Congenital aneurysm at the base of the interventricular septum as a cause of ventricular tachycardia in adults

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Abstract

Although congenital interventricular septal aneurysms are generally discovered incidentally, we present the case of an adult patient whose only manifestation was syncope and sustained monomorphic ventricular tachycardia on electrocardiogram. Subsequently, studies were done showing the septal defect, which led to implantation of a dual-chamber cardioverter defibrillator as a secondary preventive measure. **(Acta Med Colomb 2025; 50. DOI: https://doi.org/10.36104/amc.2025.3793).**

Keywords: *ventricular tachycardia, aneurysm, congenital heart defect, cardiac arrhythmias, sudden death.*

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Introduction

The most common presentation of left ventricular aneurysms occurs following an acute myocardial infarction. However, they have also been reported to be associated with conditions like sarcoidosis, Chagas disease and myocarditis. Idiopathic aneurysms are a rare condition, for which no cause is found after extensive studies (1).

The estimated prevalence of this condition is 0.34% of patients who undergo coronary angiography (2).

Congenital left ventricular aneurysms are characterized by a dyskinetic structure associated with this ventricle. This entity is widely related to morbidity and mortality due to heart failure, rupture of the lesion, thromboembolism, arrhythmias, and sudden cardiac death (3).

Some cases of congenital cardiac aneurysm, as well as sudden death attributed to this condition, have been reported in Latin America (4, 5).

Using multiple imaging modalities, this case report will show an interventricular aneurysm and its electrical-anatomical effect: ventricular tachycardia.

Case presentation

This was a 47-year-old female patient with no significant medical history who consulted due to a syncopal episode, with an electrocardiographic finding of wide complex tachycardia (Figure 1-A). She was admitted to the intensive care unit (ICU), where she remained in long-term care. A Holter showed episodes of sustained monomorphic ventricular tachycardia.

During her stay, she required pharmacological and electrical cardioversion due to hemodynamic instability. A transthoracic echocardiogram reported no structural abnormalities. Subsequently, magnetic resonance imaging of the heart showed aneurysmal dilation of the ventricular septum and sequelae of myocarditis in the inferoseptal wall of the left ventricle, with an ejection fraction of 59%.

The patient was referred to electrophysiology for complementary tests. A three-dimensional electrophysiology mapping study (EnSite) with arrhymthogenic substrate modification was ordered. Coronary arteriography with a ventriculogram was ordered.

The ventriculogram showed increased volume and contractility in the oblique, left anterior and cranial views. An aneurysm was found at the base of the left ventricle, with an ejection fraction of 60%, confirming the diagnosis of a basal septal aneurysm (Figure 1-B,C).

Three-dimensional reconstruction of the left ventricle and voltage mapping during the EnSite study showed a large anterior-posterior aneurysmal area in the basal third of the ventricular septum (Figure 2). The aneurysm had scant conduction, while its borders had very pathological electrograms, and were considered to be ventricular arrhythmogenic substrate and the source of the ventricular tachycardia. Electromodulation of the arrhythmogenic substrate in the electroanatomic area was performed, after which arrhythmias could not be induced.

A dual chamber cardiac defibrillator was implanted as secondary prevention, due to the large septal defect.

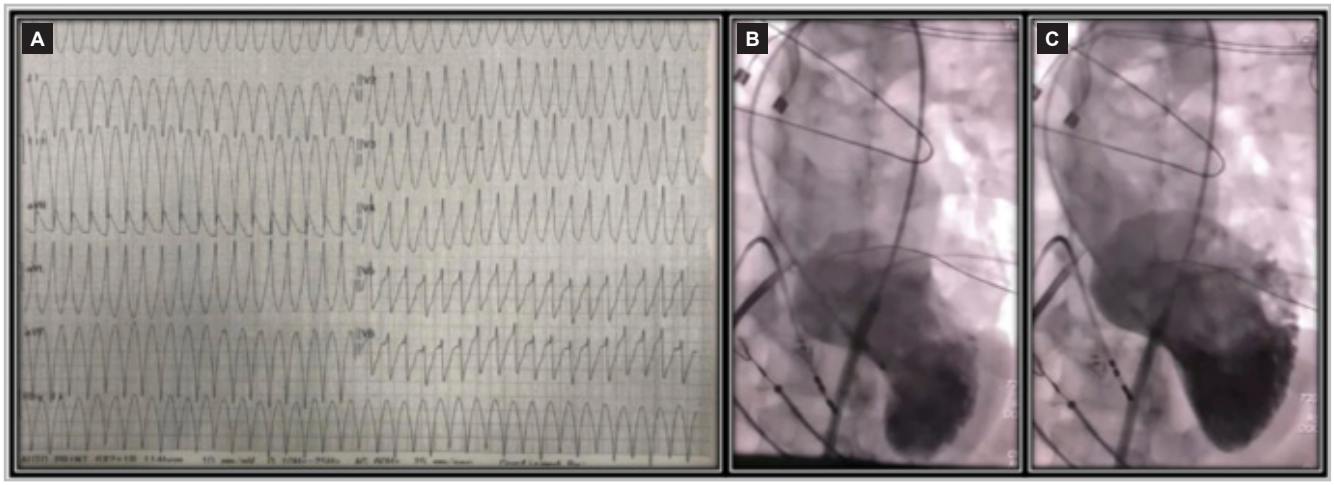

Figure 1. Panel A: *sustained monomorphic ventricular tachycardia*. **Panels B and C:** *left ventricular basal aneurysm in systole and diastole, respectively.*

On follow-up two months later, the device showed episodes of non-sustained ventricular tachycardia which responded to antitachycardia pacing (ATP) and an episode of ventricular tachycardia with a shock, which resolved.

Discussion

The mean age at which ventricular aneurysms are diagnosed is estimated to be 31 years, with up to 4.2% of cases identified prenatally. They have occasionally been found in patients with trisomy 13 and 18 (3). There have been some cases of congenital heart aneurysms and sudden death due to these aneurysms reported in Latin America (4, 5).

They are most commonly asymptomatic, and up to 41% of cases are found during diagnostic procedures for other conditions. Thrombotic material has been reported in 11% of cases, although with an embolic component in 5.4% of cases (3). When the findings are asymptomatic and incidental, expectant management is generally employed, with follow-up echocardiograms. However, if they present with cerebral thromboemboli, full anticoagulation should be

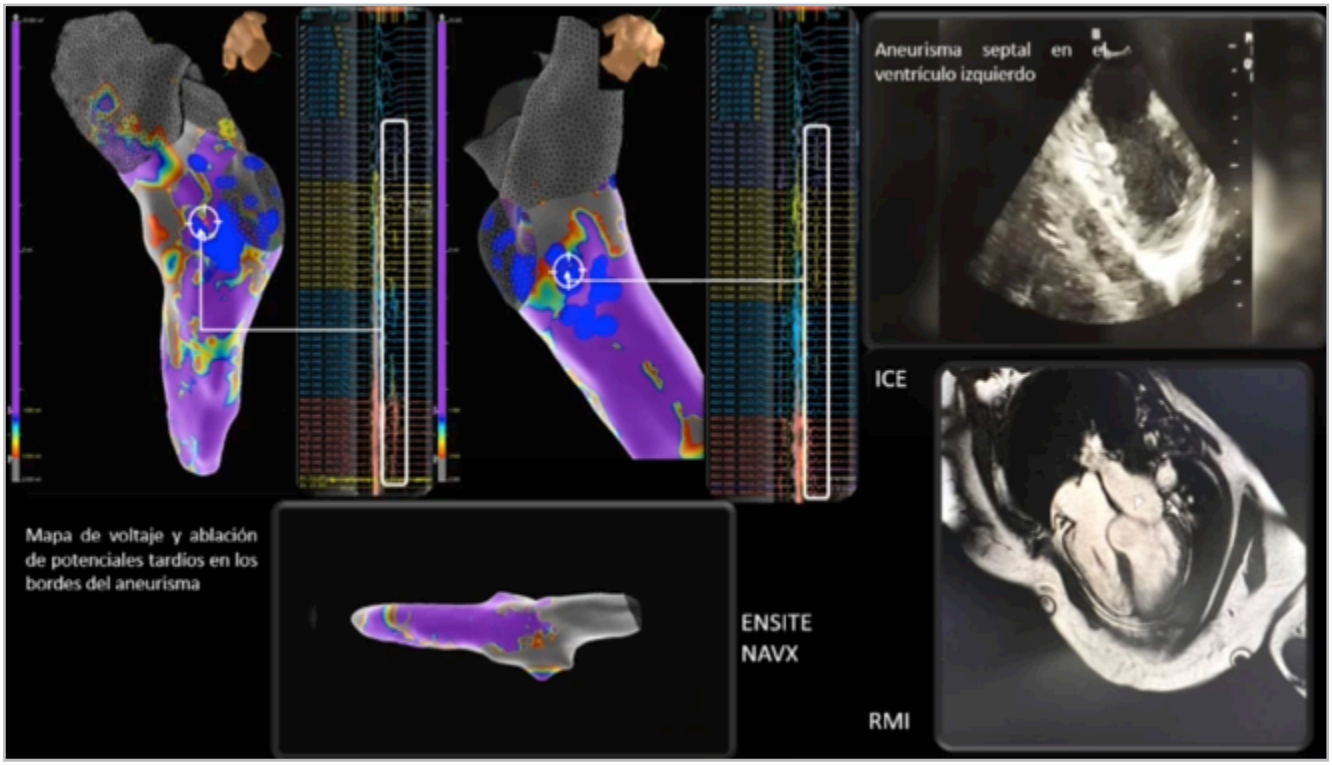

Figure 2. *Basal septal aneurysm seen on EnSite. A septal aneurysm is shown on the right, using echocardiographic and magnetic resonance imaging.*

considered and, if embolization persists, surgical closure should be considered (6).

Presentation with aneurysmal rupture has been found in 4% of cases. The second most frequent cause of clinical presentation is syncope and heart rhythm abnormalities, with a prevalence of 18.4% of the patients, and 8.8% with a syncopal presentation (3). In addition, up to 21.5% of the cases have concomitant congestive heart failure, while endocarditis occurs in 0.9% of cases (3).

Malignant tachyarrhythmias are associated with an arrhythmogenic substrate and the conduction abnormalities it produces, as well as catecholamine elevations due to either physical or mental stress (1). Over a mean follow up of 62 months, sudden cardiac death has been reported in 12.7% of patients (3).

Multiple associated cardiac abnormalities have been described, with the most common being coronary artery disorders (35%), ventricular septal defects with intracardiac shunting (11.5%), bicuspid aorta (5.8%), aberrant or absent papillary muscles (5.8%), and diaphragmatic and abdominal defects (3).

This condition does not have pathognomonic electrocardiographic abnormalities. Cardiac magnetic resonance imaging is more sensitive for diagnosis than transthoracic echocardiography, and electrophysiology studies provide additional information for stratifying the risk of sudden death, as well as determining the need for a preventive device (7).

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