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. 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.

Discussion
Allergic reactions to pacemaker generators and lead components have been reported but remain a rare cause of pacemaker pocket complication. 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. 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

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.

KEYWORDS Eosinophilic myocarditis; Pacemaker allergy; Pacemaker complication; Pocket infection; Type IV hypersensitivity

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

To alleviate this problem, devices can either be specially 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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Figure 1 Skin inflammation and erosion at the site of cutaneous pacemaker contact.