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CASE REPORT

Congenital Left Ventricular Diverticulum Manifested as T-Wave Inversion in a Child

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Abstract Congenital diverticulum of the ventricle is a rare disease, but most cases of congenital left ventricular diverticula are asymptomatic. We present a child with congenital left ventricular diverticulum whose routine electrocardiographic examination showed T-wave inversion in inferior and V4 to V6 leads. He was successfully repaired surgically.

Keywords Congenital ventricular diverticulum · Electrocardiogram · T-wave inversion

Introduction

Congenital diverticulum of the ventricle is a rare cardiac anomaly. Most cases of congenital left ventricular diverticulum are asymptomatic and usually found during diagnostic procedures performed for other reasons. We present a child with congenital left ventricular diverticulum who presented with electrocardiographic abnormalities.

Case Report

A 10.5-year-old boy was referred to us for management of cardiac arrhythmias. He had no previous history of chest pain or syncope. There was no history of coronary artery disease in his family. His blood pressure was 102/74 mmHg, and heart rate was 95 bpm. Soft heart sounds and cardiomegaly were found, but other systemic examinations were normal. Routine blood and biochemical values were in the normal range. Electrocardiogram showed T-wave inversion in the inferior and V4 to V6 leads and enlargement of the left ventricle. Because his cardiac enzyme values were within normal limits, myocarditis was excluded. Initially, it was thought that the patient may have coronary artery disease, such as Kawasaki disease or coronary artery origin anomalies; however, echocardiography showed no significant findings. For further evaluation, he underwent 64-row spiral CTA to clarify diagnosis. The outcome of CTA showed a large diverticulum originating from the frontal wall of the left ventricle near the apex (Fig. 1).

CTA showed normal coronary arteries and outlined a contractile diverticulum connected to the left ventricle. He was diagnosed as having a congenital left ventricular diverticulum.

The patient underwent surgical correction, and a huge diverticulum, 3.0 × 3.0 cm in size, was found near the cardiac apex. The diverticulum was resected while the patient underwent cardiopulmonary bypass with his heart still beating. The resected margins were closed with running sutures to plicate the edge. The operative and postoperative courses were uneventful, and his postoperative echocardiogram and electrocardiogram were normal. The patient remained asymptomatic 1.5 years after surgery. The excised specimen measured approximately 0.5 cm in thickness, and pathologic examination showed dense fibroelastic connective tissue, lack of cardiac muscle, some fiber disorders, mildly edematous tissue, and myxoid change.

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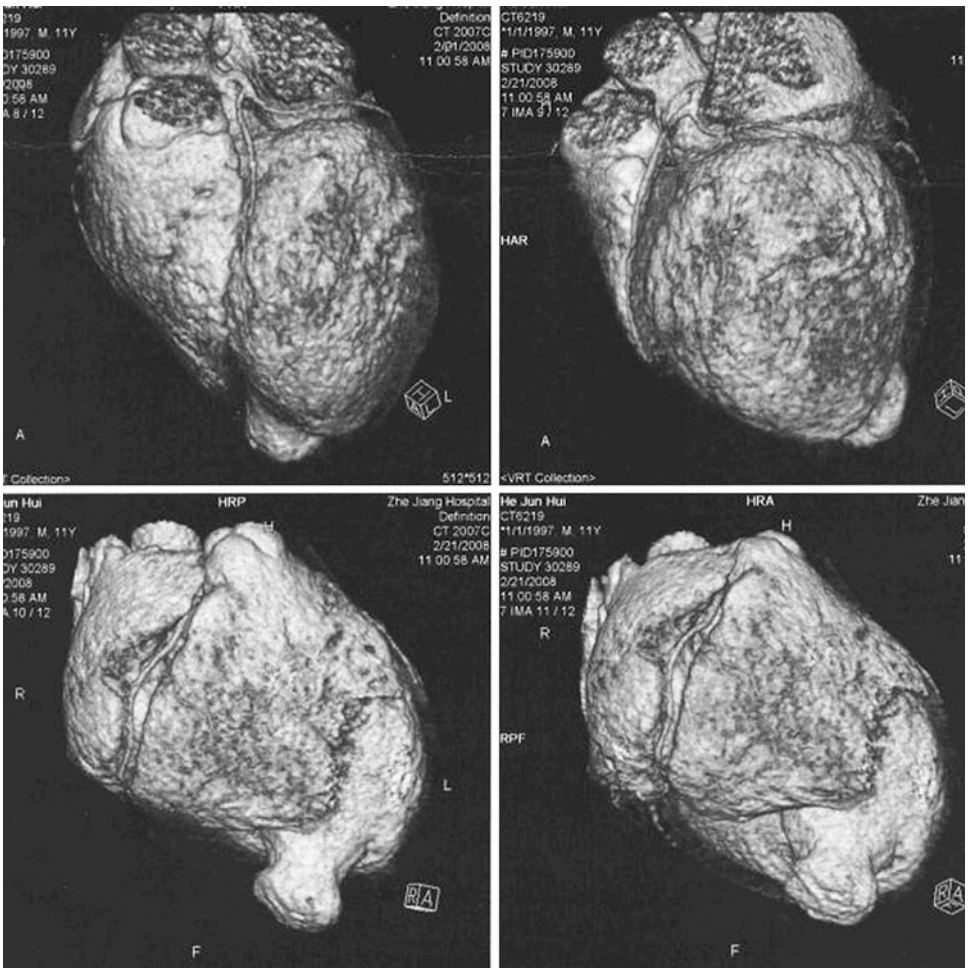

Fig. 1 CT angiography showing a large diverticulum that originates from the frontal wall of the left ventricle near the cardiac apex

Discussion

Congenital ventricular diverticulum is a rare cardiac deformity, and the first patient was described by O'Bryan in 1838 [3]. Successful resection of ventricular diverticulum was first reported in 1944 by Roessler [5]. The incidence of congenital ventricular diverticulum has been reported to be approximately 0.04% in the general population and approximately 0.02% in a consecutive paediatric autopsy series [4].

Although patients with diverticulum are usually asymptomatic, it can be quite difficult to diagnose the disease. Some patients may present without certain special symptoms, such as dyspnea, palpitation, or heart failure.

Patients with a diverticulum sometimes present with an abnormal electrocardiogram. Most of them suffer from ventricular arrhythmias [1]. According to the left ventricular origin of the arrhythmogenic substrate, some of them present with right bundle branch block [4]. Only a few reports in the literature mention myocardial ischemia with nonspecific ST and T wave changes [2]. These rare abnormal features of electrocardiogram were the primary symptom in our patient. The relation between ST-T–wave changes and diverticulum is unclear. There are three possible reasons for the relation: (1) direct compression of the left coronary artery by a great submitral diverticulum; (2) abnormal increase of systolic pressure in the diverticulum; and (3) abnormal structure of the diverticulum itself. We tend to the last possibility because sometimes in the wall of diverticulum, which is composed largely of dense fibroelastic connective tissue, the muscular tissue is absent or incomplete [6].

For patients who present insignificant syndrome like our patient, further examinations may be needed. In this situation, multidetector CTA and magnetic resonance imaging (MRI) are generally recommended. Cardiac CTA and MRI scanning are rapid and noninvasive methods of cardiac imaging [7], and the diagnosis of our patient was confirmed by CTA.

As mentioned in the literature, as well as from our own experience, early surgical management will make for an optimal outcome. For patients with isolated and asymptomatic diverticulum, however, treatment remains controversial. According to our experience, surgery is essential

for the following patients: (1) those with refractory heart failure, arrhythmia, thrombosis, and embolism and (2) those having fibrous diverticulum with dyskinetic movements or the risk of rupture. In our case, the patient underwent surgery soon after diagnosis because he had a huge diverticulum. His postsurgical recovery was uneventful.

In conclusion, cardiac diverticulum is a rare entity and is usually asymptomatic clinically. Because ST-T–wave changes were the only presentation in our case, it was easy to overlooked or confuse the condition myocarditis, especially in child. Multidetector CTA and MRI can be helpful in such a situation. For patients diagnosed with large diverticulum, early surgery is indicted to prevent the risk of sudden death caused by rupture of the diverticulum and ventricle.

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