Septic vegetation at the left atrial appendage entrance after pulmonary vein ablation for atrial fibrillation

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Pulmonary vein (PV) ablation is increasingly used to treat highly symptomatic atrial fibrillation. Here, we present a case of infective endocarditis (IE) after PV ablation at the uncommon position of the left atrial appendage entrance. We conclude that iatrogenic intracardial manipulation may create predisposing lesions for IE.

Keywords Atrial fibrillation; Pulmonary vein ablation; Complication; Infective endocarditis

Case report

A 55-year-old female patient underwent catheter ablation for highly symptomatic, drug-refractory atrial fibrillation (AF) at our institution. Radio-frequency (RF) catheter ablation of AF was performed in a standard fashion. After trans-septal puncture, circular lesions were placed in the left atrium around the ostia of the pulmonary veins (PVs) with use of an electromagnetic mapping system (CARTO, Biosense Webster). Thereafter, successful isolation of the left and right PVs was tested with a LASSO catheter. Stable sinus rhythm was documented in a 7-day Holter ECG that was routinely performed after the intervention. The patient was discharged uneventful on the second day after treatment. Two weeks after discharge, she was treated at a different hospital with electrical cardioversion for an episode of sustained AF recurrence requiring placement of a peripheral intravenous line. One week later, the patient presented with a 5-day history of fever chills, a 1-day history of tachycardia and thoracic pain. On admission, blood pressure was 100/70 mmHg, heart rate was 115 bpm and temperature was 36.6°C. The chest was clear to auscultation and no murmurs were noted. No vascular or immunological phenomena were observed. Atrio-oesophageal fistula was ruled out by a CT scan. Transoesophageal echocardiography (TEE) was performed and revealed a floating structure of 1.0 cm x 0.5 cm at the left atrial appendage (LAA) entrance (Figure 1) as well as moderate mitral regurgitation. Interestingly, in a routinely performed TEE prior to ablation (Figure 2), no such structure was visible. Before, during, and after the intervention, the patient was properly anticoagulated with phenprocoumon (INR 2.0–3.0) or full-dose low molecular weight heparin (enoxaparine s.c., 1 mg/kg twice a day). In subsequently taken blood cultures, six out of six were found to be positive for Staphylococcus aureus.

With two major criteria of the DUKE classification (9), the patient was treated for infective endocarditis (IE). Owing to the rareness of vegetation on the free intracardiac walls, there is also a lack of sufficient data regarding treatment regimens. We therefore decided to treat the patient with a 5-day course of gentamycin and a 28-day course of vancomycin. Control TEEs were performed 14 and 28 days after the initiation of the antibiotic treatment and no vegetation could be detected anymore. Consecutive blood cultures remained negative. The further course was complicated by drug-related allergic fever. Finally, the patient recovered fully and was discharged without residues 10 weeks after admission.

Discussion

Catheter ablation results in >70% freedom of AF but may be associated with severe complications such as PV stenosis or cardiac tamponade. In addition, thrombus formation at the ablation sites after PV isolation puts the patient at risk for thrombo-embolic events, especially when anticoagulation is insufficient. The formation of an atrio-oesophageal fistula is a rare complication with a high fatality rate. Patients usually present with high fever and thoracic pain, which were also present in our patient, but atrio-oesophageal fistula was ruled out by CT.

As the patient was properly anticoagulated, a thrombotic genesis of this vegetation is unlikely. Positive blood cultures, the presence of a high grade fever and the disappearance of the structure after antibiotic treatment further strengthen our hypothesis that the patient suffered from an infective IE.

To the best of our knowledge, this is the first time that a vegetation at the LAA entrance is reported. In addition, this is also the first time that a septic vegetation after PV isolation is reported.
Interestingly, IE typically develops at sites of erosions or pre-existing endothelial damage such as the cardiac valves. Vegetations are usually not seen on free intracardiac walls.

The definite cause of IE in this case will not be elucidated. Chang et al. have shown that 11% of Staphylococcus aureus bacteraemia was caused by a peripheral line. On the other hand, in community-acquired Staphylococcus aureus bacteraemia, the source of infection could not be determined in 58%. Common risk factors for the development of endocarditis such as valvular heart disease, intravenous drug use, or prior endocarditis were not present in our patient.

It is conceivable that iatrogenic endothelial damage occurring during RF ablation predisposes to the adherence of pathogens and subsequent IE development. Interestingly, after non-surgical cardiological interventions bacteraemia has been detected at a median of 1.7 days. As symptoms occurred more than 2 weeks after ablation, one may speculate that the underlying bacteraemia may have occurred after the initial discharge from our hospital. This could have

Figure 1  Transoesophageal echocardiography on admission shows a floating mass (arrow) at the left atrial appendage entrance caused by Staphylococcus aureus after radio-frequency ablation of atrial fibrillation.

Figure 2  Transoesophageal echocardiography prior to ablation 3 weeks before admission did not reveal such structure at the left atrial appendage.
happened when a peripheral line was inserted before electrical cardioversion or during routine daily activities such as dental flossing. Of course, infection during the ablation and slow development of the endocarditis cannot be ruled out.

In conclusion, we hypothesize that creation of lesions as with RF ablation may form a substrate for septic vegetations.

References