Non-sustained ventricular tachycardia in nonischemic dilated cardiomyopathy: results from a nonischemic cardiomyopathy study

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Background

The underlying substrates and mechanisms of non-sustained ventricular tachycardia (NSVT) in nonischemic dilated cardiomyopathy (DCM) are unclear and may be different than those of sustained VT.

Purpose

To characterize NSVT in DCM and analyze its association with late gadolinium enhancement (LGE) on CMR, inducibility of sustained VT during EP study, and ventricular arrhythmias during follow-up.

Methods

In the prospective Leiden Nonischemic Cardiomyopathy Study (ClinicalTrials.gov Identifier: NCT01940081) patients with DCM underwent a comprehensive evaluation. For the present study, 24h-Holters were assessed for the presence of NSVT (defined as ≥3 consecutive beats arising below the atrioventricular node with a rate =120 bpm and lasting <30 s) and its features (number of episodes, rate, rate variability >10%, duration, coupling interval and morphology). CMRs were assessed for the presence of LGE and EP studies for inducibility of sustained monomorphic VT. Patients were followed and ICDs were programmed with therapy >188-200 bpm or adjusted to clinically documented VT.

Results

Of all 148 patients, 95 underwent a 24-hour Holter at the Leiden University Medical Center and were included in the present study (age 59±13 years, 76% male, history of sustained VT in 26 [27%], out-of-hospital cardiac arrest in 7 [9%]). NSVT was observed during Holter in 52 patients (55%) and was typically short (median 4 beats, IQR 3-5 beats), relatively slow (median 144 bpm, IQR 134-156 bpm), irregular (median 67%, IQR 43-100% of all episodes per patient) and monomorphic (median 87%, IQR 12-100%). NSVT was not associated with LGE on CMR (p=0.49) or VT inducibility during EP study (p=0.96), nor were its features (all p>0.05). During 4.0±1.7 years follow-up, sustained VT occurred in 25 patients (26%), polymorphic VT/VF in 8 (8%), and any sustained ventricular arrhythmia in 30 (32%). NSVT was associated with a higher rate of sustained VT during follow-up (HR 5.45, p=0.002) and any sustained ventricular arrhythmia (HR 4.17, p=0.002), but not with polymorphic VT/VF (p=0.69). Similarly, inducibility of sustained VT during EP study was also associated with sustained VT during follow-up (HR 5.78, p<0.001) and any sustained ventricular arrhythmia (HR 4.88, p<0.001), but not with polymorphic VT/VF (p=0.13). The findings remained similar when only primary prevention patients were included. In multivariate analysis, NSVT on Holter and inducibility of sustained VT during EP study both remained independently associated with sustained VT and any sustained ventricular arrhythmia during follow-up (all p=0.001), but not with polymorphic VT/VF.

Conclusion

In DCM, NSVT on Holter and inducible sustained VT during EP study are not directly interrelated, but both predict the occurrence of sustained VT during follow-up. These data suggest that non-sustained and sustained VT may have different underlying mechanisms and provide complementary information in DCM.
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