Ectopic Focus in an Accessory Left Atrial Appendage
Radiofrequency Ablation of Refractory Atrial Fibrillation

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A 65-year-old man with symptomatic atrial fibrillation refractory to medical therapy was referred for repeat pulmonary vein (PV) isolation. Clinical symptoms included paroxysmal palpitations once to twice per week with associated light-headedness and chest pain. Initial PV isolation had been performed 6 months earlier without cessation of atrial fibrillation despite combined medical therapy with oral flecainide and bisoprolol. His past medical history was significant for hypertension, and in his family history, 1 brother had experienced a stroke at the age of 57 years. Physical examination, ECG, chest radiography, and coronary angiography were normal. Holter 24-hour ECG recordings revealed occasional atrial premature beats and paroxysmal atrial tachycardia.

A magnetic resonance imaging study of the patient’s PVs and left atrium (LA) was performed before the repeat radiofrequency ablation. Images were acquired with a 1.5-T whole-body magnetic resonance system (Siemens Avanti, Siemens Medical Solutions, Forcheim, Germany) with an 8-element cardiac synergy coil for radiofrequency signal reception. First-pass breath-hold 3-dimensional contrast-enhanced magnetic resonance angiography of the PV was obtained after pump injection (3 mL/s) of 15 mmol of gadobutrol (Gadovist, Bayer Schering Pharma, Berlin, Germany), followed immediately by a 15-mL saline flush (data acquisition began after a delay determined by a small timing bolus given before the 3-dimensional acquisition). Breath holding was performed at end-inspiration. A spoiled 3-dimensional gradient-echo sequence with the following parameters was used: Repetition time 3.19 ms, echo time 1.03 ms, flip angle 25°, 120 slices, slice thickness 1.6 mm, field of view 470 mm, matrix 227×384. Multiplanar reformations demonstrated a normal configuration of the PVs with no evidence of PV stenosis. An accessory LA appendage was identified on the anterior LA wall, 9 mm medial to the ostium of the right superior PV (Figure 1). The orifice of the accessory appendage measured 2 cm in maximal diameter and 1.5 cm in depth.

Electrophysiological mapping was performed via right femoral access. A duodecapolar catheter (Staplemapi, Medtronic, Minneapolis, Minn) was placed within the coronary sinus to record LA electrical activity and for pacing.

Figure 1. A. Axial-oblique magnetic resonance image of the LA showed an accessory appendage (straight arrow) arising from the anterior wall. The appendage was clearly separated from the LA appendage (curved arrow). B, Sagittal-oblique magnetic resonance image confirmed that the accessory appendage arose from the superior portion of the anterior LA wall, and extended into the transverse pericardial recess. AO indicates aorta; PA, pulmonary artery.

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Ablation was guided by an electroanatomic mapping system (CARTO, Biosense Webster, Diamond Bar, Calif). After transeptal puncture, an angiogram of the LA was performed through a sheath (Agilis, St. Jude Medical, Saint Paul, Minn). Images confirmed the presence of an accessory LA appendage arising from the anterior wall of the LA (Figure 2A). Initially, premature atrial contractions were demonstrated arising from the left superior and inferior PVs, which were isolated. A further separate source of atrial premature contractions was found originating from within the accessory LA appendage (Figure 2B). It was noted to contract in synchrony with the rest of the LA during the procedure (online-only Data Supplement Movie I). Radiofrequency ablation of the appendage orifice was performed, which resulted in cessation of the arrhythmia. At 3-month follow-up, the patient remained symptom free with no evidence of recurrent atrial fibrillation.

Radiofrequency ablation has become the primary treatment for medically refractory atrial fibrillation, but it has been associated with long-term recurrence of atrial fibrillation in $>25\%$ of cases.\textsuperscript{1} Recently, accessory appendages of the LA have been described with a prevalence of between 10\% and 28\%.\textsuperscript{2} The majority are located along the anterior LA wall adjacent to the ostium of the right superior PV. Histopathological analysis of such accessory appendages has shown that they contain trabeculated myocardium with the same wall structure as the surrounding myocardium.\textsuperscript{3} In the present case, the accessory LA appendage was present in the typical location, approximately 1 cm medial to the right superior PV ostium along the anterior wall of the LA. This has technical implications for ablation procedures, because even wide circumferential radiofrequency ablations of the right superior PV are unlikely to include most accessory diverticula arising from

Figure 2. A, Angiogram of the LA performed during the electrophysiological procedure confirmed the presence of an accessory LA appendage. Note the distal end of the sheath placed directly within the accessory LA appendage (arrow). B, Electrogram recorded from within the accessory LA appendage. Shown are the surface recordings (I, aVF, V_{1}, V_{6}), the mapping catheter within the coronary sinus (maps 1 through 10), and the ablation catheter (ABLd) within the accessory appendage. The earliest point of activation is seen within the accessory appendage at the site of the ablation catheter (arrows). Radiofrequency ablation around the orifice of the accessory appendage resulted in termination of this ectopic focus.
the anterior wall of LA. Although non-PV ectopy as a cause for atrial fibrillation has been studied previously, to the best of our knowledge, it has never been described as arising from an accessory LA appendage. We suggest that preablation imaging should be routinely assessed for such accessory LA appendages, and if present, should be evaluated for potential ectopic atrial beats during electrophysiological studies.

Disclosures
None.

References
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