Sudden Death in an Infant With Angina, Restrictive Cardiomyopathy, and Coronary Artery Bridging

An Unusual Phenotype for a $\beta$-Myosin Heavy Chain ($MYH7$) Sarcomeric Protein Mutation

Steven C. Greenway, MSc, MD, FRCP; Gregory J. Wilson, MD; Judith Wilson, RN-EC, MN; Kristen George, RN, NP; Paul F. Kantor, MBBCh, DCH, FRCP

The patient, a female infant aged 9 months, presented to a community hospital emergency room with fever and was referred for cardiac evaluation because of an abnormal chest radiograph. Her ECG showed biatrial enlargement and inferolateral ST depression. An echocardiogram showed a dilated left atrium and a mildly dilated and thickened left ventricle. Systolic function was preserved but diastolic filling showed restrictive physiology. A clinical diagnosis of restrictive cardiomyopathy (RCM) with associated myocardial hypertrophy was made.

The patient underwent a comprehensive metabolic screen, as well as genetic testing (Hypertrophic Cardiomyopathy [HCM] Panel, Laboratory for Molecular Medicine, Cambridge, MA), which revealed a mutation (A1157G) in exon 13 of the $\beta$-myosin heavy chain ($MYH7$) gene, resulting in a nonsynonymous amino acid change from tyrosine to cysteine at position 386. This mutation has not been reported in the literature but had been seen previously by the Laboratory in an infant with de novo HCM. The mutation was categorized as being likely pathogenic.

The child was asymptomatic, and she was started on metoprolol to limit her maximal heart rate and acetylsalicylic acid for thromboprophylaxis. At 16 months of age, the patient presented with episodes of grunting and crying, with generalized weakness and presented to a community hospital emergency room with fever and was referred for cardiac evaluation because of an abnormal chest radiograph. Her ECG showed biatrial enlargement and inferolateral ST depression. An echocardiogram showed a dilated left atrium and a mildly dilated and thickened left ventricle. Systolic function was preserved but diastolic filling showed restrictive physiology. A clinical diagnosis of restrictive cardiomyopathy (RCM) with associated myocardial hypertrophy was made.

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The findings of myocardial bridging was surprising. To our knowledge, this is the first report of a patient with an $MYH7$ mutation, RCM, and myocardial bridging. Diagnostic angiography in such patients is not routine, and the management of myocardial bridging when present in classical HCM remains controversial. Nevertheless, this case suggests that the presence of myocardial bridging should be considered with RCM and, when implicated by unexplained symptoms, should be ruled out with coronary angiography. In the absence of
effective therapy, listing for cardiac transplantation should be considered very soon after diagnosis in this high-risk patient population.

**Disclosures**

None.

**References**


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**Figure.** A, The left side of the heart shows a severely dilated and thick-walled left atrium (LA) with diffuse, marked endocardial fibroelastosis and the abnormally trabeculated left ventricle (LV) with normal wall thicknesses for age. B, The locations of consecutive tissue blocks along the left anterior descending (LAD) are shown, and the arrows indicate the intramural course of the artery. C, The intramural LAD (arrow) is surrounded by fibrosis (green staining), and patchy but extensive fibrosis is seen throughout the ventricular septum. D, Branches from the intramural LAD show luminal narrowing by fibrointimal thickening.
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