

Concurrent Septal and Right Ventricular Aneurysms Detected on Second Trimester Ultrasound Scan: A Case Report

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ABSTRACT

Congenital aneurysms and diverticula of the heart are rare anomalies and their prenatal diagnosis is challenging. Fetuses with suspected cardiac aneurysms on ultrasound (US) screening should undergo targeted fetal echocardiography, postnatal imaging, and follow-ups. Herein, we describe the second trimester US scan and postnatal cardiac magnetic resonance imaging (MRI) findings of a baby girl with concurrent septal and right ventricular cardiac aneurysms. Other cardiac and extra-cardiac structures were normal. Upon consultation about the prognostic uncertainty of the situation, the family chose to continue the pregnancy. The rest of the pregnancy and birth was without any complications. Follow-up postnatal echocardiograms showed no progression regarding the size of the aneurysms. The baby is still on follow-up without any medication and is thriving. To the best of our knowledge, this case report is the first to show the prenatal diagnosis of two concurrent rare cardiac aneurysms.

Keywords: Fetus, cardiac aneurysms, prenatal diagnosis, fetal ultrasound

Introduction

Congenital aneurysms and diverticula of the heart are rare anomalies and their prenatal diagnosis is challenging [1-5]. They are observed as localized protrusions of the ventricular free walls. There is still controversy about the definition of the aforementioned terms, that is, aneurysms and diverticula, in the literature. Thus, some authors prefer to use the term "outpouching" [2].

Here we present the prenatal cardiac ultrasound (US) scanning and postnatal cardiac magnetic resonance imaging (MRI) findings of a fetus with concurrent right ventricular (RV) and septal aneurysms.

Case Report

A 35-year-old (gravida 2, para 1) pregnant patient, was referred to the Ankara University Radiology Department for detailed second trimester fetal US at 22 weeks of gestation. Her first trimester combined test result was unremarkable. During the cardiac scan, a four-chamber view of the heart revealed a slight bulging of the interventricular septum into the left ventricle. On the short axis view of the ventricles thinning to an approximate size of 1 cm and a slight outpouching at the basal aspect of the right ventricle were noticed just above the diaphragm suggesting an RV aneurysm (Figure 1). On the same US sections, focal thinning of the interventricular septum, close to the apex, was also noted (Figure 1). Cardiac situs, ventricular outflow tracts, and great arteries were normal, and the fetal heart rate was 154 bpm with no evidence of pericardial effusion or arrhythmia. No extra-cardiac anomalies were detected as well.

A fetal echocardiogram following the detailed US examination confirmed the findings. The family was consulted about the prognostic uncertainty of this situation (i.e., RV and septal aneurysms) and they decided to continue the pregnancy. There were no signs of cardiac impairment, hydrops, or arrhythmias on the sequential echocardiograms until birth. The pregnancy reached term without any complications, and a 3850-g healthy baby girl was delivered via C-section. The Apgar scores were determined as 7 and 9 at first and fifth minutes, respectively.

Postnatal echocardiogram on the second day of birth showed prominent bulging of the interventricular septal aneurysm into the RV. This change was attributed to the alteration

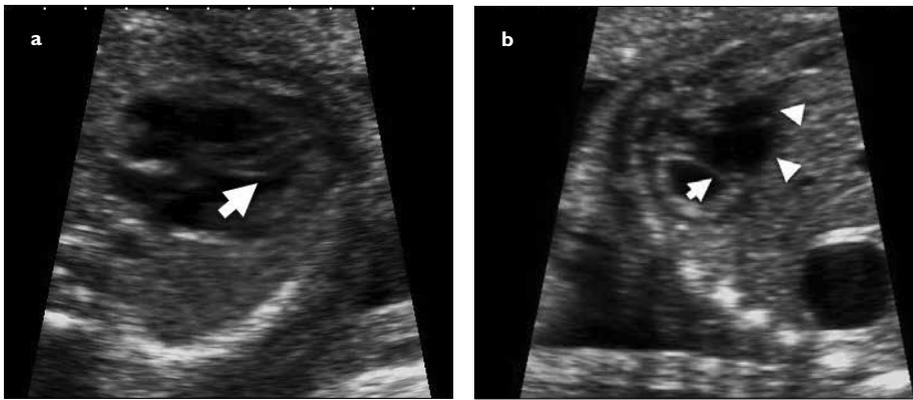


Figure 1. a, b. Fetal US at 22 weeks. Four-chamber view of the heart (a) revealed a slight bulging of the interventricular septum into the left ventricle (arrow). Short-axis view of the ventricles (b) shows 1-cm measuring thinning and slight outpouching of the basal aspect of the right ventricle, suggesting a right ventricular aneurysm (arrowheads). Focal thinning of the interventricular septum was also noted (arrow)

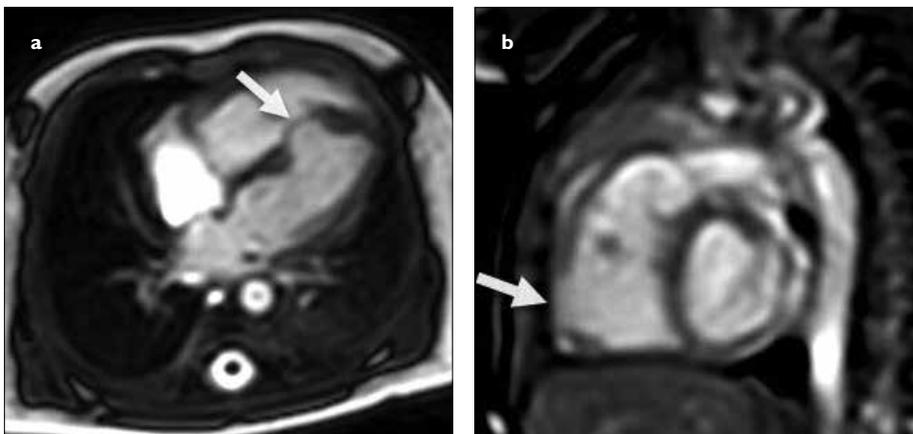


Figure 2. a, b. Postpartum second day cardiac MRI. Four-chamber BTFE (Balanced Turbo Field Echo) image (a) shows mid-muscular interventricular septal thinning and aneurysmal dilatation, with a broad neck, bulging into the right ventricle during diastole (arrow). On the short axis BTFE image of the right ventricle (b), thinning and slight outpouching of the right ventricle wall close to the apex, measuring 1 cm was noted (arrow)

of the ventricular pressure gradients postnatally.

Cardiac MRI was also performed to reveal the size and borders of the aneurysms better, on the second postnatal day. On the four-chamber Balanced Turbo Field Echo (BTFE) views, mid-muscular interventricular septal thinning and nearly 1-cm diameter aneurysmal dilatation with a broad neck, bulging into the RV during diastole, was detected. Additionally, on the short- and long- axis BTFE images of the RV, thinning and 1-cm diameter outpouching of the RV wall close to the apex were noted, suggesting an RV aneurysm (Figure 2).

On the follow-up echocardiogram performed 2 weeks later, it was detected that the prominent septal bulging appearance had resolved; however, the thinning persisted. Follow-up echocardiogram in the third month revealed no alterations regarding the size of the septal or RV aneurysms.

As there was no evidence of arrhythmia or any other clinical findings, the baby is still on follow-up without any medications and she is thriving. The family's informed consent was obtained for publication.

Discussion

Morphologically, a cardiac diverticulum is described to have a narrow connection, whereas an aneurysm establishes a broad neck connection with the ventricle. In addition, a diverticulum is expected to make contractions synchronously with the ventricle, whereas aneurysms do not contract or paradoxically show expansion [1, 2, 4, 5]. From the histological point of view, a true aneurysm contains elements of myocardium, whereas a pseudo-aneurysm does not; however, the diverticulum contains all the layers, that is, epicardium, myocardium, and endocardium. Ventricular diverticula are always congenital, whereas aneurysms can be acquired [5]. In our case, as

both RV and septal aneurysms had large communication paths with the ventricle (broad neck), both were considered to be pseudo aneurysms, still distinguishing true or false aneurysms by imaging alone is challenging [2]. To the best of our knowledge, this case report is the first representing the concurrence of two rare aneurysms of the heart, that is, RV and septal aneurysms.

Congenital RV and septal aneurysms are very rare [1-4]. Septal aneurysms are usually described in association with a ventricular septal defect or rarely isolated. Membranous septal aneurysms are generally accompanied by membranous ventricular septal defects which may close spontaneously but they may also be associated with other cardiac conditions such as aortic stenosis. Muscular ventricular septal aneurysms are rarer and usually are isolated [3]. Nguyen et al. [3] reported four cases of congenital muscular septal aneurysms, which were accompanied by right heart lesions (three patients had pulmonary atresia with intact ventricular septum, and one patient had absent pulmonary valve syndrome with severe tricuspid stenosis). Our case also had an RV lesion (aneurysm) accompanying a muscular septal aneurysm, although the mechanism of this co-occurrence seemed to be different. In our case, it is thought to occur due to a simultaneous injury, like an embryonic development defect, or ischemia of an unknown reason.

The rarity of congenital cardiac aneurysms makes it difficult to publish large and prospective data, reflecting the pediatric development and prognosis of these lesions. Fetuses with suspected ventricular aneurysms on the US screening should undergo targeted fetal echocardiography. Prenatal and postnatal sonographic follow-ups are needed to rule-out newly developing pericardial effusions, hydrops, or dysrhythmias; and growth of the lesion should be monitored [4]. Outcome depends on the size and progression of the lesion; thus, the lack of any complications in the presented case so far can be attributed to the stability of the lesions.

The number of prenatally detected cardiac aneurysms and diverticula cases seems to be increasing in the last two decades. Considering most of these lesions are asymptomatic and isolated, possible reasons for the increased detection rate are the technical improvement of the US devices, as well as the increasing knowledge and experience in fetal cardiac US scanning.

Informed Consent: Written informed consent was obtained from the parents of the patient who participated in this study.

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