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A Rare Case of Skin Cancer above a Subcutaneously Implanted Pacemaker: Implications for Future Implants

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ABSTRACT

Background. The occurrence of a skin neoplasm close to the position of an implanted pacemaker or cardioverter-defibrillator device is not very common.

Case Report. We report on an 82-year-old patient who developed a basal cell carcinoma in the skin directly above a subcutaneously implanted pacemaker generator. The patient presented with a history of recurrent basalioma at various locations. The pacemaker (Kappa KDR 731; Medtronic) was implanted 17 months before and represented a series that was recalled because of problems occurring after submuscular implantation.

Conclusion. Primary submuscular implantation of pacemaker devices should be carefully considered in elderly patients with a history of previous skin tumors.

INTRODUCTION

Tumorigenesis—benign or malignant—at the site of pacemaker implantation is a rare phenomenon [Magilligan 1980; Rotehnberger-Janzen 1998; Carpentier 2000]. However, the development of a neoplasm close to implanted pacemakers or cardioverter-defibrillators raises concern about whether the occurrence of the tumor is directly related to the implantation of these devices.

CASE REPORT

An 82-year-old man with a history of intermittent atrial flutter, several external cardioversions, and consecutive sinus bradycardia received a dual-chamber pacemaker in September 2001 (Kappa KDR 731; Medtronic, Minneapolis, MN, USA). The device was implanted subcutaneously on the left thoracic side in the pectoral region. The skin over the generator was healthy with no signs of inflammation or suspect efflorescence. The patient's postoperative course as well as the regular pacemaker controls showed no abnormalities. In November 2002, the patient noted a small erythremic area with a slightly squamose surface above the pacemaker pocket. Although the patient had experienced a basal cell carcinoma (BCC) on his face 20 years before, he did not pay attention to the efflorescence. At a routine examination in our institution in February 2003, we recognized a tumor approximately 3 cm in diameter. An examination of a biopsy specimen taken at the time revealed a recurrent BCC of the superficial type. Because the subcutaneous pacemaker pocket was located directly below the tumor (Figure 1), a safe and complete excision of the carcinoma and surrounding tissue was not possible without relocating the generator under the left pectoral muscle. Although the generator was functioning and was free from defects, the device was replaced because it belonged to a series of recalled devices that had serious problems in submuscular implant locations. The patient underwent explantation of the pacemaker, and the new generator (Kappa KDR 931; Medtronic) was repositioned in a subpectoral location in February 2003. Subsequently, the basalioma was excised widely along with the surrounding skin. A histopathologic evaluation revealed a BCC of a partly superficial and partly sclerosing subtype (morphoeic BCC).

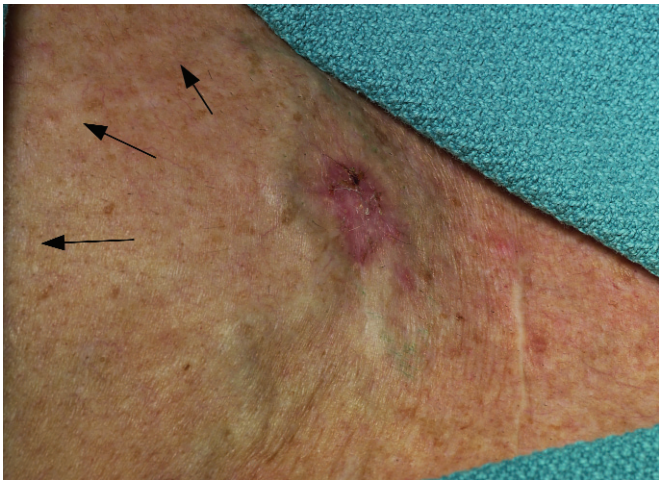

Figure 1. Intraoperative view of the basal cell carcinoma directly above the pacemaker pocket (arrow). On the right side is the superficial scar of the primary implant.

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DISCUSSION

The development or recurrence of a neoplasm in relation to an implanted pacemaker or implantable cardioverter-defibrillator device is a rare finding [Magilligan 1980; Knez 1999; Rothenberger-Janzen 1998; Carpentier 2000]. The reports have led to an ongoing discussion about whether the occurrence of the mostly malignant tumors at such sites is merely a coincidence or whether the pacemaker itself is in some way responsible for the formation of tumor cells [Knez 1999]. Our search of the literature, however, revealed no reported case of BCC occurring directly above an implanted pacemaker device. Because these skin tumors have their origins in the embryonic germ tissue of hairs in the cutis, tumor growth is unlikely to be initiated by a subcutaneously implanted generator. Some authors have suggested possible activation of dormant neoplastic cells via a chronic inflammatory process induced by the generator [DerHagopian 1978; Magilligan 1980]. Such activation could conceivably be caused by tiny movements of the device or by a chronic infection of the pacemaker pocket. In our case, none of these conditions were present. From the information currently available, the occurrence of a BCC in the skin directly above the pacemaker pocket is probably coincidental; however, our patient had reported a facial skin tumor approximately 10 years before at a different site. This fact suggests that the patient was at risk of developing recurrent basalioma, also in uncommon locations. This finding is underlined by the fact that the excised carcinoma was a superficial subtype histologically, and the upper trunk is the most common location for this subtype [Scrivener 2002]. If the patient had basalomatosis [Wollenberg 1995], which is characterized by the occurrence of multiple superficial BCCs, he, in fact, had a high risk of developing skin cancer in the thoracic region. In this case, a primary subpectoral implantation of the pacemaker would have made the treatment of the basalioma easier. In our case, repositioning of the generator was necessary because of the large subcutaneous defect caused by excision of the basalioma.

The coincidence of a skin tumor and a pacemaker implant has to be recognized as a rare problem; however, because nontrivial numbers of older patients have had such treatments as arsenic therapy for psoriasis [Wollenberg 1995], there are likely to be more cases of superficial BCC or even basalomatosis. In view of this rare case, we suggest a careful consideration before implanting a primary subcutaneous device in patients with previous skin tumors and of the necessity for pacemaker therapy.

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