Surgical management of a giant congenital left ventricular aneurysm in a 2-month-old infant.

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Abstract

This clinical case demonstrated surgical management of a giant congenital left ventricular aneurysm in a 2-month-old female using the Dor procedure. Transthoracic echocardiography performed at 6-month follow-up showed an ejection fraction of 66%.

Introduction

We present a clinical case where we employed a Dor procedure, to address a giant congenital aneurysm of the left ventricle (LV) in an infant.

Case Report

The patient was a 2-month-old, 5,8-kg female. She was born at 38 weeks of gestation. Apgars were 8 and 9 at one and five minutes. An LV aneurysm was diagnosed on prenatal echocardiography at 33 weeks gestation. After birth, initial transthoracic echocardiography (TTE) revealed an LV aneurysm, the end diastolic volume (EDV) was 7,4 ml and the ejection fraction (EF) was 62%. The infant did well in the newborn period and was discharged home with no medications. Two months later, she was admitted to hospital for intervention.

Imaging

TTE demonstrated a large apical LV aneurysm. The myocardium in the region of the aneurysm showed no contractility (Figure 1A). Measuring the EDV including the aneurysm was 35 ml and the EF was 18%. But, measuring the EDV, without including the aneurysm, was 20 ml and the EF was 42%. The aneurysm wall thickness was 2 mm. Multi-slice spiral computed tomography with 3D (3D-MSCT) reconstruction showed protrusion of the apex and anterolateral wall of the LV (Figure 1B). The LV volume with and without the aneurysm was 13 ml and 9 ml, respectively. Angiography demonstrated that the distal part of the left anterior descending coronary artery coursed over the aneurysm. Myocardial perfusion imaging with single-photon emission computed tomography (MPI with SPECT) showed perfusion defects in the posterolateral part of the aneurysm.

Based on these imaging studies, the infant was taken to surgery for aneurysm repair with cardiopulmonary bypass (CPB).

Surgery

A median sternotomy was performed. Bicaval and ascending aorta cannulation was performed with an LV vent. When the pericardium was opened, a giant saccular aneurysm that measured 20x20 mm arose from the apex (Figure 1D). The aneurysm did not contract. The distal part of the left anterior descending coronary artery coursed over the aneurysm. After cardioplegic arrest, the aneurysmal cavity was opened. The LV was not calcified and there was no thrombus.

We used the Dor technique, endoventricular circular Dacron patch plasty using Prolene 5-0 locking suture (Figure 1E). After the patch was sutured inside the LV cavity to close the myocardium we used Prolene 4-0 locking suture (Figure 1F). The aortic cross-clamp time was 51 minutes and the CPB time was 72 minutes. Histologic sectioning of the aneurysm was performed (Figure 2A).

After an uneventful discontinuation from CPB, the patient was transported to the intensive care unit with an open chest and moderate inotropic support (dopamine,adrenaline, milrinone). A transesophageal echocardiography (TEE) revealed an EF of 30% with EDV of 20 ml (Figure 1C). On the next day the chest was closed.

The patient was discharged from the hospital on the 9th day after surgery in satisfactory condition. The EF was 38% with an EDV of 20 ml (Figure 2B). The heart rate was 103 bpm and the blood pressure was 90/65 mmHg. The patient was prescribed digoxin and diuretics for a short period of time.

The patient had a follow-up visit 6 months after surgery. She was in good condition, and not taking medications. Her weight was 8 kg. The TTE at that time revealed an EF of 66% with an EDV of 16 ml (Figure 2C, D).

Comments

A pouch protruding from the free wall of the LV may be either a congenital diverticulum or aneurysm. Both have distinct presentations, morphology, associated defects, and prognosis [1]. A congenital diverticulum usually contracts synchronously with the LV

chamber. Histologically a diverticulum contains three layers (epi-,myo-,endocardium). A congenital aneurysm is a-/dyskinetic and histology is mainly fibrous tissue with no organized myocardium [2]. We used 3D-MSCT and MPI with SPECT for differentiating the area of interest and formulated a treatment strategy.

Congenital LV aneurysm was first described in 1816. The typical age of presentation was 30 to 60 years old [3]. Patients with congenital aneurysm of the LV are usually asymptomatic. They may have ventricular arrhythmias, heart failure, endocarditis, cardiac rupture or even sudden death [4].. The optimal management for patients with congenital aneurysm of the LV is controversial and the optimal surgical technique is not defined. There are two preferred methods for LV aneurysm repair: 1) external plication (small aneurysm) or 2) reconstruction of normal geometry of the LV (large aneurysm) [5].–

In this case, the aneurysm was large and compromised ventricular function. We used a Dor technique since it is a simple and less aggressive method for surgical management in children. Firstly, it eliminates the need for external prosthetic materials, which can change heart growth potential and avoids persistent pericardial adhesions. Secondly, it produces a more physiologic LV cavity geometry.

Six-months after surgery the patient was in good condition. Continued follow-up with periodic echocardiography surveillance will be essential as she grows into adulthood.

Authors Note

Written consent for the publication of this case report was obtained from the parents of the study participant.

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Figures Legends

Fig. 1

(A) TTE showing a large apical aneurysm of the LV. (B) Anterior view of the aorta and the LV on 3D-MSCT showing protrusion of the apex and anterolateral wall. (C) TEE in the operating room after discontinuation of CPB. (D, E, F) Operative view: White arrow indicates congenital LV aneurysm. Yellow arrow indicates Dacron patch.

Fig. 2

(A) Histological section showing connective tissue with single muscular fibers. Some muscular fibers are hypertrophied. (B) Post-operative TTE. (C, D) TTE performed 6 months after surgery.