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INTERMEDIATE

IMAGING VIGNETTE: CLINICAL VIGNETTE

Regression of Left Ventricular Hypertrophy in a Case of Sarcomeric Hypertrophic Cardiomyopathy

An Unexpected Outcome

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ABSTRACT

We present a case of sarcomeric hypertrophy cardiomyopathy diagnosed in a child who had hypertrophy degree regression during adolescence, with no left ventricular dysfunction and no increase of the ventricular diameters. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2020;2:935–7) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 15-year-old male was diagnosed with severe hypertrophic cardiomyopathy (HCM) after experiencing a supraventricular paroxysmal tachycardia due to a concealed left-sided accessory pathway, which was successfully ablated. An echocardiogram (**Figure 1A**) revealed the presence of severe nonobstructive septal left ventricular (LV) hypertrophy (up to 33 mm), predominantly at the basal and mid segments. Cardiac magnetic resonance showed extensive and diffuse late gadolinium enhancement at the septal level (**Figure 1B**), with a not completely typical appearance for HCM (LGE was located in mid wall but presented a disorganized, nonpatched pattern, and it was not present at the right ventricle insertion points). After an individualized assessment of the risk of sudden death, a subcutaneous automatic defibrillator was implanted.

The patient underwent a 104-gene Next Generation Sequencing (NGS) panel testing, which included the main sarcomeric genes related with HCM and metabolic disease genes (i.e., Fabry's, Danon's, or Pompe's diseases). We also verified the absence of consanguinity within the family. The NGS test identified the heterozygous p.Ala8Val mutation in *TNNC1*, which is likely pathogenic. The *TNNC1* gene encodes cardiac troponin C. This variant is a missense mutation that produces an increase in the affinity of troponin C for calcium and delays its release, which could cause diastolic dysfunction (1,2). The data available from families carrying this mutation suggest that p.Alal8Val is associated with the development of late-onset forms of HCM. In general, the maximum parietal thickness is mild and does not tend to evolve to systolic disfunction at an early age.

The familial cascade screening in the available relatives supported segregation of the mutation with a mild phenotype of HCM. As it is shown in the pedigree (Supplemental Figure 1), the father (age 45 years, II.4) is a

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ABBREVIATIONS AND ACRONYMS

HCM = hypertrophic cardiomyopathy

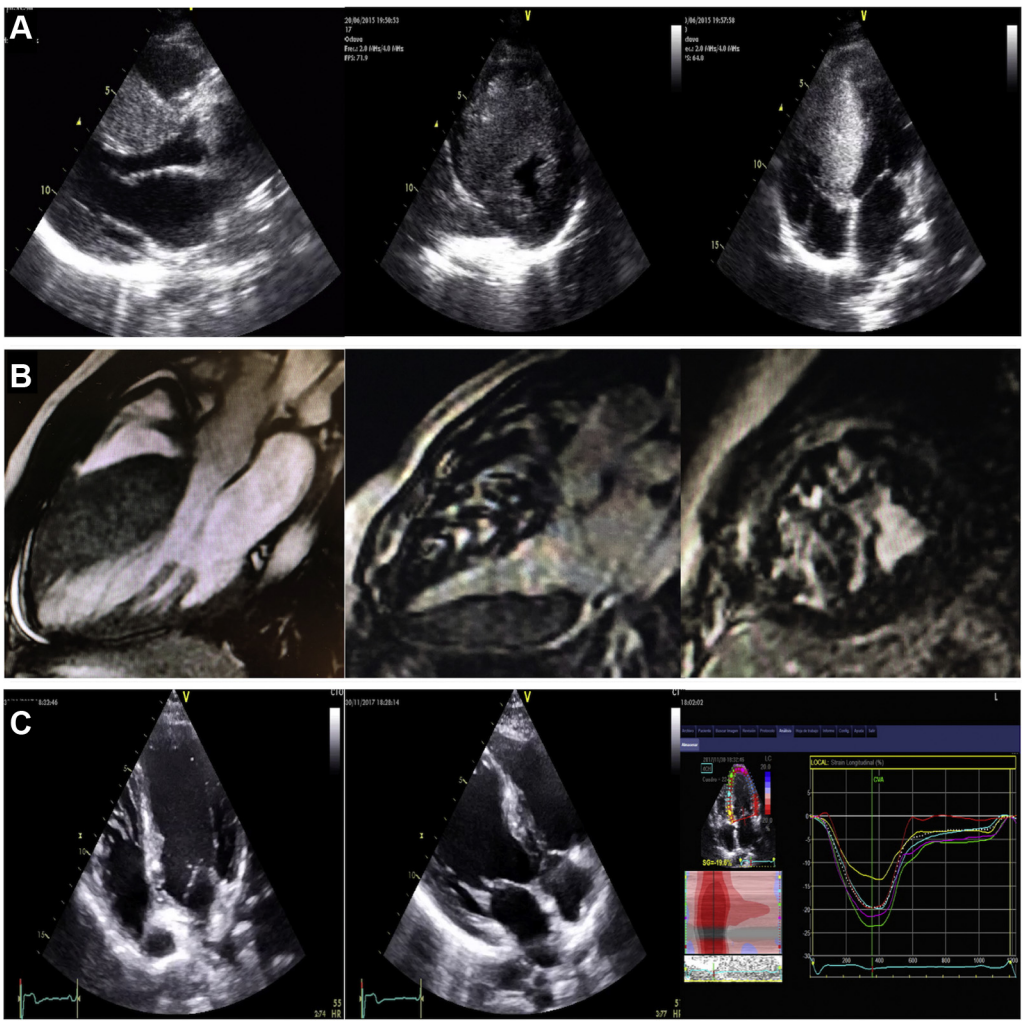
LV = left ventricular

carrier of the *TNNC1* variant and has a mild nonobstructuve septal LV hypertrophy (Supplemental Figure 2), while the mother (II.5) and the paternal grandmother (I.2) are not carriers and do not present traces of cardiomyopathy at clinical evaluation. The grandfather (I.1) is an obligate carrier but he died in an accident at 33 years of age and we have no previous medical records of him. In the 2 paternal aunts (II.1 and II.2), the genetic study did not identify the mutation and also they do not present clinical features of HCM.

During a 4-year follow-up, the patient remained asymptomatic under atenolol, without defibrillator therapies, and with a surprising progressive reduction in LV wall thickness. The last echocardiogram showed a regression of septal hypertrophy to 12 mm in the basal level and 13 mm in the medium septal level, with no changes in ventricular diameters (adjusted by body surface) or left ventricular ejection fraction. A strain rate imaging study confirmed the absence of systolic dysfunction with no evidence of the HCM end-stage phase (**Figure 1C**, Video 1).

These images demonstrate an unusual case of LV hypertrophy regression during adolescence, highlighting the complexity of HCM management in children and pre-adolescents.

FIGURE 1 Evolution of the Hypertrophic Cardiomyopathy of the Patient



(A) Diagnostic echocardiography with hypertrophy of 30 mm in the medium septal level. **(B)** Diagnostic cardiac magnetic resonance with gadolinium late enhancement with a patched pattern in the interventricular septum. **(C)** Last echocardiography with a septal thickness of 12 mm in the basal level and 13 mm in the medium level and a normal strain rate.

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KEY WORDS hypertrophic cardiomyopathy, sarcomeric genes, subcutaneous automatic defibrillator

APPENDIX For supplemental figures and a video, please see the online version of this paper.