**Anamnestic Findings**

41 y.o. man with normal cardiac findings on echocardiography, suffering for paroxysmal supra-ventricular tachycardia since 1982 with rapid onset and resolution with spontaneous or vagal maneuvers interruption.

During the years developed more frequent and vagal maneuvers resistant episodes and documented FA paroxism.

Underwent electrophysiological test (EPT) and diagnosis of Atrio-Ventricular Reentrant Tachycardia (AVRT) by para-hissian concealed Accessory Pathway (AP) and high atrial electrical vulnerability (easy to induce A. Fib.) complicated by AV fistula on right femoral vein access.

This patient underwent anti-arrhythmic drug (AAD) therapy to control AVRT since 1997 first with Propafenone (complicated by asthmatic chrysies) and then with Sotalol with uncomplete control of arrhythmia.

In 2000 underwent trans-catheter radio-frequency ablation (TCRF) of AP without any results interrupted for high risk of His damage.

After AAD washout he referred to our department to undergo EPT and TCRF ablation.

**Physical Esamination and ECG**

Tachycardic sounds, VM on chest auscultation, no signs or symptoms of heart failure and EKG showing incessant AVRT (210 bpm).

**EPT**

In basal condition AVRT was observed with 290 msec of cycle length.

![Fig.1 basal recording of EKG end EGM shows AVRT with 290 msec of cycle length (CL).](image-url)
During AVRT atrial and ventricular decremental pacing until the refractoriness of the AP (260 msec of cycle length) showed interruption with immediate recurrence of the tachycardia.

Fig. 2 Atrial pacing during tachycardia until AP refractoriness (260 msec) produce AVRT interruption and tachycardia initiation is observed immediately.
Ventricular Pacing on refractory His (60 msec on His trigger) confirmed the presence of Hissian AP.

Fig. 3 Pacing on His refractory period show first atrial activation on His catheter independent from His bundle (non decremental retro-conduction during His bundle refractory period). VV interval and AA interval on paced beat are equal showing the penetration of the stimulus through the AP.
Ventricular entrainment pacing (260 msec) was performed confirming the presence of a re-entry circuit involving the right ventricle.

Fig. 4 Entrainment was confirmed by: (1) advancement of the atrial cycle length to the paced cycle length; (2) no change in the pattern of atrial activation; and (3) ongoing tachycardia after pacing was discontinued. The postpacing interval was measured from the last pacing stimulus to the onset of the local ventricular electrogram on the RV apex catheter, PPI was corrected for the first tachycardia cycle length showing a value predictive of AVRT. SA and VA were measured instead of HA interval because of the unclear signal on the His catheter (assuming that VH interval is constant) showing that during entrainment and during tachycardia the retro-conduction is non decremental (via the AP).
4mm irrigated tip catheter was placed on His observing retrograde AP potential and first atrial activation on ABL_d.

Fig. 5 4mm irrigated tip catheter is placed on Hissian region in the atrial aspect of the tricuspid valve.

Fig. 6 Retrograde AP potential and first atrial activation on Abl_d.
Single RF delivery on that site led to AVRT interruption (after 5 sec.) with appearance of His potential on ABL_d.

**Fig. 7** During radio-frequency ablation stable interruption of tachycardia is observed and normalization of AV interval. Note the presence of Hissian potential on ABL_d during the ablation (non typical waveform because of RF artifacts).
After RF ablation retrograde dissociation was observed during RVA pacing at 380 msec, concentric decremental retrograde conduction during RVA programmed stimulation (S1 450 S2 310 msec) with retrograde jump (S1 450 S2 300 msec) and Hissian effective refractory period 290 msec (S1 450 S2 290 msec).

Fig. 8 Retrograde second degree Wenckebach type block is strongly suggestive of Hissian refractoriness excluding AP retro-conduction (which usually leads to a Mobitz II block). Note that block occurs at pacing interval longer than AVRT cycle length (that make the tachycardia impossible for the absence of excitable gap).

After RF delivery EPT was performed in order to check the results of ablation and measurement were constantly repeated during 40 min. of observation even during isoproterenol infusion (4mcg/min).

The good result of ablation persisted during the observation period and isoproterenol was discontinued after 18 min of infusion.
Fig. 9 The response to RVa programmed stimulation (S1 450; S2 310 msec) shows a clear decrementality of retroconduction.

Fig. 10 Reducing the S2 cycle length of 10 msec (S1 450; S2 300 msec) a retrograde jump is observed with a significant (137 msec) prolongation of the VA (HA interval was not clearly observable. That behavior demonstrate the nodal dependence of retrograde conduction.
The progressive reduction of the cycle length of the extrastimulus of 10 msec (S1 450; S2 290 msec) shows complete block of retrograde conduction after ventricular depolarization showing the complete absence of retroconduction via accessory pathway.

Normal anterograde conduction findings on final EGM (AH 61 msec, HV 66 msec) during the whole observation period (about 40 min).

Final EGM shows normal conduction parameters after RF delivery in Hissian region.

Stable sinus rhythm persisted during the annual follow-up, the patient was told to refer us just in case of palpitation … .
HAPPY ENDING

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