Administration of Adenosine Triphosphate Provides Additional Value over Programmed Electrophysiologic Study in Confirmation of Successful Accessory Pathway Ablation

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Introduction: Both programmed electrophysiological study (PES) and medication including injection of adenosine or adenosine triphosphate (ATP) can confirm the absence of accessory pathways (APs). Many electrophysiologists prefer PES alone to test the endpoint. We wondered if the administration of ATP in combination with PES could be superior to PES alone in the outcome of AP ablation.

Methods: We reviewed consecutive patients with supraventricular tachycardias due to APs demonstrated by intracardiac PES that underwent radiofrequency catheter ablation from Jan 2016 to Sept 2018 in our center. The patients were divided into two groups, the ATP group (who had passed both the ATP test and PES after ablation as the endpoint) and the non-ATP group (who had passed PES only after ablation as the endpoint). We reviewed patients’ intra-cardiac electrograms and analysed the long term outcomes of the two groups.

Result: In total 1343 patients with APs underwent successful radiofrequency ablation during this period. There were 215 patients in the ATP group with one patient lost to follow-up. There were 1128 patients in the non-ATP group with 39 lost to follow-up. Twenty-three patients in the ATP group demonstrated additional electrophysiological entities due to ATP administration, including reappearance of the ablated APs in 16 patients, discovery of PES-undetected APs in 5 patients, induction of paroxysmal atrial fibrillation in 5 patients, induction of premature atrial contractions in one patient and induction of premature ventricular contractions in one patient. During 7 to 39 months (average 24.4 ± 9.5 months) follow-up, the recurrence rate was 8.41% (18/214) in the ATP group, and 6.80% (74/1084) in the non-ATP group. In subjects with a recurrence, fourteen patients (14/18=77.8%) in the ATP group and 50 patients (50/74=67.6%) in the non-ATP group accepted redo ablations. Among the ATP-group, all the redo-APs were the same ones as previously. Among the non-ATP-group, redo ablations confirmed that 39 APs were the same ones as previously, while 20 APs were newly detected which had been missed by previous procedures. Differences in recurrent AP locations between the two groups was significant (p=0.008). All the patients in the ATP group experienced transient drug related symptoms and demonstrated short lived A-V conduction block managed with temporary ventricular pacing.

Conclusion: The inherent existence of multiple APs was an important cause for recurrence when ATP
administration is not used to confirm ablation endpoints and the use of ATP adds additional value over PES alone in confirmation of ablation endpoint of APs by detecting latent APs. ATP is also helpful in induction of some arrhythmias due to triggered activity. With the use of ventricular pacing, the ATP test is safe in patients without contraindications to this agent.