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CLINICAL VIGNETTE

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Pocket hematoma that turned out to be cancer

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A 61-year-old female patient was admitted to the cardiac surgery department for treatment of a non-healing wound at the pacemaker pocket site. In 2017, she received a dual-chamber pacemaker. The patient also reported paroxysmal atrial fibrillation, arterial hypertension, stroke, and type 2 diabetes. In 2022, the patient sustained an injury at the pacemaker site but did not visit her doctor to check the device. A few days after the injury, a hard circumscribed mass about 7 × 5 cm in size "formed" over the site of the pacemaker generator. In the Cardiac Department, the only abnormal test results were C-reactive protein (7.8 mg/L) and urea (114 mg/dL). A chest radiograph showed no pathological changes. Ultrasound imaging revealed a tissue mass of 68 × 46 mm that looked like an "old" organized pocket hematoma. In the operating room, the mass was removed "in its entirety".

Two months later the patient was hospitalized again with a "decubitus ulcer". Inflammatory markers were normal. The cultures of ulcer swabs showed the presence of *Enterococcus faecalis*, *Staphylococcus aureus* (MSSA), and *Candida parapsilosis*, but blood cultures were negative. The echocardiogram was normal. The patient was qualified for pacemaker removal and referred to another facility. The cardiac surgeon qualifying the patient for a transvenous lead extraction had a high suspicion of cancer. A pacemaker checkup showed the presence of a normal sinus rhythm and no conduction abnormalities. A decision was made to remove the entire pacing system. A generator and leads were removed by transvenous lead extraction using mechanical polypropylene catheters (Fig. 1). Histopathological examination from the second procedure confirmed the presence of invasive breast cancer [grading (G) III, estrogen receptors (ER)-positive, progesterone receptors (PgR)-negative, human epidermal growth factor receptor 2 (HER2) + 1, Ki-67 antibodies 90%]. The clinical stage was IV, pT-4N2M1. The patient underwent a total mastectomy preceded by chemotherapy followed by radiation therapy. The systemic therapy included 6 courses according to the schematic AC (doxorubicin, cyclophosphamide), 3 courses of paclitaxel, and therapy with an inhibitor of cyclin-dependent kinase 4 and 6 (CDK4/6).

The overall benefits of cardiac implantable electronic device (CIED) therapy are unquestionable; however, the therapy is associated with complications similar to those caused by a retained foreign body. Undoubtedly, infections are the most serious CIED complications occurring in 2.3–3.4% of patients [1]. This case study draws attention to a different, much rarer cause of complications, namely neoplastic infiltration at the pocket site. Only 15 cases of various malignancies arising within the pocket

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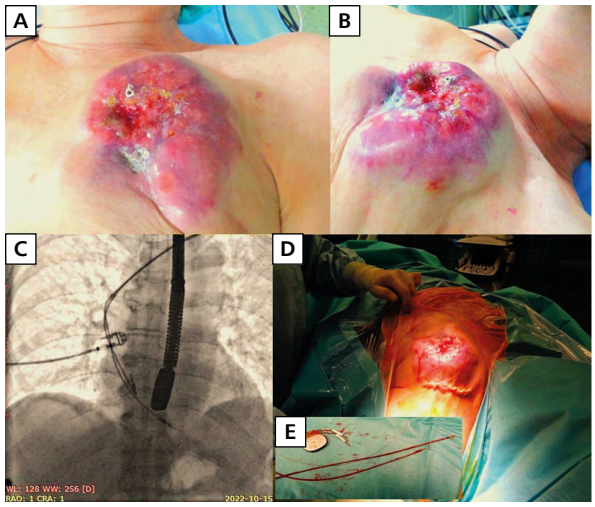

Figure 1. Malignant breast tumor in the pacemaker pocket; **A, B.** A large ulcerating skin lesion; **C.** Transvenous lead extraction procedure; **D.** Surgical field — after removal of the pacemaker system, a tumor above the wound is visible; **E.** The removed generator and leads

are described in the literature [2, 3]. The pacemaker pocket tumors affect patients at a mean age of 72.9 years, more frequently in men (76.9%). The average time for tumor development was 4.4 years. The most prevalent pacemaker model was Medtronic (38.4%), with titanium (83.3%) being the most common metal composition of pacemaker. Adenocarcinoma occurred in 29.62% of cases, lymphoma in 22.22%, and carcinoma in 22.22%. The most frequent clinical manifestation was local expansion over or close to the pacemaker pocket reported as local proliferation or skin nodules [4].

There are only a few reported cases of breast cancer located in the pacemaker pocket. Rasmussen et al. [5] described the case of a 75-year-old man with papillary adenocarcinoma, initially treated as a pocket infection. Similarly, De Mattia et al. [6] presented the case of an 87-year-old woman who was evaluated for a suspected pacemaker pocket granuloma infection after 7 years of pacing therapy and finally diagnosed with invasive ductal carcinoma of the breast. Zonca et al. [7] described a 78-year-old female patient with invasive ductal adenocarcinoma in the pacemaker pocket. A decubitus-like tumor had developed in this place and had been considered a benign lesion for 5 months [7] The rarity of this type of malignancy makes it a challenging clinical problem, and this condition may be missed in initial differential diagnosis. Ultrasound is the primary diagnostic test to differentiate soft tissue masses from "organized blood tissue masses". If a soft tissue mass is identified, an ultrasound-guided biopsy is recommended. The result of histopathological examination helps decide on the next steps, including further process of cancer staging and grading, additional tests, treatment options, and pacemaker management strategy.

In this case report, the correct diagnosis was delayed because the symptoms and events recounted by the patient did not suggest cancer.

Article Information and Declarations

Ethics statement

The patient gave their informed written consent to use anonymous data from their medical records.

Author contributions

A.N.: data curation, writing — original draft preparation, visualization; D.N.: project administration, writing — review and editing, visualization, K.K.: formal analysis, resources, data curation, J.G.: formal analysis, data curation; A.K: formal analysis, investigation, data curation, supervision.

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Conflict of interest

The authors declare no conflict of interest.

Supplementary material

None.

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