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Case Report

Contact allergy to a subcutaneous implantable cardiac defibrillator – A rare problem with a golden solution

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ABSTRACT

Contact allergy to implantable cardiac defibrillators (ICD) is an uncommon and underdiagnosed complication. We report a case of a 20-years-old man patient that was resuscitated from sudden cardiac death. Workup imaging study was unremarkable, but genetic testing identified a mutation in the KCNH2 gene of uncertain significance. The patient underwent a subcutaneous implantable cardiac defibrillator (S-ICD) implantation, with no complications. The patient suffered two hospital re-admissions due to a device-related inflammatory reaction, leading to two device re-implantations. At the first time, it was considered a bacterial infection and the S-ICD was replaced by an endovascular device. At the second time, a tissue-device interaction, with hypersensitivity reaction and device rejection was suspected. The skin patch-tests were inconclusive, but it was decided to implant a custom-made gold-coated endovascular ICD. Indeed, the tendency is an initial misdiagnosis as an infection and a high clinical suspicion is essential to an early diagnosis.

1. Introduction

Implantable cardiac defibrillators are essential in the prevention of sudden cardiac death (SCD) [1]. Contact allergy to implanted cardiac devices are rarely reported or mostly misdiagnosed as infectious in origin [2]. This manifests usually as localized pain and erythema on or near the site of implantation Cutaneous reaction can be self-limiting and it can solve with topical treatment, but recurrence is the rule. Usually, it requires the removal of all the system components and its replacement with hypoallergenic material [2,3].

2. Case report

A 20-years-old man was admitted to the emergency department after being resuscitated from SCD while playing football. No personal medical history or daily medication, no alcohol or drugs consumption and no history of medical or food allergy was noted.

During hospitalization stay, a monomorphic ventricular tachycardia with hemodynamic instability was documented and successfully electrically converted to sinus rhythm. The baseline EKG showed a QT interval upper normal limit range. The patient started antiarrhythmic therapy with no recurrence of events.

His older brother had died of SCD at the age of 21 (non-diagnostic autopsy findings). No other family history was reported.

Workup study including transthoracic echocardiography and cardiac magnetic resonance did not reveal any specific structural or functional abnormalities. Coronary artery disease and congenital anomalies were excluded. Genetic testing identified a mutation in the KCNH2 gene of uncertain significance, usually associated to long QT syndrome type 2. He was then referred for a subcutaneous implantable cardiac defibrillator (S-ICD; generator Emblem® MRI A219) implantation for secondary prevention, with no immediate complications.

Four months later, the patient developed suture dehiscence and inflammatory signs through the path of the subcutaneous lead and an infection was assumed. Empirical antibiotic therapy was initiated but blood cultures were consistently negative. Because of the persistence of inflammatory signs, the S-ICD was removed, and an endovascular ICD (generator: Boston Autogen EL® VR D174; Lead: Reliance 4-Front) was implanted without complications. The patient was then discharged symptom-free.

A pocket fragment and lead portion were sent to microbiology, but the results were negative.

Five months later, he was readmitted due to inflammatory signs

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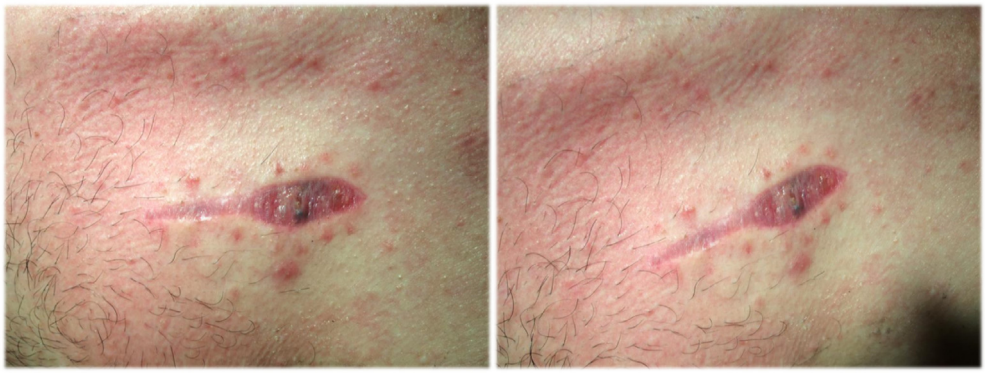

Fig. 1. Implanted cardiac defibrillator pocket site with evident cutaneous inflammatory signs and wound dehiscence.

on the device incision and wound dehiscence (Fig. 1). Systemic infection was excluded, and the ICD was removed again with negative microbiologic results. We noticed a clear straw-colored exudate as we opened the incision. At this point, a hypersensitivity reaction with device rejection was suspected and the patient was referred to Allergy and Clinical Immunology Department. A patch-test was performed with a sparse reaction to some materials, with no evident allergy to a specific one. A localized dermatitis with titanium material was suspected, but repeated testing was negative. A trial with low dose systemic corticosteroid therapy was initiated with a transient improvement of symptoms followed by an early recurrence of cutaneous inflammatory signs.

Despite of inconclusive results, around three months after the explant, it was decided to implant a custom-made gold-coated endovascular ICD (Medtronic Evera® XT DR, DDBB2D4G; coating thickness 0.5 μm, pure 99.9% 24 carat gold). This gold device was, on this occasion, implanted in the right chest wall percutaneously via the right subclavian vein. It has been well tolerated for 3 years since implantation with no signs of rejection or other complications.

3. Discussion

Contact sensitivity to an ICD or other implanted cardiac device represents a challenge to clinicians since there is no other alternative treatment option to these devices [1].

These reactions can have an early or delayed presentation and there are less than 30 cases described in literature. A negative reaction to prick testing does not rule out an allergy to a specific component. These tests could lead to false-negative reactions related to inadequate chemical release or even to the type of putative allergen hypersensitivity [2,3]. Replacement with a gold-coated pulse generator can be a solution to this problem [4,5].

To the best of our knowledge no other case of a S-ICD rejection was reported which makes this case a unique presentation of an unspecific contact sensitivity at an endovascular level and a subcutaneous one.

References

[1] Kaya E, Rassaf T, Wakili R. Subcutaneous ICD: current standards and future perspective. Int J Cardiol Heart Vasc 2019 Aug 8;24:100409. https://doi.org/10.1016/j.ijcha.2019.100409.
[2] Honari G, Ellis SG, Wilkoff BL, et al. Hypersensitivity reactions associated with endovascular devices. Contact Dermatitis 2008 Jul;59(1):7–22. https://doi.org/10.1111/j.1600-0536.2008.01351.x.
[3] Gold M, Nath N, Green C, et al. Frequency of contact allergy to implanted cardiac devices. JAMA Dermatol 2019 Jun 1;155(6):749–52. https://doi.org/10.1001/jamadermatol.2019.0036.
[4] Kypta A, Blessberger H, Lichtenauer M, et al. Gold-coated pacemaker implantation for a patient with type IV allergy to titanium. Indian Pacing Electrophysiol J 2016 Feb 23;15(6):291–2. https://doi.org/10.1016/j.ipej.2016.02.009.
[5] Syburra Thomas, Schurr Ulrich, Rahn Mariette, Graves Kirk, Genoni Michele. Gold-coated pacemaker implantation after allergic reactions to pacemaker compounds. EP Europace May 2010;12(Issue 5):749–50. https://doi.org/10.1093/europace/eup411.