IMAGE

Inflammatory cutaneous reaction to a temporary permanent pacemaker

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Introduction

The type IV, T cell–mediated hypersensitivity response to intravascular implanted medical devices is well described.[1] Though components of pacemaker generators are extravascular, they can contain potentially allergenic compounds and cause clinically relevant adverse allergic reactions that may necessitate device extraction.

Case Report

We present a 72-year-old woman with newly diagnosed heart failure with preserved ejection fraction secondary to biopsy-confirmed acute eosinophilic myocarditis who developed complete heart block necessitating pacemaker implantation. Owing to the severity of the patient's illness and unclear reversibility, an Abbott/St. Jude temporary-permanent external pacemaker made of 100% pure titanium alloy was the preferred initial strategy. The patient had a notable history of nickel allergy but no known allergy to titanium.

An active-fix pacemaker lead was placed in the right ventricle via the right subclavian vein owing to pre-existing dialysis access in the left internal jugular vein and a Swan-Ganz catheter occupying the right internal jugular vein. The pacemaker lead was attached to an external generator, which was placed on the chest in the right infraclavicular region. A cutaneous rash was identified after 1 week of contact with the pulse generator. At that time of diagnosis, the device was segregated from the skin using a gauze barrier for the remainder of its use to prevent further inflammation. The image (Figure 1) depicts the clear erosive outline of a temporary-permanent pacemaker prior to device segregation from the skin. The patient continued to have pacing needs with intermittent complete heart block; therefore, a permanent Medtronic Parylene polymer-coated dual-chamber pacemaker was implanted to replace the temporary pacemaker approximately 4 weeks after the initial procedure but during the index hospitalization. The patient had a prolonged hospital stay (approximately 2 months), during which the myocarditis was treated with intravenous steroid and a prolonged oral steroid taper. At the time of discharge, she was without any subsequent signs of allergy to the coated permanent device, after which she was unfortunately lost to follow-up.

KEY TEACHING POINTS

- Pacemaker allergy is a potentially under-recognized cause of pocket complication and presents similarly to pacemaker pocket infection, with erythema and tenderness around the implant site.
- Allergic response is a not miss diagnosis in patients with recurrent pocket infection. This is of especially high concern when infectious markers such as leukocytosis or fever are not present.
- Devices can be specially ordered from manufacturers made of hypoallergenic materials or with a hypoallergenic coating to assist in reducing but not eliminating this potential complication.

Discussion

Allergic reactions to pacemaker generators and lead components have been reported but remain a rare cause of pacemaker pocket complication.[2,3] Allergies have been described to the various components of pacemaker generators and leads, more commonly including but not limited to titanium, nickel, silicone, and polyurethane.[1] The typical presentation includes cutaneous eruptions, erythema, pain, or swelling at the site of implantation, not dissimilar from features of pocket infection; however, in the setting of an

KEYWORDS Eosinophilic myocarditis; Pacemaker allergy; Pacemaker complication; Pocket infection; Type IV hypersensitivity
(Heart Rhythm Case Reports 2021;7:571–572)

Funding Sources: The authors have no funding sources to disclose. Conflict of Interest Statement: No authors have any relevant conflicts of interest to disclose, with the exception of T. Jared Bunch, who is Editor-in-Chief of *Heart Rhythm Case Reports*. **Address reprint requests and correspondence:** Dr Jeffrey L. Turner, Division of Cardiovascular Medicine, University of Utah Health Sciences Center, 50 N Medical Drive, Salt Lake City, UT, 84132. E-mail address: Jeffrey.Turner@hsc.utah.edu.

https://doi.org/10.1016/j.hrcr.2021.05.009

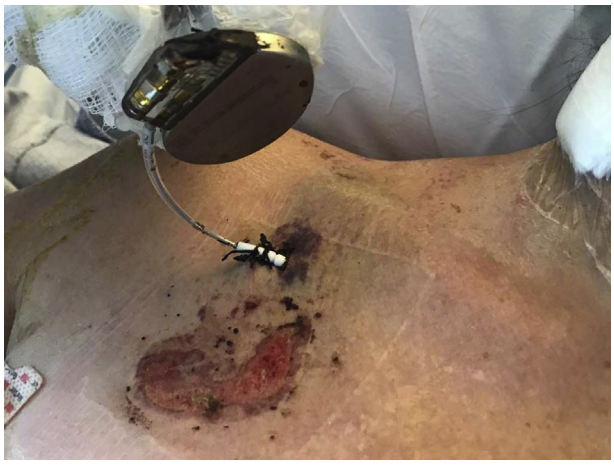

Figure 1 Skin inflammation and erosion at the site of cutaneous pacemaker contact.

isolated allergic response, infectious symptoms such as leukocytosis, fever, and bacteremia are notably absent.[4]

To alleviate this problem, devices can either be special ordered from the majority of manufacturers with a protective coating/gold plating or be manufactured specifically free of the allergic alloy to prevent this complication.[2,4,5]

Conclusion

This image and case exemplify the extent of inflammation that may occur inside a pacemaker pocket in the hypersensitive patient. Pacemaker component allergy patch or contact testing should be a consideration in patients with recurrent pacemaker pocket complication, especially in the setting of a known allergy or when other infectious markers are not present.

Question: Can the extravascular components of pacemakers and defibrillators cause clinically relevant allergic reaction?

Answer: Patients can indeed have a clinically relevant allergic response to pacemaker components, which may necessitate extraction, and this should be a consideration in patients with recurrent "pocket infection" without the systemic signs of infection or in patients with a known allergic history.

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