EP CASE REPORT

Prompt recognition and successful aspiration of a left atrial thrombus under intracardiac echocardiography guidance during radiofrequency catheter ablation for atrial tachycardia

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An 80-year-old woman with mild chronic thromboembolic pulmonary hypertension (CTEPH) and a 4-month history of atrial tachycardia (AT) was admitted for radiofrequency ablation (RFA). She was on apixaban (5 mg) for 5 years and her D-dimer level at the time of admission was 0.6 μg/mL. Contrast-enhanced computed tomography showed a tapering of the pulmonary artery on the right middle lung field, and the pulmonary perfusion scintigraphy revealed a slight hypoperfusion in the same area. Transthoracic echocardiography revealed normal cardiac function and only mild tricuspid regurgitation. Transoesophageal echocardiography at 1 day preoperatively revealed no evidence of an intra-atrial thrombus.

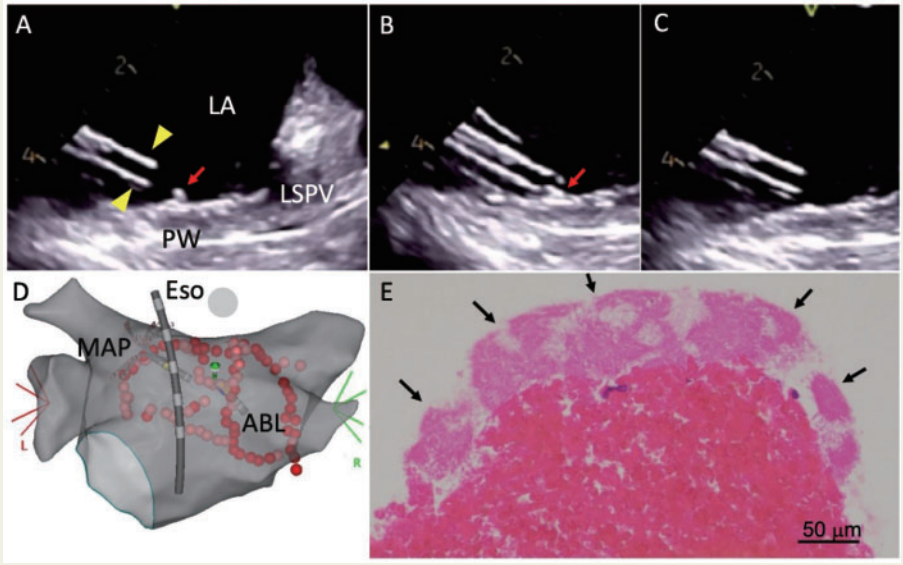

Figure 1 (*A*) ICE showed a mobile thrombus (red arrow) on the PW of the LA, which was ablated. The steerable Agillis sheath (yellow arrowheads) was placed near the PW. (*B*) The deflectable Agillis sheath was carefully advanced to the LA PW, and aspiration was performed using a 20-mL syringe attached to the proximal end of the sheath. (*C*) After successful aspiration, ICE confirmed the complete removal of the thrombus. (*D*) Posterior-anterior view of the three-dimensional geometry mapping of the LA shows the ablation points and location of catheters where the mobile thrombus formation occurred. (*E*) Haematoxylin and eosin staining of the histological specimen of the aspirated thrombus, showing fresh erythrocyte-rich thrombus with platelet aggregation (arrows). ABL, ablation catheter; Eso, oesophagus temperature probe; ICE, intracardiac echocardiography; LA, left atrium; LSPV, left superior pulmonary vein; MAP, mapping catheter (Pentaray); PW, posterior wall.

The patient arrived the catheter laboratory with AT. After administrating intravenous heparin (5000 U), transseptal puncture was performed under intracardiac echocardiography (ICE, CARTO SOUND, Biosense Webster Inc., Diamond Bar, CA, USA) guidance; two sheaths were inserted into the left atrium (LA): an SL0 sheath (Abbott, St Paul, MN, USA) for a mapping catheter (Pentaray, Biosense Webster Inc.) and a steerable Agillis sheath (Abbott) for an ablation catheter (ThermoCool SmartTouch Surround Flow catheter, Biosense Webster Inc.). The Agillis sheath was continuously flushed with heparinized saline (2 units/mL) at 10 mL/h. Left atrial activation mapping revealed a mitral-isthmus-dependent flutter; therefore, mitral isthmus linear ablation preceded by pulmonary vein and posterior wall (PW) isolation was planned. During extensive pulmonary vein isolation, ICE-based continuous monitoring of the ablation site revealed no evidence of left atrial thrombi. During linear ablation across the LA PW (30 W; contact force, 10–20 g; and ablation index, 350), ICE detected a mobile thrombus at the PW's centre. The activated clotting time (ACT) was maintained

>350 intraoperatively; the values before starting PW linear ablation and immediately after identifying the thrombus were 400 and 378, respectively. To aspirate the mobile thrombus, the Agillis sheath was advanced under ICE guidance to the LA PW, closer to the thrombus. Using a 20-mL syringe attached to the sheath's proximal end, the thrombus was aspirated (*Figure 1A–D*, Supplementary material online, *Video*). ICE confirmed complete thrombus (2.0 × 1.0 mm) removal. Posterior wall linear ablation was completed after confirming the normal irrigation function of the ablation catheter. Atrial tachycardia was terminated during mitral isthmus linear ablation. At follow-up, no transient ischaemic attack or stroke was noted; the hypercoagulable workup was unremarkable. Histological examination of the clot confirmed the presence of a fresh erythrocyte-rich thrombus with platelet aggregation without evidence of organization (*Figure 1E*).

Thrombus formation is a risk associated with RFA, despite adequate anticoagulation to achieve ACT > 350; normal contact force = 10–20 g; and power = 30 W[1] and the use of the open-irrigation ablation catheter.[2] Although the hypercoagulable workup was unremarkable, the patient had a history of CTEPH; therefore, she might have been hypercoagulable and reacted sensitively to the RFA-associated endomyocardial tissue damage. Mural and mobile thrombi attached to radiofrequency lesions are rarely reported.[3] If left unremoved, such a thrombus could cause postoperative thromboembolism. This case highlights the importance of a thorough ICE-based intraoperative investigation of thrombus formation.

Supplementary material

Supplementary material is available at *Europace* online.

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References

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