CLINICAL IMAGE

The LifeVest wearable defibrillator for noninvasive prevention of sudden arrhythmic death syndrome

The first Polish case of an adequate LifeVest intervention

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The current Polish and European guidelines do not recommend implantation of permanent implantable cardioverter–defibrillator (ICD) within 40 days after myocardial infarction. The wearable cardioverter–defibrillator (WCD) is a novel preventive option for patients during this period, with Class IIb recommendation of the European Society of Cardiology.[1] We present the first Polish case of an adequate LifeVest intervention.

A 67-year-old patient with permanent atrial fibrillation (AF) was admitted with acute anterolateral ST-segment elevation myocardial infarction. An electrocardiogram on admission showed AF with a ventricular rate of 66 bpm with ST-segment elevation of 2 mm in leads I, aVL, and V_2 to V_6. After an urgent coronary angiography, thrombectomy was performed and 2 drug-eluting stents were implanted into the left anterior descending artery and diagonal branch, which resulted in Thrombolysis in Myocardial Infarction grade 3 flow. An echocardiography revealed left ventricular dysfunction with a left ventricular ejection fraction (LVEF) of 34%. On 24-hour Holter monitoring, AF with a mean ventricular rate of 70 bpm and an episode of nonsustained ventricular tachycardia (VT; 4 evolutions at 120 bpm) were noted. In line with the guidelines, the implantation of ICD was generally not indicated in this patient.

As a participant of a clinical trial, the patient was equipped with a LifeVest wearable defibrillator (Zoll Medical Corporation, Chelmsford, Massachusetts, United States; FIGURE 1A and 1B). The WCD consists of 4 electrodes recording an electrocardiogram, 3 defibrillation electrodes, condenser, and cardiac rhythm analyzer capable of delivering defibrillation using energy of 150 J in case of ventricular fibrillation (VF) or VT. The device releases a gel over the therapeutic electrodes just before a defibrillation shock. By pressing an appropriate button, a conscious patient can prevent an inadequate intervention, which can be caused by electromagnetic interferences or incorrect VT/VF detection due to artefacts. The LifeVest defibrillator should be worn for at least 22 hours a day.

After 4 weeks, the patient was urgently admitted to a cardiac department following out-of-hospital sudden cardiac arrest due to VF, successfully discontinued by LifeVest. The episode occurred during moderate activity in a shopping center. The patient was wearing the WCD for an average of 23 hours a day. FIGURE 1C shows an episode of AF correctly identified and successfully defibrillated by LifeVest. The energy of the shock was 150 J. After the intervention, a regular rhythm was restored with subsequent recurrence of AF within minutes. No new risk factors for arrhythmia were detected during hospitalization, troponin levels were normal, and LVEF was stable at 34%. Following this episode, a permanent ICD was implanted as a secondary prevention of sudden cardiac death.

Our case confirms the clinical relevance of the WCD in situations where permanent implantation of the ICD is not yet indicated despite reduced left ventricular systolic function (LVEF ≤35%). Patients in the early period after myocardial infarction or after coronary revascularization, with newly diagnosed cardiomyopathy, awaiting cardiac transplantation, and those after removal of an infected ICD might benefit from a temporary use of the WCD. However, with an expected low intervention rate, the medical and economic issues of this strategy remain to be solved.

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Received: April 29, 2017.
Revision accepted: June 26, 2017.
Published online: September 29, 2017.
Conflict of interest: none declared.
Pol Arch Intern Med. 2017; 127 (9): 641-642
doi:10.20452/pamw.4111

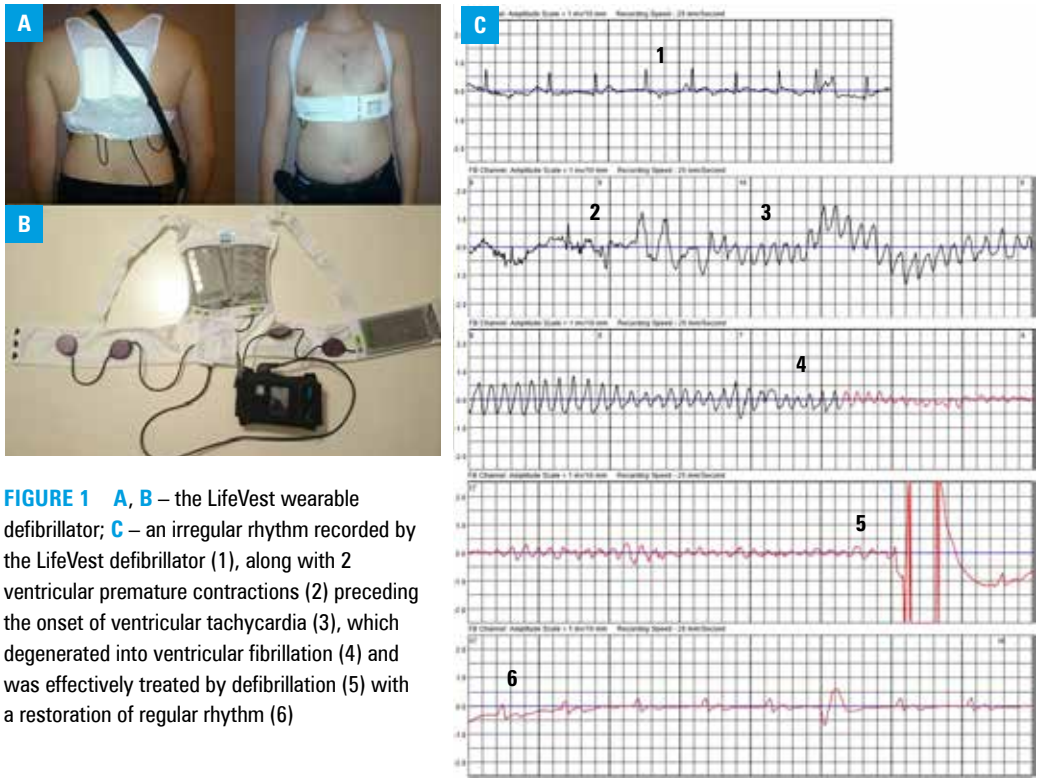

FIGURE 1 **A**, **B** – the LifeVest wearable defibrillator; **C** – an irregular rhythm recorded by the LifeVest defibrillator (1), along with 2 ventricular premature contractions (2) preceding the onset of ventricular tachycardia (3), which degenerated into ventricular fibrillation (4) and was effectively treated by defibrillation (5) with a restoration of regular rhythm (6)

REFERENCES

1 Priori SG, Blomström-Lundqvist C, Mazzanti A, et al. 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: The Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC). Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC). Eur Heart J. 2015; 36: 2793-2867.