

Contact dermatitis after implantable cardiac defibrillator implantation for ventricular tachycardia

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Summary Pacemaker contact sensitivity is a rare condition. Less than 30 reports of pacemaker skin reactions have been described. We report a 57-year-old woman who underwent an implantable cardiac defibrillator (ICD) implantation for ventricular tachycardia. A skin patch test was positive on almost all components of the pacemaker system. She was treated with topical corticosteroids and skin lesions resolved within 2 weeks. Because of widespread use of various devices, we will see this more often and therefore it is important to recognize this problem and its effective management.

Keywords: Dermatitis, implantable cardiac defibrillator (ICD), skin patch test

1. Introduction

Contact dermatitis is an inflammatory response that appears from the contact of irritant or allergic substances to the skin. Contact dermatitis due to pacemaker devices is a rare clinical situation. There are possibilities of being not detected and being misdiagnosed because of negative skin tests. The most important step of the diagnosis is the skin patch test. The treatment management may also be problematic once the contact dermatitis is diagnosed (1). We have presented a case who had localized erythema development after an implantable cardiac defibrillator (ICD) implantation nearly 8 months ago, the ICD was removed from the patient and re-implanted, and the patient had contact dermatitis 24 hours after the re-implantation.

2. Case report

A 57-year-old woman was admitted to our hospital for replacement of an ICD for hypertrophic cardiomyopathy who had suffered ventricular tachycardia. Her medical history included an ICD implantation 8 months ago which had been removed for suspected pacemaker infection with localized erythema at the side of the

generator pocket one week after implantation. No bacterial infection had been found in microbiological screening tests. The patient underwent reimplantation successfully but within 24 hours of reimplantation localized erythema was limited within the border of the generator and pruritis occurred at the side of the generator pocket (Figure 1) as in the past described by the patient. This time the reaction occurred earlier than formerly and allergic contact dermatitis was suspected. She underwent patch testing that showed reaction to the various components of the pacemaker such as nickel, chromium, and titanium. Skin lesions resolved within 2 weeks with topical corticosteroids. After an 18-month follow-up, the patient is still asymptomatic.

3. Discussion

The first contact dermatitis case due to a permanent pacemaker device was reported by Rague and Golschmidt (2). There were several case presentations after this. Implantable loop recorder induced allergy has also been reported (3). Many allergens have been suspected to influence contact dermatitis due to permanent pacemakers, and it has been determined that the most frequent allergens are titanium and nickel. The duration of the appearance of symptoms has been reported to vary between 2 days and 2 years. However, the reaction generally appears within a few weeks after the implantation. According to the data obtained from the biopsy material, the pathophysiology includes a delayed hypersensitivity reaction (Type 3 - Type 4) (4-7).

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Figure 1. This photograph shows the skin reaction over the pacemaker after the second pacemaker implantation.

Clinical suspicion is the most important step in diagnosis of the cases. Complete blood count (hemogram) of the patient is generally normal; however, sometimes eosinophilia may be observed (8). The diagnosis is made with the skin patch test. It must be kept in mind that negative results will not exclude pacemaker contact dermatitis. A skin patch test following a pacemaker implantation may give negative results due to the antibiotics that are being used. The use of corticosteroids may also lead to wrong negative skin test results. This situation makes it difficult for diagnosis. The skin test results of 6 out of 17 patients were negative. They had reactions after pacemaker implantation and were treated successfully (4-6,9). The test that is used for titanium, which is the most-frequent allergic material, is not very reliable. Titanium tetrachloride, which is highly diluted and hydrolyzed in water, is used for this test (5). Some other methods such as electron probe microanalysis (EDAX) and a lymphocyte stimulation test have also been used for difficult diagnoses (6,9). In our case, although the reaction developed 24 hours after implantation, the skin test result was positive, and therefore the diagnosis was made easily.

The real treatment of contact dermatitis is removing the agent that causes the allergy. Although there are cases that react to topical steroids (6), treatment management is difficult in many cases. Long-term use of systemic steroids may be influential in difficult cases, but they are not recommended due to their side effects. Antihistaminic drugs may also be used to decrease symptoms. A device that does not contain allergic components and that is confirmed with a negative skin test may be used in cases that do not react to treatment. Another choice is the possible use of generators with non-allergic coatings. The recommended materials may be silicone (10), parylene, and gold (11). There have been some allergies reported for these materials in some cases as well (7). Kang *J et al.* reported three cases of a cardiac rhythm device induced contact dermatitis which

was treated by device extraction and reimplantation with another device without offending agent or coating with a non-allergenic substance (12). In our patient this is the second implantation of a device so we first tried to treat with topical corticosteroids and antihistaminics. Topical corticosteroids were applied twice daily at the side of the generator pocket. After treatment pruritus decreased first and localized erythema dissolved slowly within two weeks.

In conclusion, pacemaker contact dermatitis is a rare clinical condition. In some cases, diagnosis and treatment are difficult. Cardiologists should always keep pacemaker allergy in mind when a patient appears with wound complications.

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