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Painful Eczema Mimicking Pocket Infection in a Patient With an ICD

A Rare Cause of Skin Allergy to Nickel/Cobalt Alloy

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A 74-year-old man with severe ischemic cardiomyopathy and chronic persistent dyspnea was referred to our institution for discussion of cardiac resynchronization therapy with backup antitachycardia protection. The patient's medical background consisted of paroxysmal atrial fibrillation, a remote lung cancer, and a recent resection of a basocellular carcinoma on the neck; no history of allergy to nickel/cobalt alloy or other contact reaction was noted. After clinical and echocardiographic assessment, the patient was determined to be eligible for cardiac resynchronization therapy with an implanted cardioverter-defibrillator according to guidelines. After successful implantation, substantial clinical improvement was observed during the follow-up. Although he remained in New York Heart Association class II, the patient complained of a painful erythema with pruritus in a large area above and around the device 8 months after the implantation procedure (Figure 1). A pocket infection was rapidly ruled out, and both a biopsy and epidermal test were performed. Biopsy confirmed the diagnosis of eczema, and the allergy test kit, comprising different samples (cobalt/nickel, medical-grade epoxy, parylene-coated titanium, silicone rubber, and



Figure 1. Painful eczema in the area of the cardioverter-defibrillator implantation.



Figure 2. Complete resolution of the eczema after appropriate local dermocorticoid therapy.

polyurethane allergen), was strongly positive for cobalt chloride. Local therapy with betamethasone dipropionate for 6 months, with progressive discontinuation, resulted in complete resolution of the eczema after 3 months. At a 1-year follow-up visit (6 months remote from interruption of dermocorticoid therapy), neither recurrence of the eczema nor pruritus was observed, and the patient showed a significant slimming of the skin, which was related to the dermocorticoid therapy (Figure 2). Because of persistent resolution of the erythema, no material removal had to be undertaken in favor of a more coated or a gold-coated device.

True skin allergy to nickel/cobalt alloy is exceptional^{1–3} because of the absence of direct contact of either the device can or the leads that contain these compounds with the patient's skin. The screws in a pacemaker/defibrillator are made of stainless steel, which contains nickel; however, these are only in indirect contact with the patient via the hole in the septum plug. Furthermore, all pacemaker/defibrillator leads make use of a conductive coil for current transfer that is made of a metal alloy called MP35N. This alloy consists of cobalt, nickel, and chromium in approximately equal proportions,

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and the conductive coil is not in direct contact with the patient. Finally, the pin and the ring on the fixation part of the electrode lead are also made of stainless steel that contains nickel. These parts are put in the pacemaker (header), and are not in direct contact with the patient. This alloy has been in use in pacemaker leads for many years and has shown excellent biocompatibility.

To confirm such a rare hypothesis, and because of the alternative diagnosis of a pocket infection and its consequences (removal of the materials), it is mandatory to rapidly rule out an infection process and to perform epidermal tests with an appropriate allergy test kit provided by the manufacturer. This kit contains small samples of the various materials used in their implantable pacemakers/defibrillators that may come in contact with a patient once the device has been implanted. Specific therapy with a dermocorticoid may per-

manently resolve the skin reaction; otherwise, a more coated or a gold-coated device may need to be implanted in place of the original device.⁴

Disclosures

None.

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