PSYCHOLOGICAL INTOLERANCE TO IMPLANTABLE CARDIOVERTER DEFIBRILLATOR

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Background: Implantable cardioverter defibrillators (ICD) are mobile implantable cardiac devices for immediate treatment of life threatening ventricular arrhythmias. However, these devices can affect patients, physiologically, psychologically and have effects on electrical devices.

Case report: The case of a 61-year-old patient is reported. The patient came for regular 3-months visits with his ICD and complained about electromagnetic interference with all household electrical appliances, especially refrigerator and digital television set-top box. He described several phantom shocks when he came close to the electrical appliances. He noted the exact times and symptoms of the episodes but the device memory did not record anything.

Conclusion: This case demonstrates the rare occurrence of psychological intolerance to implanted ICD shortly after implant. The device was programmed for higher sensitivity. The patient was calmed and reassured about the reprogramming.

INTRODUCTION

Using of active cardiac medical devices, including implantable cardioverters defibrillators (ICD) and pacemakers (PM) have increased worldwide steadily. In the Czech Republic, there were 1229 first implants and 252 replacements of ICD, 6213 first implants and 1982 replacements of PM in 2007 (ref.¹).

Electromagnetic fields may interfere with ICD. This is called electromagnetic interference (EMI). Although there are sophisticated discrimination algorithms and using of bipolar leads is routine, we still need to be concerned about EMI. Many cases of EMI made leading to inappropriate shocks have been described in the literature, especially with various electrical households^{2,3}, washing machines^{4,5} and electronic article surveillance systems⁶ (EAS).

Patients may also develop a psychological intolerance to an implantable system that may include dependency, depression, fear of premature battery depletion, fear of shock while conscious, fear that shocking capability may be lost, imagined shocking⁷. These cases are rarely reported because patients are afraid to talk about or are not interested in being educated. Some patients with ICDs experience the sensation of a shock in the absence of true therapy (phantom shock)⁸.

CASE DESCRIPTION

A sixty-one-year-old male patient with no structural heart disease but 2nd heart block had risk features, included history of presyncopal and syncopal attacks and

non sustained ventricular tachycardia. Dual-chamber ICD (Vitality 2 DR EL, Guidant, USA) and leads (Endotak Reliance 0185 integrated bipolar for right ventricle and Flexextend 4096 for right atrium, both manufactured by Guidant corp.) were implanted. The ICD was programmed into two zones, 170 min⁻¹ for ventricular tachycardia (VT zone) and 200 min⁻¹ ventricular fibrillation (VF zone). The ventricular sensitivity was programmed to nominal value of 0.27 mV after testing correct VF detection at 0.43 mV at the implant. The therapy was programmed twice eight bursts, twice eight scans, then shocks 21 J, multiplied 31 J for VT zone and 21 J, multiplied 31 J for VF zone. There was an atrial lead dislocation two months after implant successfully managed by lead repositioning. In the mean-time he was calling to ambulance several times to report the supposed EMI.

Recently the patient presented for follow-up after three months. He complained of receiving shock after bending over the set-top box or after coming closely to the radio. The refrigerator and fridge were the worst. He described swoon, palpitation and receiving a shock when ran away from the refrigerator. Patient reported three phantom shocks.

The device memory did not record any episodes at the times the patient mentioned as EMI. There were two episodes of induced VF from the implant and a single episode of accelerated cardiac origin VT (Fig. 1) treated by antitachycardia pacing (ATP). The patient did not complain of this regular therapy. Other sources for lead oversensing such as myopotentials were ruled out from EGM. Pacing thresholds, lead impedances and sensing amplitudes were within normal range and were stable compared to previous follow-up data.

DISCUSSION

EMI with ICD rarely occurs. Some of the sources for EMI are predictable and are restricted for ICD patients (welding). Next, algorithms which enable discrimination of 50/60 Hz potentials from true cardiac arrhythmias increase safety of ICD.

This case report also emphasizes the need for proper education of patients with ICD. Psychological stress can adversely affect the quality of life of ICD patient. It is recommended that all ICD patients should get the brochure of potential sources of EMI. Some patients have a fear of active implanted medical devices and do not want to understand, how these work. As the number of ICD patients is expected to increase, hospital staff and patients will be faced with these side effects.

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