Catheter ablation of atrial fibrillation without prior transoesophageal echocardiography: are we there yet?

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This editorial refers to ‘Usefulness of transoesophageal echocardiography before circumferential pulmonary vein ablation in patients with atrial fibrillation: is it really mandatory?’ by N. Calvo et al., on page 486.

The risk of thrombo-embolic events at the time of the procedure remains one of the most serious complications of catheter ablation in patients with atrial fibrillation (AF). The published incidence of symptomatic thrombo-embolic events ranges from 0 to 7%,1–6 and data from (active) screening for asymptomatic thrombo-embolic events after ablation suggest that the true event rate is even higher.7–9 Therefore, prevention of thrombo-embolism during and after the procedure is one of the most important aims during AF ablation.

The mechanisms of thrombogenesis associated with ablation are complex and not completely understood, but involve (among others) (i) dislodging an already existing clot from the left atrium (LA), (ii) thrombus formation on intracardiac sheaths or the ablation catheter, (iii) char formation at the ablation electrode, and (iv) thrombus forming at the endothelial defect after ablation. The best strategy to prevent thrombo-embolic events remains to be determined, but a number of preventive measures have been recommended including transoesophageal echocardiography (TEE) before ablation in patients with persistent AF who are in AF at the time of the procedure,10 regardless of whether they were anticoagulated or not (and independent of the CHADS2 score).

In many ablation centres, all (or the majority of) patients scheduled for AF ablation undergo TEE prior to the procedure. In the single-centre study, Calvo et al.11 assessed the incidence of LA thrombus in patients undergoing catheter ablation for AF. In their series, the incidence of LA thrombus detected with TEE was low (6 of 408 patients, 1.47%). Five of these were receiving oral anticoagulation before the CHADS2 score was <2 in five and 2 in one remaining patient, and patients with LA thrombus had persistent AF and larger LA diameters. The authors conclude that TEE before AF ablation might not be needed in patients with paroxysmal AF and no LA dilatation or structural heart disease. Although it would be desirable to omit TEE before the ablation procedure, several questions remain. This is an observational study, not a randomized trial, the number of patients was relatively small, and the majority had paroxysmal AF. Thus, definitive conclusions about the difference in outcome with and without TEE before ablation cannot be drawn.

More importantly, little information regarding anticoagulation prior to TEE is given. If adequate anticoagulation can be ensured before ablation, TEE might indeed not be necessary. However, if this is more problematic (and this might be quite common), not performing TEE even in the so-called low-risk patients might be risky and compromise the safety of ablation procedures. If a pre-existing thrombus in LA or LA appendage (LAA) is detected by TEE, the strategy would change and a scheduled ablation would be postponed. This is the main argument against not performing a TEE before ablation.

In published series, the incidence of thrombus detected (in most instances despite prior anticoagulation) ranged from 1.4 to 2.9%, and the clinical risk factors associated with thrombus were diverse: CHADS2 score ≥2, a history of cerebrovascular accident and LA dilatation but not the type of AF and rhythm at the time of TEE,12 impaired left ventricular function and a history of congestive heart failure,6 hypertension, advanced age and cardiomyopathy,13 persistent AF, advanced age and structural heart disease.14 In a multicentre survey, the incidence of thromboembolic complications was low (0.49%) and, in patients with paroxysmal AF and normal LA diameters, independent of whether TEE was performed or not.15 Using computed tomography (CT) before ablation and TEE only in a subset of 1221 patients (and those who had LAA thrombus on CT), Khan et al.16 showed a low incidence of LA/LAA thrombus. There were nine patients who had LAA thrombus on CT, and patients with LAA thrombus had lower ejection fraction than patients without LAA thrombus (40 vs. 53%, P = 0.007) but had similar LA size (5.0 vs. 4.5 cm, P = 0.77). No other differences in baseline characteristics were noted.

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So are we there yet?

In the study by He et al.,17 the prevalence of atrial thrombi in 188 patients who either did or did not receive oral anticoagulation for 3 weeks prior to ablation was 6.3 and 11.7%, respectively (P < 0.05). There were no thrombotic events or major haemorrhage in either group. Their recommendation was that TEE should be performed in patients planned for catheter ablation of AF. In a retrospective analysis of consecutive patients undergoing AF ablation,18 7 (3.6%) out of 192 patients had evidence of thrombus on TEE despite being anticoagulated 4 weeks prior to the echocardiogram. Univariate analysis demonstrated that structural heart disease, enlarged LA, and number of AF ablations were associated with thrombus. Three patients with thrombus had paroxysmal AF with normal left ventricular function. These two latter studies suggest that there is likely to be some benefit from performing TEE before ablation to exclude the presence of thrombus in (almost) every patient.

Because of the inconvenience, costs, and (small) risk involved with TEE19 and the negative impact of the TEE on the workflow in the electrophysiology laboratory, we might be tempted after the study by Calvo et al.11 and some of the previous studies6–15 to abandon performing TEE in subgroups of patients scheduled for catheter ablation. However, costs and cost-effectiveness of TEE20 may not be as relevant when dealing with a major complication where even small incremental benefits (i.e. preventing a few additional strokes) may be clinically desirable. Furthermore, additional information (e.g. floppy septum, patent foramen ovale, etc.) is gained with the TEE that may be helpful for planning the procedure.

Therefore, it seems prudent not to change the current approach until prospective randomized clinical trials are available to guide the selection of patients who can safely undergo AF ablation without prior TEE. In particular, the contribution of the underlying heart disease and therapeutic anticoagulation before the procedure, respectively, needs to be better understood. Probably the most promising strategy would be to include a comprehensive assessment of underlying heart disease (e.g. the CHA2DS2-VASc score as suggested by the newest update of the AF guidelines1) and integrate information on the status of anticoagulation in the weeks prior to ablation. Rhythm at the time of the procedure may not be the most important aspect to consider in this respect, and numerous areas of uncertainty remain at present.

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References

10. Calkins H, Brugada J, Packer DL, Cappato R, Chen SA, Crijns HJ et al. HRS/EHRA/ECAS expert consensus statement on catheter and surgical ablation of atrial fibrillation: recommendations for personnel, policy, procedures and follow-up. A report of the Heart Rhythm Society (HRS) Task Force on Catheter and Surgical Ablation of Atrial Fibrillation developed in partnership with the European Heart Rhythm Association (EHRA) and the European Cardiac Arrhythmia Society (ECAS); in collaboration with the American College of Cardiology (ACC), American Heart Association (AHA), and the Society of Thoracic Surgeons (STS). Endorsed and approved by the governing bodies of the American College of Cardiology, the American Heart Association, the European Cardiac Arrhythmia Society, the European Heart Rhythm Association, the Society of Thoracic Surgeons, and the Heart Rhythm Society. Europace 2007; 9:335–79.