Abstract

During the past decade a rational and curative therapy became available for several cardiac arrhythmias. This has been the result of a detailed understanding of the mechanism of these arrhythmias and the development of safe catheter based technology (radiofrequency ablation).

Despite these significant improvements, two big hurdles still remain: atrial fibrillation and life-threatening ventricular tachycardia. This current research focuses on some therapeutic aspects of atrial fibrillation by answering some questions:

- What is the role of the position of defibrillator’s electrodes in influencing the efficacy of cardioversion in atrial fibrillation?
- Does the form of the electrical shock influence the efficacy of cardioversion in atrial fibrillation?
- To what extent does the premedication with antiarrhythmic drugs influence the efficacy of cardioversion in atrial fibrillation?
- What are the acute results and what is the long-term evolution of the patients with atrial fibrillation who undergo AV-node ablation and permanent pacing?
- What are the results of the ablative therapy in patients with isthmic atrial flutter, with or without antiarrhythmic drugs?

In the first two chapters (Electrophysiologic mechanisms in atrial rhythm disturbances; Therapeutic aspects in atrial arrhythmias) which have a vast bibliography, the fundamental electrophysiological concepts as well as the actual therapeutic possibilities in atrial rhythm disturbances are discussed.

The next three practical chapters analyse the efficacy of DC cardioversion under diverse circumstances (The role of the position of the electrodes in DC cardioversion for atrial fibrillation; DC cardioversion for atrial fibrillation in patients premedicated with amiodarone; The comparative study of monophasic and biphasic shocks in DC cardioversion for atrial fibrillation).

The last two practical chapters (Radiofrequency catheter ablation of the atrioventricular node and permanent pacing for atrial fibrillation; Radiofrequency catheter ablation for isthmic atrial flutter) evaluate the results of some ablative techniques targeting the symptomatic amelioration (in atrial fibrillation, when pharmacologic control of the ventricular rate is inefficient or the antiarrhythmic treatment is not tolerated), or curative purpose (in isthmic atrial flutter). Evaluating 379 patients in five studies, I concluded:

1. The electrical cardioversion remains the most efficient method of the restoration of sinus rhythm in atrial fibrillation.

- There is no significant difference between anterolateral and anteroposterior positions of cardioversion electrodes.
• It is up to the physician to decide between the anterolateral or anteroposterior position of cardioversion electrodes, in the case of a heavy patient the anteroposterior position of the electrodes is probably more favourable.
• Premedication with amiodarone ameliorates the results of electrical cardioversion in atrial fibrillation, even in patients with more complex pathologies.
• Although the administration of amiodarone in higher doses (600-800 mg/die), being relatively sure, can be allowed even under ambulatory conditions, in the case of a minor proarrhythmic risk, this risk isn’t always negligible.
• Electrical disturbances (hypopotasemia, hypomagnesiemia) and myocardial lesions occurring during post-conversion may favour the apparition of the torsade of points in patients treated with amiodarone.
• Patients treated with amiodarone need no greater energies for cardioversion in atrial fibrillation.
• There is no significant difference between monophasic and biphasic shocks when patients are well prepared, inclusively with antiarrhythmic medication.
• The biphasic shock is superior to monophasic shock in the reduction of energies necessary for cardioversion by approximately 50%, reducing the chance of myocardial lesion and increasing the compliance of patients for this procedure.

2. The RF ablation of the AV node is an efficient method for controlling ventricular frequency in atrial fibrillation.
• The registration of an ample His potential on the ablation catheter is the best indicator of intraprocedural success.
• The complications associated with this therapeutic procedure are minor if patients are monitored carefully.
• The control of ventricular rate by the AV node ablation produces symptomatic amelioration in the case of permanent or paroxysmal atrial fibrillation.
• Because of the efficiency and safety of this technique, its indications should be extended to a greater number of patients.

3. The RF ablation should be a curative therapy in isthmic atrial flutter, which is considered the elective treatment of recidivant isthmic atrial flutter.
• Because of its high success and low complications rate, it is an adequate therapy not only for patients with therapy resistant atrial flutter, but even for patients who prefer this alternative treatment to antiarrhythmic drugs or repeated electric shocks.
• The success of the procedure depends on the experience of the team as well as on factors that belong to the anatomy of the cavotricuspid isthmus (CTI).
• The angiography of the CTI should be utilised when guiding the RF ablation, especially during the initial learning stage of the procedure.
• Some special catheters ameliorate the success rate significantly.
• Monitoring parameters like energy / temperature / impedance during RF ablation is useful in excluding inefficient applications.
• Using several more simple criteria for bidirectional isthmic block can reduce the duration of the procedure (double potentials with more than 110 ms, the morphology of the atrial bipolar and unipolar electrograms, etc.)
• The predictors of success of the ablation of the CTI seem to be the favourable anatomy of the isthmic region, the use of 8 mm tip catheters as well as the optimal parameters of watts/temperature during RF current application.