sectional echocardiogram demonstrated a large muscular band (14 × 20 mm) in the left ventricular anterolateral wall region that originated from the apex and ran to the interventricular septum (Fig. 2). The MRI showed the muscular tendon originating from the apex and crossing the left ventricular cavity (Fig. 3). There were no abnormal findings for the left ventricular inflow and outflow patterns on the Doppler examination. Laboratory examinations revealed normal findings, including the creatine kinase, creatine kinase MB, cardiac troponin I and myoglobin. There were no abnormal tumor makers.

The patient remained symptom-free for more than one year with no progression of the repolarization abnormalities on the follow-up ECG tracings, and there was no interval change of the muscular mass on the echocardiograms.

Discussion

False tendons are thin, fibrous or fibromuscular structures that traverse the cavity of the left ventricle with no connection to the valvular cusps; these tendons may be single or multiple.³⁾ The false tendons extend from the septum to the left ventricular free wall or more rarely, from the septum to a papillary muscle.

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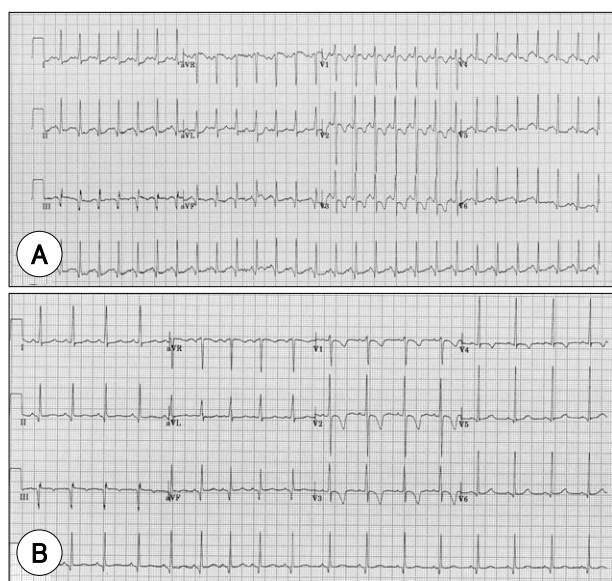


Fig. 1. A: ECG showing the changes of the ST segment with negative T waves on leads I, II, aVF and V3-6 in a 5-year-old girl on the screening ECG examination. B: twelve-lead ECG showing the negative T waves on leads III, V3 and V4. The QT interval is prolonged (QT/QTc: 350/456 ms).

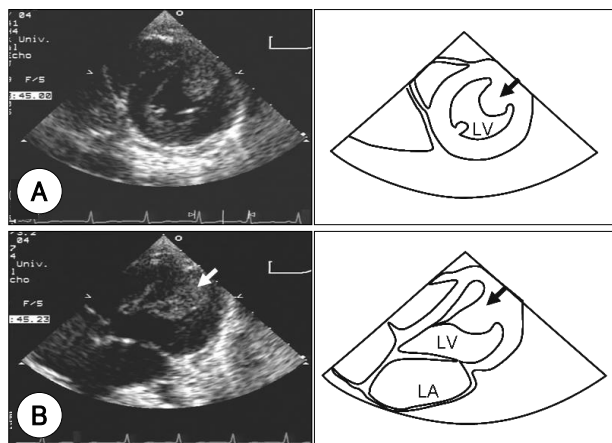


Fig. 2. A: two dimensional parasternal short-axis echocardiogram showing the muscular false tendon (band) in the left ventricular anterolateral wall region. B: apical four-chamber echocardiogram showing the large muscular band (14×20 mm) originating from the apex to the interventricular septum and crossing the left ventricular cavity. LV: left ventricle, LA: left atrium.

Histological examination has shown the false tendons to be composed of cardiac muscle, blood vessels and fibrous tissue. In some of them, elements of the conductive system have been confirmed as being an extension of the left branch of the bundle of His. This may explain the role of the false tendons in cardiac arrhythmias. The false tendons may be related to the generation of innocent murmurs, cardiac rhythm disorders or left ventricular dysfunction.³⁻⁵⁾ False tendons are not simply curiosities discovered on echocardiographic examinations or at autopsy. Even though one of the common causes of innocent murmur in childhood is the left ventricular false tendon, the false tendon can

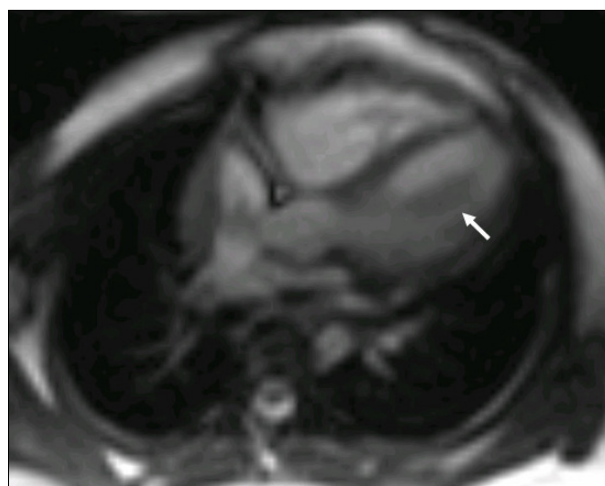


Fig. 3. MRI showing the muscular band (arrow) originating from the apex and crossing the left ventricular cavity.

induce fatal ventricular arrhythmias. It is possible that conduction through the false tendon constitutes part of the ventricular tachycardia circuit or that the tendon may produce stretch in the Purkinje fiber network in the interventricular septum.^{6,7)}

Even though more than 50% of healthy people are thought to have demonstrable left ventricular false tendons, these are thin, chordal strands noted on the echocardiographic findings. However, a few cases of large muscular tendons associated with repolarization abnormalities on the electrocardiogram have been reported in adults.¹⁾ A similar case has also been reported concerning a child.²⁾ The large anomalous muscle band close to the left ventricular apex can be misinterpreted as apical hypertrophy or cardiac rhabdomyoma.^{8,9)} For evaluation of the large muscular tendons in the left ventricle, regular follow-up echocardiographic and ECG examination should be considered.¹⁰⁾ In our case, there were no evidences of tuberous sclerosis or left ventricular hypertrophy. We suggest that the ECG abnormalities in this case, including the inverted T wave on the precordial leads, were caused by the large muscular tendon in the left ventricular cavity.

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