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Case Report

Development of an iatrogenic aneurysm nine months after pacemaker implantation: Consideration of causes and treatment

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ABSTRACT

Careful technique is required in pacemaker implantation to avoid serious iatrogenic complications. A 70-year-old woman on an anticoagulant agent underwent pacemaker implantation. Nine months after implantation, a 35-mm pulsatile mass appeared just near the cranial edge of the generator. An iatrogenic pseudoaneurysm was suspected because ultrasonography showed communication with the blood stream through tiny artery. The resected mass proved to be a pseudoaneurysm. This was a rare case of iatrogenic delayed pseudoaneurysm appearing nine months later. It is essential to keep in mind the risk of pseudoaneurysm after pacemaker implantation, especially when the patient takes anticoagulant agents.

<**Learning objective:** Iatrogenic delayed pseudoaneurysm might develop after pacemaker implantation. It is essential to avoid risk factors for a pseudoaneurysm after pacemaker implantation when the patient is taking anticoagulant agents and to keep in mind careful follow-up even after discharge. Prospective measures such as suspension of antithrombotic agents, minimizing puncture attempts, and wound compression are also important.>

Introduction

A pseudoaneurysm is defined as a mass consisting of blood flowing from an injured artery and is capsulated by surrounding connective tissue. Unlike an artery, a pseudoaneurysm does not consist of three layers, but may only have adventitia [1]. Upper limb pseudoaneurysms are less common than lower limb pseudoaneurysms. The incidence of iatrogenic superficial femoral artery pseudoaneurysm is 8% following therapeutic catheterization [2,3], but less than 2% in the upper limb [4]. Correct diagnosis and optimal treatment of an upper limb pseudoaneurysm is essential, because of the risk of irreversible neurological damage once formed [5]. We describe a rare case of iatrogenic pseudoaneurysm that developed nine months after pacemaker implantation, and rapidly enlarged within a few days. An iatrogenic pseudoaneurysm can be dangerous, and requires a cautious approach, especially when the patient takes antithrombotic agents. The causes and treatment of iatrogenic pseudoaneurysms as in this case are considered.

Case report

A 70-year-old woman who had undergone mitral valve replacement (mechanical valve of St. Jude Medical 27 mm; St. Paul, Minnesota, USA,) for severe mitral regurgitation came to our hospital with a chief complaint of dyspnea on exertion. The electrocardiogram revealed bradycardic atrial fibrillation at 30 beats per minute as the cause of dyspnea. Permanent pacemaker implantation was planned. Warfarin prescribed after mitral valve replacement was discontinued, and intravenous heparin was administered just before pacemaker implantation. Pacing leads were inserted by extrathoracic puncture using a guidewire through the axillary vein because venous angiography could not be performed due to allergy to contrast medium. Puncture was performed on the second rib because the first rib almost overlapped with the clavicle under fluoroscopic guidance. The puncture was difficult, but succeeded after several reattempts; 8-Fr sheaths were used for insertion of pacemaker leads. A hematoma was found the next day, although the wound had been

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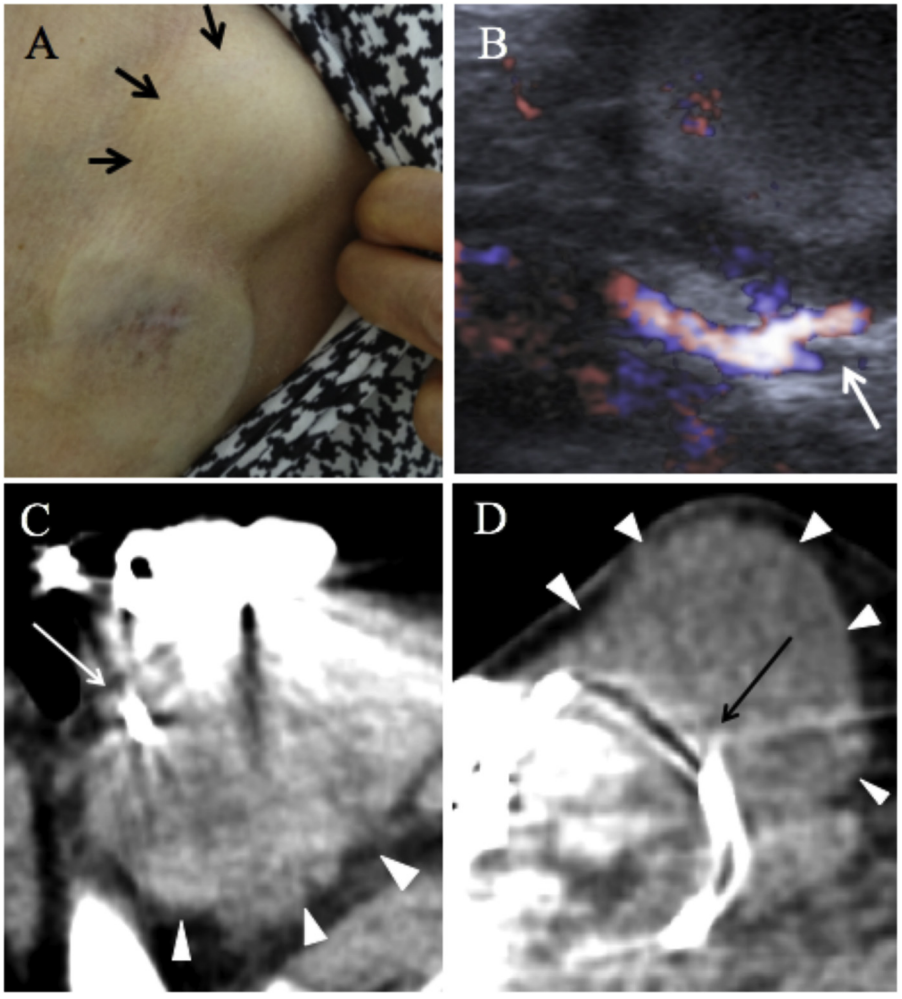

Fig 1. (A) Skin appearance. There is a painless 35-mm mass on her left chest (black arrows). (B) Ultrasonography reveals pulsatile blood flow from the subclavian artery into the mass (white arrows). (C, D) Plain computed tomography (C: axial view, D: coronal view). Pacing lead (black and white arrow) is involved in the mass (white arrow heads).

compressed just after the procedure. Bruit was not heard at that time. The hematoma gradually decreased and resolved spontaneously. There were no abnormal signs around the wound. However, nine months later, a pulsatile mass suddenly appeared on the left chest without apparent cause, and rapidly enlarged to 35 mm within a few days. She was readmitted to our hospital.

She was allergic to penicillin compounds in addition to contrast medium, and had no history of trauma at the pacemaker site. Other than warfarin, she took no other antithrombotic agent. She was thin, with height 150 cm, weight 46 kg, and body mass index 20.4. Blood pressure was 93/52 mmHg, pulse rate was 60 beats per minute, and body temperature was 36.7 °C. There was a painless 35-mm mass on her left chest (Fig. 1A) and bruit was heard on it. The skin around the mass was normal, neither flare nor swelling. She also had no left upper limb neurological abnormality.

Laboratory data showed slight anemia (hemoglobin 10.0 g/dL), similar to previous data. Prothrombin international normalized ratio was 2.55. The C-reactive protein was 0.54 mg/dL, which did not indicate active inflammation (Table 1). Blood cultures were negative for bacteria. The electrocardiogram revealed paced rhythm and the X-ray was unchanged compared with that taken just after pacemaker implantation. Ultrasonography revealed pulsatile blood flow from the subclavian artery into the mass and plain computed tomography revealed pacing lead was involved in the mass (Fig. 1B–D). A pseudoaneurysm was suspected, and the mass was resected.

During resection from surrounding connective tissue, the thoracoacromial artery appeared just under the mass. After the mass was resected, a tiny hole appeared with a tiny mural thrombus on the artery. That is, the mass communicated with the artery through the hole (Fig. 2). The mass involved pacing lead, however, the lead still functioned appropriately and was left without change. Pathological examination revealed that the mass was a pseudoaneurysm, because it did not have intima and media. An infectious pseudoaneurysm was ruled out by the absence of inflammatory cells or bacteria and negative blood cultures.

Discussion

An upper limb pseudoaneurysm is less common than a lower limb pseudoaneurysm. The incidence of iatrogenic superficial femoral artery pseudoaneurysm is 8% following therapeutic catheterization [2,3], but less than 2% in the upper limb [4]. Pseudoaneurysms can have an iatrogenic, infectious, or traumatic origin [6]. Penetrating injuries due to catheterization are the most frequent causes of upper limb pseudoaneurysms [7]. Age 65 years or older, anticoagulant use, and insertion of 8-Fr or larger sheathes, as in this case, are also risks factors.

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