



Pacemaker mimicking a tunnel digger

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An 81-year-old woman was admitted to our cardiology clinic with episodes of atypical chest pain. She had a personal history of hypertension and had undergone implantation of a VVIR pacemaker (in a subcutaneous pocket at the

right upper side of her thorax) fifteen years before at another institution, because of atrioventricular conduction disturbances (Figure 1DI). Seven years before, the pacemaker was re-implanted and substituted by a DDDR device be-

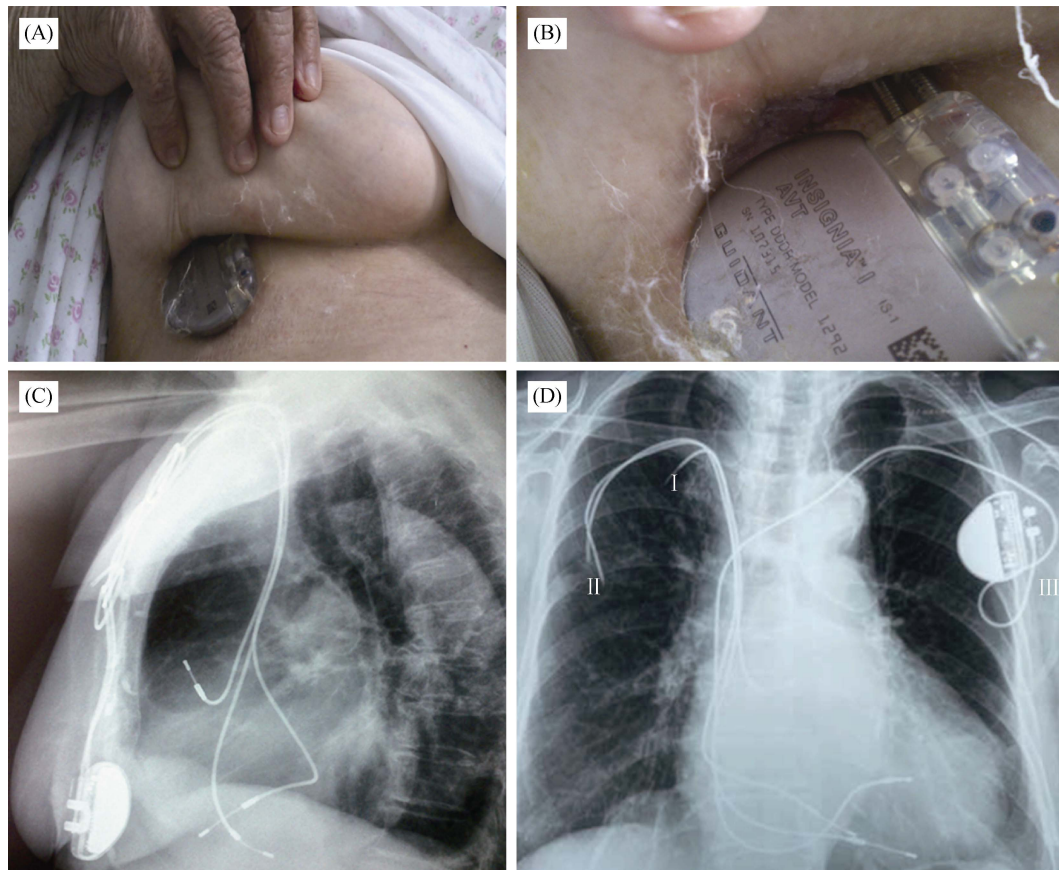


Figure 1. Clinical images and X-rays. (A): Display of pacemaker’s generator upon the elevation of the right breast; (B): detailed view of the skin tunnel’s entrance. Note the cotton flakes that the patient used to cover the opening; (C): X-ray chest film, lateral view showing the external position of the device; and (D): X-ray chest film poster anterior view, ten days after the re-installment of the pacemaker. I presented as initial pocket of the VVIR pacemaker. II presented as re-implantation pocket of the DDDR device leading to tunnel formation and complete generator extrusion. III presented as final re-implantation on the left side.

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cause of skin erosion and inserted in a lower subcutaneous pocket, also in the right side of the thorax, without lead removal (Figure 1DII).

On physical examination, she revealed to us a tunnel-hole beneath the right breast which she used to hide and cover with cotton pads. To our surprise, a complete pacemaker generator extrusion was observed (Figure 1A–C). Pacemaker testing revealed that the device's functional values were completely within normal ranges. Neither fever nor other manifestations of systemic infection were noted upon admission. However, wound swab cultures were positive for *Proteus mirabilis* and *Klebsiella pneumoniae* and intravenous antibiotic treatment, according to antibiogram results, was initiated for two weeks. Explantation, without lead removal and replacement with a new VVIR unit, placed subpectoral (under the pectoralis major muscle) on the left side was accomplished without complications at one-year follow-up (Figure 1DIII).

Skin erosion as the most common late complication of pacemaker implants is widely documented with an estimated incidence of around 0.8%, but the complete extrusion of the device from the subcutaneous pocket is very rare.^[1–4] Tissue vulnerability in elderly patients, the presence of a thin subcutaneous layer, erosive action (especially the scratching of an itch), small pocket size, depressed level of immunity, poor hygiene, poverty and cognitive impairment are the most important causal factors.^[1,2] In our case, the large breast size with plenty of loose fatty tissue in the retromammary space, may have predisposed to this extremely unusual, invisible, longitudinal downward displacement of the generator, leading to its complete extrusion below the woman's right breast, forming a tunnel of about 20 cm onto the pectoralis major muscle. Early diagnosis at the period of pre-erosion is crucial, in order to avoid more serious complications that may require the removal of the hardware. Careful

examination of the skin at the expected site of the pocket and subpectoral implantation of the device, as performed the second time in our patient, should be considered in order to prevent this rare complication. The removal of the generator and leads is recommended if erosion occurs, as the system is considered contaminated.^[3] In our patient, no lead removal was attempted because she was considered high-risk in case an open heart surgery was needed and she had no signs of systemic infection. An alternative and feasible approach includes permanent pacemaker implantation via the femoral vein, especially in cases with recurrent erosion.^[5]

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