
A USEFUL TOOL TO MANAGE SUDDEN CARDIAC DEATH RISK DURING MEDICAL OPTIMIZATION FOR NEWLY DIAGNOSED DILATED CARDIOMYOPATHY PATIENTS—CASE STUDY

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HISTORY OF PRESENT ILLNESS (HPI) A 52-year-old male presented to his pulmonologist with complaints of shortness of breath, dyspnea on exertion, orthopnea, paroxysmal nocturnal dyspnea, lower extremity edema, and weight gain over the last several months. The patient was transferred to the emergency department for further evaluation. He had a history of hypertension, hyperlipidemia, asthma, gastroesophageal reflux disease, renal stones, and obstructive sleep apnea. Relevant prescribed medications prior to arrival included rosuvastatin, valsartan, omeprazole, montelukast, simvastatin, and albuterol. The patient admitted to ceasing his medications a few months prior to arrival because he did not think they were working.

SOCIAL HISTORY The patient is married with a 4-year-old son. He denied tobacco, alcohol, and illicit drug use.

PHYSICAL EXAMINATION/LABS The physical examination revealed an elevated jugular venous distention and 3+ lower extremity pitting edema with reports of shortness of breath, orthopnea, and chest pressure. The patient had a mildly distended soft abdomen. The examination revealed bilateral crackles in the bases of his lungs. The patient was awake, alert, and had no appearance of acute distress.

Relevant labs: INR 1.2, sodium 140, potassium 3.9, chloride 103, CO₂ 23, BUN 22, creatinine 1.2, troponin 0.05, CPK 174, CK-MB 3.6, BNP 1232, cholesterol 166, triglycerides 84, HDL 22, LDL 128, TSH 3.05

Hematology: white blood count 9.6, hemoglobin 13.8, platelets 200,000

STUDIES/RESULTS The patient's electrocardiogram (EKG) revealed sinus tachycardia with a left anterior fascicular block and an isolated episode of asymptomatic non-sustained ventricular tachycardia (NSVT). The chest x-ray revealed cardiomegaly with minimal pulmonary vascular congestion. An echocardiogram revealed a severely dilated left ventricle with an ejection fraction (EF) of $\leq 15\%$ and grade II diastolic dysfunction.

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IMPRESSIONS/PLAN The patient was deemed to have newly diagnosed non-ischemic cardiomyopathy with a severely depressed EF. The patient was started on furosemide, aspirin, metoprolol, lisinopril, and began aggressive diuresis with a one liter negative fluid balance on a daily basis.

After medical stabilization, the patient was transferred to Rochester General Hospital for cardiac catheterization, where his coronary arteries were found to be normal and revealed no significant occlusions. The patient originally presented with New York Heart Association (NYHA) class IV symptoms, but improved to NYHA class III symptoms prior to discharge. He was discharged with the following medications:

- furosemide 40 mg qd
- carvedilol 3.125 mg bid
- lisinopril 5 mg qd
- budesonide/formoterol bid
- spironolactone 25 mg qd
- atorvastatin 40 mg qd
- aspirin 81 mg qd
- citalopram 10 mg qd
- alprazolam 0.25 mg qd

It was determined that the patient's severely low EF put him at an elevated risk of sudden cardiac death (SCD). The patient was prescribed a wearable cardioverter defibrillator (WCD) (manufactured by ZOLL, Pittsburgh, PA, marketed under the brand name LifeVest®) for three months.

The discharge plan was to optimize medical management for three months and reevaluate his EF for consideration of an implantable cardioverter defibrillator (ICD) for long-term protection from SCD.

CLINICAL UPDATE The patient was brought in for evaluation after three months. While his EF had improved since onset, it remained depressed at 20–25%. He had not been rehospitalized and reported improvements in edema, shortness of breath, and orthopnea. He also reported strict compliance wearing the WCD (which was verified by using the LifeVest Network; see Figure 1) and taking his prescribed medications. Carvedilol dose was increased to 6.25 mg bid but could not be increased further due to patient's current blood pressure (98/60) and reported dizziness.

Given the patient's persistent systolic dysfunction, despite medical optimization, he went on to receive a dual chamber ICD for long-term protection from SCD.

Following implantation of the ICD, the patient returned home to his wife and 4-year-old son.

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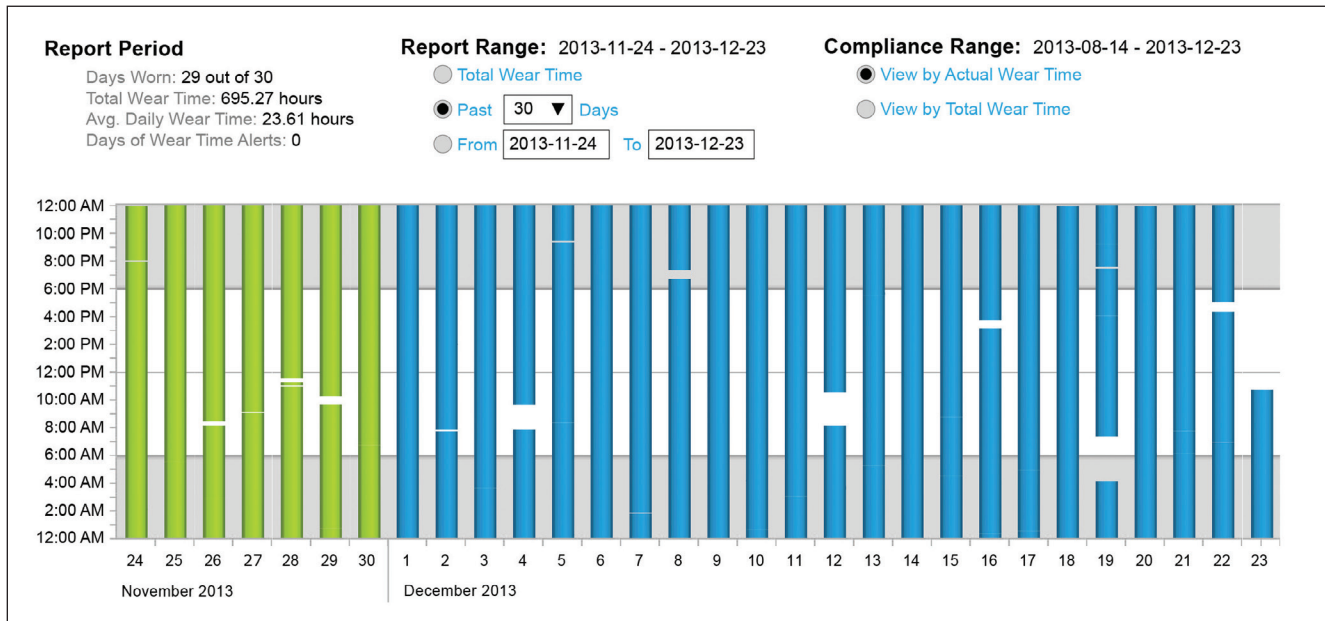


Figure 1: Patient's WCD compliance report generated from the LifeVest Network documenting high compliance (breaks in bars indicate times when WCD was not worn). The LifeVest Network is an online patient data management system available to healthcare professionals to review data captured by the LifeVest WCD.

DISCUSSION In this case study, a 52-year-old patient with no history of heart failure presented to his pulmonologist with symptoms that he thought were related to asthma. A physical examination along with routine diagnostic tests ruled out coronary artery disease and revealed the diagnosis of nonischemic dilated cardiomyopathy with an EF of $\leq 15\%$.

Optimized doses of beta blockers have been shown to reduce total mortality, including SCD.¹ Given his initial improvement during hospitalization, it was hoped that progress would continue with optimal medical management. To mitigate immediate SCD risk, the patient was prescribed a WCD while optimizing medical management and assessing the need for ICD implantation. With the patient's persistently low EF, it was ultimately determined that he required an ICD for long-term protection from SCD.

During the three-month period of use, the patient did not require treatment from the WCD to convert episodes of ventricular tachycardia (VT) or ventricular fibrillation (VF). However, the WCD proved to be a useful tool by allowing time for medication optimization while providing confidence of SCD protection during the vulnerable period following a new diagnosis of dilated cardiomyopathy.

REFERENCES

1. MERIT-HF Study Group, Effect of metoprolol CR/XL in chronic heart failure: Metoprolol CR/XL Randomised Intervention Trial in Congestive Heart Failure (MERIT-HF). *Lancet* 1999; 353: 2001–07.

