

Non-sustained ventricular tachycardia due to extreme stress induced by road traffic in a healthy adult

Wojciech Skorupski, Marek Grygier, Maciej Lesiak, Przemysław Mitkowski

^{1st} Department of Cardiology, Poznan University of Medical Sciences, Poznań, Poland

Correspondence to:

Wojciech Skorupski, MD,
^{1st} Department of Cardiology,
Poznań University of Medical
Sciences,
Długa 1/2, 61–848 Poznań,
phone: +48 61 854 92 22,
e-mail: wojtek.skorupski@wp.pl

Copyright by the Author(s), 2022

DOI: 10.33963/KPa2022.0210

Received:

June 11, 2022

Accepted:

August 29, 2022

Early publication date:

October 27, 2022

Episodes of extreme emotional stress can have significant adverse effects on the heart. The incidence of sudden cardiac death increases in populations who experience disasters such as earthquakes or wars [1]. The physiological connection between mental stress and sudden cardiac death is not clear; one mechanism may be the direct effect of adrenergic stimulation on arrhythmias. Ventricular tachycardia (VT) and sudden cardiac death are more common in the morning, during the peak catecholamine levels and lowest vagal tone [2]. Negative emotions, such as anger, anxiety, and sadness, may accelerate ventricular arrhythmias and myocardial infarction [3]. Acute emotional stress can produce left ventricular contractile dysfunction, myocardial ischemia, or disturbances of cardiac rhythm [4]. Although these abnormalities are often reversible, their consequences can be very harmful or, in the worst-case scenario, fatal.

A previously healthy 24-year-old woman was referred for a cardiological consultation because of non-specific chest discomfort. She did not have any risk factors for cardiovascular diseases. Blood tests, including the thyroid hormone levels, were normal. She did not take any drugs. A non-invasive diagnostic examination protocol was introduced. Electrocardiography (ECG) was normal, with sinus rhythm of 75 beats per minute (bpm). Echocardiography showed no abnormalities, and the stress test confirmed good physical capacity. Finally, ambulatory 24-hour ECG Holter monitoring was implemented. Right after monitoring started, on the way back home, the patient almost caused a fatal traffic accident. She did not notice a pedestrian crossing the lanes, who was stunned by the

life-threatening situation and froze in front of the patient's car. The patient avoided the accident by stopping the car at the last moment, right in front of the pedestrian. At this exact point, Holter recorded 3 episodes of non-sustained VT (NSVT) (3–4 ventricular beats), and the patient experienced cardiac palpitations unlike any other in her life (Figure 1A). After this surprising ECG recording, control 72-hour Holter ECG was performed, and this examination presented no ventricular extrasystoles. Aftermath cardiac magnetic resonance was implemented to confirm no uncommon congenital cardiac defects or myocarditis (Figure 1B1–1B3). The final decision was made that the NSVT episode had been caused by stress, and there was no need for an invasive electrophysiology procedure or any treatment.

According to the best of our knowledge, this is the first report of a healthy adult presenting with NSVT due to extreme stress. Our case documents that extreme short-term severe stress can induce severe cardiac arrhythmias. In patients with cardiac diseases, such arrhythmias can be life-threatening. The frequency of this phenomenon is unknown. Holter monitoring could in rare accidental conditions shed light on pathomechanism of stress/injury-arrhythmia-severe outcome pathway [5]. After ruling out organic heart disease, symptoms previously presented by the patient suggested neurosis, and perhaps this subgroup of patients is more exposed to such incidents. Moreover, in our case, the NSVT episode was particularly short (3–4 ventricular beats). According to the guidelines, there are currently no indications for treatment of such cases.

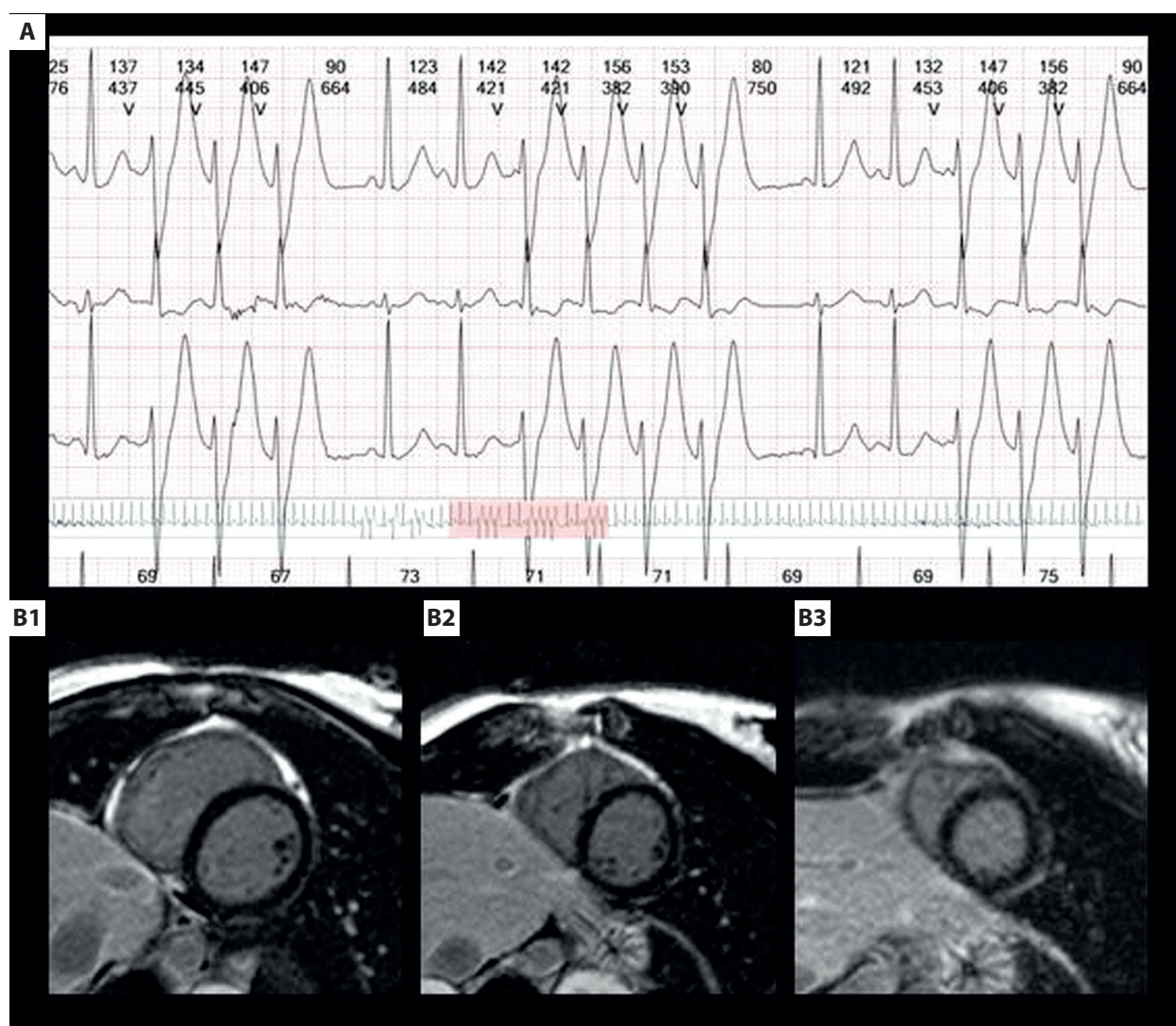


Figure 1. A. 24-hour ECG Holter monitoring showing episodes of non-sustained ventricular tachycardia. **B1–B3.** Cardiac magnetic resonance with no abnormalities

Article information

Conflict of interest: None declared.

Funding: None.

Open access: This article is available in open access under Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially. For commercial use, please contact the journal office at kardiologiapolska@ptkardio.pl.

REFERENCE

1. Leor J, Poole WK, Kloner RA. Sudden cardiac death triggered by an earthquake. *N Engl J Med*. 1996; 334(7): 413–419, doi: [10.1056/NEJM199602153340701](https://doi.org/10.1056/NEJM199602153340701), indexed in Pubmed: [8552142](https://pubmed.ncbi.nlm.nih.gov/8552142/).
2. Huikuri HV, Niemelä MJ, Ojala S, et al. Circadian rhythms of frequency domain measures of heart rate variability in healthy subjects and patients with coronary artery disease. Effects of arousal and upright posture. *Circulation*. 1994; 90(1): 121–126, doi: [10.1161/01.cir.90.1.121](https://doi.org/10.1161/01.cir.90.1.121), indexed in Pubmed: [8025987](https://pubmed.ncbi.nlm.nih.gov/8025987/).
3. Lampert R, Joska T, Burg MM, et al. Emotional and physical precipitants of ventricular arrhythmia. *Circulation*. 2002; 106(14): 1800–1805, doi: [10.1161/01.cir.0000031733.51374.c1](https://doi.org/10.1161/01.cir.0000031733.51374.c1), indexed in Pubmed: [12356633](https://pubmed.ncbi.nlm.nih.gov/12356633/).
4. Lampert R, Jain D, Burg MM, et al. Destabilizing effects of mental stress on ventricular arrhythmias in patients with implantable cardioverter-defibrillators. *Circulation*. 2000; 101(2): 158–164, doi: [10.1161/01.cir.101.2.158](https://doi.org/10.1161/01.cir.101.2.158), indexed in Pubmed: [10637203](https://pubmed.ncbi.nlm.nih.gov/10637203/).
5. Marcinkiewicz K, Baranowski R. Death recorded by Holter monitoring due to multiple traumatic injuries as a consequence of a car accident. *Kardiologia Pol*. 2020; 78(12): 1301–1303, doi: [10.33963/KP.15702](https://doi.org/10.33963/KP.15702), indexed in Pubmed: [33293498](https://pubmed.ncbi.nlm.nih.gov/33293498/).