A 69-year-old man with ischemic heart disease presented with increasing lethargy and breathlessness several months after coronary artery bypass surgery. In the immediate postoperative period, he developed heart block requiring insertion of a pacemaker; during the procedure, however, there was excessive bleeding from the right subclavian vein puncture site, and only a single-chamber pacemaker could be inserted. This was upgraded to a 3-lead system via a further right subclavian venous puncture 4 months later. One month after this procedure, a loud continuous murmur became audible throughout the precordium, and there was a slow deterioration of his cardiac function. Initial echocardiography demonstrated poor right heart compliance and a dilated inferior vena cava, with subsequent angiography confirming the presence of an innominate–superior vena cava fistula (Figure 1). The defect in the innominate artery arose from the posterolateral aspect of the vessel <1 cm from the aortic arch origin.

To prevent deterioration of myocardial function and in view of the patient’s high medical risk and difficult reoperative surgical access to the fistula, a minimally invasive endovascular technique was used to cover the arterial defect. A retrograde approach via surgical exposure of the right common carotid artery was used to insert a 21F delivery device. A 20-mm×3.75-cm AneuRx (Medtronic) covered stent (Figure 2) was deployed across the lower innominate artery, with the proximal one third of the graft positioned within the aortic lumen to assist in fixation of the stent. After deployment, angiography confirmed complete closure of the fistula (Figure 3) and adequate flow into the left common carotid and subclavian arteries beyond the stent. There were no postprocedural complications, and the patient had a subsequent symptomatic improvement in cardiac function.
Figures 1-3.

Figure 1. A, Digital subtraction angiography of aortic arch demonstrating a fistula (small arrow) arising from proximal innominate artery and communicating with superior vena cava (large arrow). Multiple cardiac pacing wires are noted, and fistula probably occurred during percutaneous insertion into subclavian vein. B, Schematic identifying great vessels within mediastinum illustrated in A.

Figure 2. Woven polyester 20-mm×3.75-cm AneuRx stent used to cover defect in innominate artery.

Figure 3. After stent deployment, angiography demonstrates absence of flow through fistula. Proximal segment of graft is seen within aortic lumen.
Endovascular Management of an Innominate-Caval Fistula Secondary to Insertion of a Cardiac Pacemaker
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