Restoration of sinus rhythm in patients undergoing surgery for rheumatic valvular heart disease: is it worth the effort?

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Online publish-ahead-of-print 2 July 2010

This editorial refers to ‘Efficacy of catheter ablation and surgical CryoMaze procedure in patients with long-lasting persistent atrial fibrillation and rheumatic heart disease: a randomized trial’\textsuperscript{1}, by X. Liu et al., on page 2633

Acute rheumatic fever produces a pancarditis affecting the pericardium, epicardium, myocardium, and endocardium. Consequently, rheumatic heart disease (RHD) is a chronic inflammatory disorder that may involve most parts of the heart including valves and myocardial tissue. Atrial fibrillation (AF) in patients with RHD results from haemodynamic consequences of valvular or myocardial heart disease and from direct tissue injury of the atrial myocardium by the underlying inflammatory process.\textsuperscript{1} Thus, AF is highly prevalent and a major cause of morbidity including thromboembolism in patients with RHD.\textsuperscript{2,3} Prevention of AF and restoration of durable sinus rhythm might be a desirable goal in the management of patients with RHD.

The efficacy and clinical value of catheter ablation in patients with structural heart disease is currently a matter of scientific debate. Reported clinical success rates following initial catheter ablation using pulmonary vein isolation (PVI) in patients with paroxysmal AF with no or minimal structural heart disease of \textasciitilde{}60\textendash{}70\%\textsuperscript{4,5} have not been achieved in the setting of persistent AF. In patients with structural heart disease and long-lasting AF, AF ablation is associated with a significantly higher recurrence rate.\textsuperscript{6} Linear ablation strategies have been shown to modify the substrate successfully, especially when electrophysiological lesion completeness has been achieved.\textsuperscript{7,8} RHD is the prototype of structural heart disease that is characterized by creation of severe tissue injury of the atrial myocardium as a substrate for development and persistence of AF (Figure 1). Previous data clearly demonstrated that left linear lesions in addition to PVI and more aggressive ablation strategies significantly increase the success rate.\textsuperscript{9}

Thus, the results shown by Liu and colleagues in their recent study\textsuperscript{10} confirm both the pathophysiological assumptions of AF occurrence in RHD and the results from previous studies of ablation in patients with structural heart disease. The authors randomly assigned patients with RHD and long-lasting AF undergoing surgery for valvular heart disease to a modified MAZE procedure performed in the same surgical session or to catheter-based radiofrequency ablation (including circumferential PVI in combination with left atrial linear ablation and ablation of complex fractionated atrial electrograms) 6 months postoperatively. Patients randomized to the modified surgical MAZE procedure, that was performed using saline-irrigated cooled-tip radiofrequency ablation, had a significantly lower rate of AF recurrences after 15 months and underwent repeat procedures for recurrent AF less frequently compared with patients undergoing catheter ablation.

There is a lot of discussion about the proper way to verify success after an AF ablation procedure. Continuous rhythm monitoring is the gold standard of follow-up, but very few studies use it due to the technical and economical implications. Some AF recurrences can occur without symptoms, and the true effectiveness might remain unknown. Thus, infrequent rhythm assessments during the follow-up period as performed in the study by Liu and colleagues may overestimate the positive results, being more hypothesis generating and less definite. It is true, however, that in patients with long-lasting AF, as in this study, restoration of sinus rhythm can be easily assessed and the presence of non-diagnosed asymptomatic self-terminating episodes might be less relevant to the final result.

The study by Liu et al. nicely contributes to comparative effectiveness research that is simply a rigorous evaluation of the impact of different options that are available for treating a given medical condition for a particular set of patients.\textsuperscript{11} Their study
compares different approaches, such as surgery and catheter-based therapy, for long-lasting AF in patients with RHD undergoing surgery for valvular heart disease. In this particular case, one treatment is more effective for this specific type of patient considering only one outcome event (freedom from recurrent AF). The study is an example of comparative effectiveness research that demonstrates that refinements of the technique to ablate AF could result in a higher success rate. However, high-quality comparative effectiveness research usually focuses on both the relative medical benefits and the risks of each option. Additionally, it may also weigh the costs in relation to the particular benefits of those options. The relative medical benefit frequently results from more than one outcome parameter and should include a measure of the net clinical outcome.

Despite the interesting issue investigated in the study of Liu et al., from an electrophysiological point of view, the clinical benefit of sinus rhythm restoration in this particular study population with RHD should be thoroughly elucidated. Future studies should investigate the association of AF recurrence with clinical outcomes that include functional status, exercise capacity, quality of life, and possibly biomarkers such as natriuretic peptides. Such data would help to define the role of ablation procedures in the complex management of patients undergoing surgery for rheumatic valvular heart disease. AF is only one sequela of RHD, and most patients undergo implantation of metallic valve prostheses and have to be kept on vitamin K antagonists indefinitely. Thus, prevention of thromboembolism and avoiding the need for anticoagulation is no major issue in this specific type of patient.

Putting ablation procedures for AF into a broad clinical perspective (Figure 2) is of utmost importance (at least from an ethical point of view) considering severe procedure-associated complications reported in the present small-sized study. Before ablation for persistent AF can be recommended for a broad range of patients undergoing surgery for rheumatic heart valve disease, the possible clinical benefit of this procedure has to be more thoroughly assessed.

Conflict of interest: none declared.

References


