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and these patients should be closely monitored for serious complications.



Short communication

Is pruritus over the pacemaker pocket may be a sign of a serious complication?



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ABSTRACT

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Introduction

Millions of patients require cardiac implantable electronic devices (CIEDs) for the management of cardiac dysrhythmias. Implantation of CIEDs can cause many early and delayed complications such as lead dislodgment with repositioning, pneumothorax, hemothorax, pocket hematoma, pericardial tamponade, myocardial perforation and skin erosion. Infections of CIEDs are relatively rare but difficult to treat complication after implantation.¹ The rate of pacemaker infection is growing even more rapidly than the rate of implantation, probably because devices with more leads are being used in older patients with more risk factors for infection.² Patients with CIED infection can present with pocket infection or endovascular infection. The mainstays of treatment are complete removal of the infected device and a prolonged course of appropriate antibiotic therapy.³ CIED infections represent a major complication associated with substantial morbidity and mortality, prolonged hospital stay, and significant financial cost.²

Case report

A 73 year old male patient was admitted to the cardiology clinic with partial extrusion of pacemaker generator (Figure). A dual chamber rateadaptive pacemaker (DDDR) was implanted subcutaneously on the left pectoral side of the chest wall for total atrioventricular block one year ago by an experienced physician. Parenteral antibiotics were given to

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the patient prior to implantation and have been continued after the procedure. After the implantation, early complications such as hematoma did not occur. Three months after the implantation, he started to complain of pruritus above the site of the pacemaker but did not see a physician. The pacemaker generator had migrated toward the left shoulder due to scratching movements. Before reaching this conclusion, the patient was asked to demonstrate how he was scratching. During scratching, the patient's fingers were applying force to the generator through the lateral side of the chest wall. Erythema, tenderness, secretion from a fistula, dehiscence or allergic skin lesions like dermatitis and eczema did not occur around the incision scar. He did not complain of systemic symptoms like fever, chills, or malaise associated with local or systemic infection. The pruritus steadily continued, and he saw a small piece of metal poking through the skin. He assumed that it was something minor related to the surgery; however, it gradually increased in size over the next few weeks until he realized it was the pacemaker eroding through his chest wall. There were no other implanted devices, and he had no history of reaction to metals. Patch testing, including the metals, was negative.

We describe a case of an early pacemaker pocket infection in a male patient within one year of insertion of a

subcutaneous dual chamber rate-adaptive pacemaker and complaining of only pruritus during infection. We

also summarize other complications related to the generator that must be considered in the differential diagnosis

of pocket infections. Pruritus in patients with cardiac implantable electronic devices should be taken seriously

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Usually, pacemaker pocket infections cause extrusions of pacemaker generators. In our case, we thought that the migrated generator and scratching movements applied pressure to the skin and pressure dermatitis occurred. Pressure dermatitis and pacemaker pocket infection may have caused skin erosion and finally the generator extrusion. We assumed that the generator was contaminated, therefore we decided to remove the generator and pacemaker leads completely first and then implant a new DDDR pacemaker into the subcutis of the right chest wall. We removed the battery from the pocket and tried to extract the leads by traction to slowly break the lead free of its attachments but we have not succeeded. Because of this we used a lead extraction system (Liberator Beacon Tip Locking Stylet and Evolution Mechanical

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Figure. Migration and partial extrusion of pacemaker is seen in figure. Black arrow shows the incision scar of the pacemaker implantation.

Dilator Sheath Set, Cook Medical Inc., Bloomington, IN, USA). After debridement of infected and necrotic tissues in the wound and closing the pocket, a new DDDR pacemaker was implanted into the subcutis of the right chest wall. The patient was discharged from the hospital two days later, and he is followed for one year without any complication.

Discussion

Complications related to the CIED generator include infection, migration, skin erosion, and extrusion. Pacemaker erosion or extrusion has been reported in 0.9% of patients receiving the device.⁴ The two main causes are infection and pressure necrosis.⁵ The risk for CIED infection after the primary implantation is around 0.5% and after the secondary implantation (device replacement or upgrade) is about 1%–5%.⁶ Infection has been shown to be reduced by antibiotic treatment during the peri-placement period and pressure necrosis appears to be influenced largely by the size of the device, complexity of the connections and technical skill with which the pocket is created.⁵ After extrusion, the pacemaker should be considered contaminated and removed.

Bacterial exposure for the CIED infection can occur at the time of primary implantation or during pocket revision for device change for upgrade. Infections can become manifest within days and weeks after the procedure or sometimes, might take months and years to become apparent. In fact, fewer than half of patients with CIED infection present within 1 year of their last procedure.⁷ It can manifest itself as pocket infection with erythema, tenderness, drainage or erosion. The differential diagnosis of dermatoses overlying pacemakers includes infection, irritant or allergic contact dermatitis, reticular telangiectatic erythema and impending device extrusion. The features of pacemaker allergic contact dermatitis are circumscribed skin reactions over the site of insertion such as eczematous changes and erythema, absence of significant signs of infection such as fever, elevation of the serum white blood cell count or CRP and absence of a response to treatment with antibiotics.⁸ If clinically suspicious, patch testing may be helpful to establish a diagnosis.⁹ Pressure dermatitis may initially present as erythema, yet there is a subsequent erosion of the overlying skin. Most of these reactions are isomorphic responses to the expansion of the subcutaneous tissues by the hard device.¹⁰ In our patient, there was only pruritus, not pain, erythema, or dermatitis over the pacemaker site. Based on the clinical history and the lesion morphology, the diagnosis of chronic pocket infection was established. Erosion of the skin and exposure of the generator were thought to be a result of migration of the generator followed by pressure dermatitis and infection of the pacemaker pocket.

Most patients with CIED infection present with pocket infections that manifest as inflammatory changes involving the pocket (erythema, tenderness, drainage, warmth, and erosion). These localized changes could be accompanied by systemic symptoms and signs, including fever, chills, or malaise. Other patients present with a pocket that looks well healed and intact, but with a combination of systemic signs and symptoms, supported by blood cultures and imaging data (echocardiography and computed tomography) that suggest endovascular infection. In our patient, neither inflammatory changes in the pacemaker pocket nor systemic signs and symptoms were present. The patient complains of only pruritus, and this was attributed to the low severity of the infection.

Pruritus should not be underestimated in patients with CIEDs. Although allergic contact dermatitis is usually the underlying reason of pruritus, it may be a sign of chronic infection which should be kept in mind. When CIED infection is suspected, all efforts should be made to obtain two sets of blood cultures prior to initiation of any antibiotics. CIED infection can be easily diagnosed when there is a clear pocket infection. However, shortly after the implantation procedure, it is important to distinguish a true pocket infection from simply an incisional erythema or superficial wound infection. The latter could be managed locally with a short course of oral antibiotics. It is important to carefully interpret the findings on the basis of the context of the clinical presentation, and the key is close follow-up.

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