A 53-year-old white man was identified through family screening as having arrhythmogenic right ventricular cardiomyopathy caused by a frameshift mutation in the desmoplakin gene (DSP S1015fsX1017). Direct questioning revealed a previously undisclosed history of palpitations. The electrocardiogram (ECG) showed anterolateral T-wave inversion (Figure 1). Holter monitoring detected an asymptomatic 11-beat run of nonsustained ventricular tachycardia, 2 triplets, 11 couplets, and 1754 multifocal ventricular ectopics. These ectopics were of left ventricular (LV) origin when captured on 12-lead ECG. There were no late potentials on signal-averaged ECG.

Cardiovascular magnetic resonance showed mild LV dilatation with global and regional systolic dysfunction (Figure 2 and Movie I of the online Data Supplement). T1-weighted fast spin-echo images, with and without fat saturation, revealed extensive areas of conspicuous LV intramyocardial fat (Figure 2 and Movie II of the online Data Supplement). After gadolinium, there was circumferential LV late gadolinium enhancement, which was mid-myocardial in the septum and epicardial elsewhere (Figure 2). No abnormalities of right ventricular size, function, or tissue characterization were detected.

The clinical and genetic diagnosis was arrhythmogenic right ventricular cardiomyopathy. LV involvement is common (up to 75% at postmortem), and “biventricular” and “predominant LV” subphenotypes are recognized, particularly in association with desmoplakin mutations. Here, the left-sided ECG changes, LV dysfunction, fibrofatty replacement, LV origin ectopy, and absence of late potentials illustrate the rarer scenario of clinically undetectable right ventricular disease. Alone, this case could be misdiagnosed as dilated cardiomyopathy. In this family, the desmoplakin mutation was highly penetrant and cosegregated with a clinical phenotype in 6 affected individuals, whereas all those evaluated without the mutation had no clinical expression of disease. To our knowledge, this is the first genetically proven case of arrhythmogenic right ventricular cardiomyopathy with no discernible right ventricular involvement. It adds support to the concept of a generalized “arrhythmogenic cardiomyopathy” and poses questions as to whether desmosomal gene mutations might be implicated in individuals with dilated cardiomyopathy.

Sources of Funding

Professor McKenna is supported by a grant from the British Heart Foundation. This work was undertaken at University College London Hospitals/University College London, which receives a proportion of funding from the Department of Health’s NIHR Biomedical Research Centres funding scheme.

Disclosures

None.

References

Figure 2. End-diastolic short-axis view showing circumferential late gadolinium enhancement of the LV wall. Short-axis T1-weighted images showing fatty infiltration of the LV wall that follows the late gadolinium enhancement (fat) and nulls with fat saturation (fat-sat).
Arrhythmogenic Left Ventricular Cardiomyopathy
Caroline J. Coats, Giovanni Quarta, Andrew S. Flett, Antonios A. Pantazis, William J. McKenna
and James C. Moon

_Circulation_. 2009;120:2613-2614
doi: 10.1161/CIRCULATIONAHA.109.874628

_Circulation_ is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circ.ahajournals.org/content/120/25/2613

Data Supplement (unedited) at:
http://circ.ahajournals.org/content/suppl/2009/12/28/120.25.2613.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in _Circulation_ can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial
Office. Once the online version of the published article for which permission is being requested is located,
click Request Permissions in the middle column of the Web page under Services. Further information about
this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to _Circulation_ is online at:
http://circ.ahajournals.org/subscriptions/