Pulmonary Artery Pseudoaneurysm Associated With Abandoned Epicardial Defibrillator Patch

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We describe an 84-year-old man who presented with hemoptysis and acute blood loss anemia due to a pulmonary artery pseudoaneurysm (PAP). The etiology of his PAP was thought to be an abandoned epicardial defibrillator patch that was implanted at age 55. To our knowledge, PAP has never been reported as a possible complication of an abandoned epicardial defibrillator patch. **(Am J Cardiol 2020;128:161−162)**

From 1982 until late 1991, the standard implantable defibrillator system entailed the use of epicardial patches that had to be positioned around the heart.[1] During the early evolution of these devices, epicardial lead systems, placed via thoracotomy, median sternotomy, subcostal, and subxiphoid approaches, were used commonly.

Description

The patient is an 84-year-old man with history of coronary artery bypass surgery at age 55, ventricular tachycardia necessitating placement of epicardial defibrillator patches, presented with 6 weeks of large volume hemoptysis. He continued to have hemoptysis despite discontinuation of Aspirin and Clopidogrel, requiring 4 blood transfusions. Computerized tomography chest showed an 8 × 4.7 × 2.1 cm pseudoaneurysm (PAP) of the left upper lobe pulmonary artery, located deep to the epicardial defibrillator patch on the left lateral margin of the heart (Figure 1). Patient was deemed to be at an unacceptably high risk for surgical removal and was taken for angiography to percutaneously coil the PAP. Digital subtraction angiography of the left main pulmonary artery was performed (Figure 2); imaging demonstrated a PAP arising from the midportion of the left pulmonary artery. The PAP was cannulated using a triple coaxial system from the right femoral vein, consisting of an 8-Fr 55 cm Ansel Check-Flo sheath (Cook, Bloomington, IN), a 6-Fr JR4 Launcher guide (Medtronic, Minneapolis, MN), and a telescoping 4-Fr Vertebral 135° Tempo Aqua Catheter (Cordis, Milpitas, CA), which could not cross the PAP ostium. Thus, it was exchanged for a 4-Fr CXI support catheter (Cook) over an 0.035' Angled Glide Wire (Terumo, Somerset, NJ). A total of nine 20 mm × 20 cm Nester Embolization Coils (Cook) were successfully used to treat the pseudoaneurysm (Figures 1 and 2).

Discussion

The mortality rate associated with the rupture of a PAP is high, may be 50% to 100%; death is secondary to aspiration

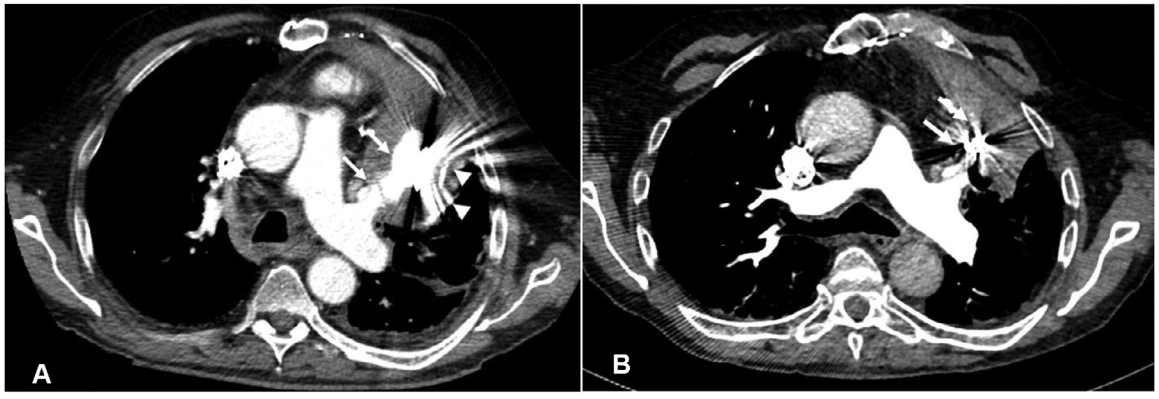

Figure 1. (A) An 8 cm irregularly marginated, partially thrombosed pseudoaneurysm of the left upper lobe pulmonary artery (arrows), located immediately deep to the epicardial defibrillator patch on the left lateral margin of the heart (arrowheads). (B) Post percutaneous coiling CT chest showing a completely thrombosed left pulmonary artery pseudoaneurysm (arrows).

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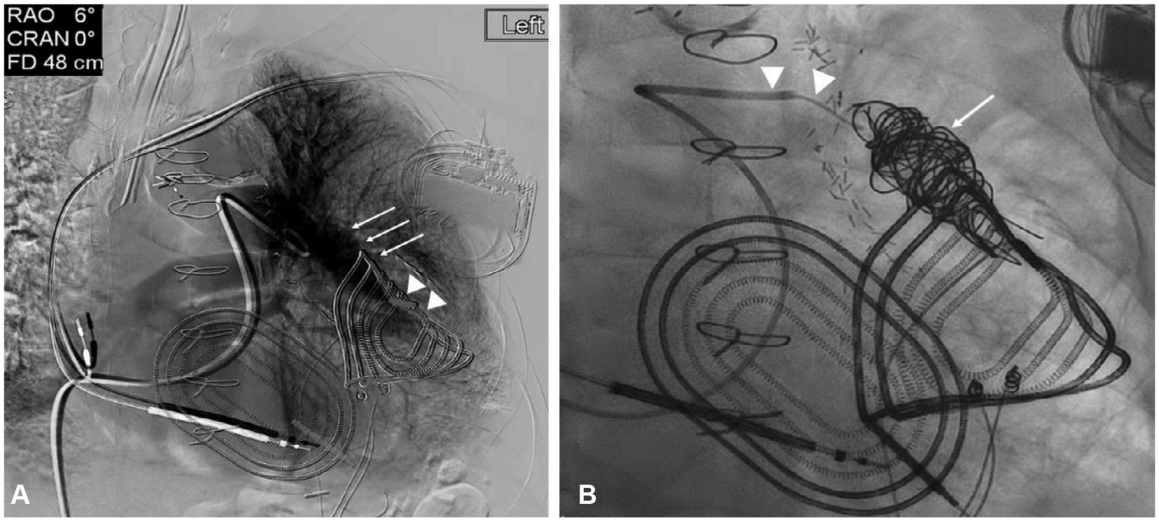

Figure 2. (A) Digital subtraction angiography using a 6-Fr pigtail catheter showing a pseudoaneurysm (arrows) arising from the left pulmonary artery under an abandoned epicardial defibrillator patch (arrowheads). Dual-chamber transvenous implantable defibrillator with leads in the right atrium and the right ventricle (star). (B) Multiple embolization coils (arrow), deployed in the left pulmonary artery pseudoaneurysm delivered through a 6-Fr JR4 guide catheter and a telescoped 4-Fr CXI support catheter (arrowheads).

and asphyxia after intrapulmonary hemorrhage.[2–5] PAPs are most commonly associated with acquired etiologies, such as trauma, iatrogenic injury from pulmonary wedge catheter, infection, or Bahcet's disease.[6,7] Numerous late complications following epicardial defibrillator implantation have been described, including penetration into the bronchial tree, erosion of the left ventricular wall, and migration of the epicardial patch.[8–10] Although rare, patch migration of extrapericardial defibrillator leads should be suspected in patients presenting with hemoptysis, atypical pneumonia, or lung collapse.[9] It is difficult to ascertain whether erosion from the defibrillator patch was the etiology of our patient's PAP, as opposed to a prior right heart catheterization, or if the epicardial defibrillator patch served as an outer barrier preventing exsanguination (Figures 1 and 2).

This report details another possible complication of an epicardial defibrillator patch left in the pericardium: PAP. Although most ICD systems are now placed transvenously, many patients have had epicardial systems implanted. The diagnosis of PAP should be considered in patients with epicardial patches who present with intermittent or massive hemoptysis, hemothorax, or hemopericardium. If these patches are not removed, they could potentially continue to cause mechanical damage to the surrounding structures.

Disclosures

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

1. Molina JE, Benditt DG, Adler S. Crinkling of epicardial defibrillator patches. A common and serious problem. *J Thorac Cardiovasc Surg* 1995;110:258–264.
2. Poplausky MR, Rozenblit G, Rundback JH, Crea G, Maddineni S, Leonardo R. Swan-Ganz catheter-induced pulmonary artery pseudoaneurysm formation: three case reports and a review of the literature. *Chest* 2001;120:2105–2111.
3. Jean-Baptiste E. Clinical assessment and management of massive hemoptysis. *Crit Care Med* 2000;28:1642–1647.
4. Ungaro R, Saab S, Almond CH, Kumar S. Solitary peripheral pulmonary artery aneurysms. Pathogenesis and surgical treatment. *J Thorac Cardiovasc Surg* 1976;71:566–571.
5. DeLima LG, Wynands JE, Bourke ME, Walley VM. Catheter induced pulmonary artery false aneurysm and rupture: case report and review. *J Cardiothorac Vasc Anesth* 1994;8:70–75.
6. Bartter T, Irwin RS, Nash G. Aneurysms of the pulmonary arteries. *Chest* 1988;94:1065–1075.
7. Nguyen ET, Silva CI, Seely JM, Chong S, Lee KS, Müller NL. Pulmonary artery aneurysms and pseudoaneurysms in adults: findings at CT and radiography. *Am J Roentgenol* 2007;188:W126–W134.
8. Sutton AGC, McComb JM, de Belder MA. Erosion of the left ventricle by the epicardial patch of an automatic implantable cardioverter defibrillator. *Heart* 1999;82:112–113.
9. Singer I, Calzada N, Austin EH 3rd. Patch migration: a serious late complication of thoracotomy lead systems. *Pacing Clin Electrophysiol* 1998;21:2616–2620.
10. Quigley RL, Hamer ME, Swiryn S. Migration of an automatic implantable cardioverter-defibrillator patch causing massive hemothorax. *Tex Heart Inst J* 1996;23:54–57.