6. AVNRT: ELECTROPHYSIOLOGICAL ASPECTS AND ABLATION RESULTS

6.1 NODAL CONDUCTION VELOCITY ACCORDING TO SITE OF STIMULUS ORIGIN


Objective: Establish if the nodal conduction velocity is different if the impulse comes from the left atrium in relation to the right.

Methods: Twenty patients submitted to an electrophysiological study for different reasons were paced during sinus rhythm with an S1 series followed by six test stimuli emulating the beginning of a supraventricular tachycardia. Identical stimuli sets were given in the coronary sinus and the high right atrium. We then considered the S1-H interval.

Results: The mean S1-H interval stimulating the right atrium was 220 ±37, vs. 170 ±35 ms (p<0.0003) when the stimulus was in the coronary sinus, which represents a 29% difference. Effective (222 ±49 vs. 230 ±40 ms) and functional (314 ±33 vs. 320 ±54 ms) refractory periods were similar from both atria. Comparing conduction curves to find refractory periods, the S2-H2 interval pacing in the coronary sinus was 27.4% shorter than that from the high right atrium. Comparing anatomical distances in an anatomic piece, both distances were similar (65 ±5 mm).

Conclusions: Nodal conduction is significantly faster (30%) if the impulse comes from the left atrium compared to the right.

6.2 IDENTIFYING THE FAST AND SLOW AV NODAL PATHWAY CONDUCTION TIMES USING THE AH AND VA INTERVALS RECORDED IN THE HIS BUNDLE ELECTROGRAM

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Uncertainty regarding the basis for the >50 ms jump used to define dual AV nodal physiology prompted us to calculate the threshold for significant change in the AH1 and VA1 intervals during decremental pacing. From this, we sought to establish whether ranges of AH and VA intervals are unique to the fast (FP) and slow (SP) AV nodal pathways among 100 pts. undergoing routine EP testing.

The jump, defined as 2 STD beyond the mean increment in the AH1 or VA1 interval during decremental pacing, was ≥25 ms or ≥25 ms, respectively. Among 61 pts. with ≥25ms jump, none had longest pre-jump AH1 intervals >200ms and none had shortest post-jump AH1 intervals <150ms. Among 89 pts. with intact retrograde conduction, 26 had ≥25ms jump in VA1 interval. In all 26, VA1 intervals ≥150ms corresponded to earliest atrial activation at the coronary sinus or while those <150ms had earliest activation in the His recording. Using 200ms to define minimum SP AH interval, SP prevalence was 92%.

The data suggest that 200 ms may be a minimum SP AH interval and 150 ms is a maximum FP AH interval with values between 150-200 indeterminate. VA1 intervals <150 ms and those ≥150 ms suggest FP and SP conduction time limits, respectively.

6.3 AVNRT THAT MIMICS LEFT SIDE ACCESSORY PATHWAY


Background: During a supraventricular tachycardia an eccentric retrograde atrial activation usually suggests a left side accessory pathway (AP).

Aim of the Study: To report cases AVNRT with eccentric retrograde atrial activation.

Methods: Among 526 patients (pts) referred for electrophysiological evaluation for recurrent supraventricular tachycardia, we selected 6 pts (2 males, mean age 39.14 years) with AV node reentrant tachycardia (AVNRT) showing an eccentric retrograde atrial activation during tachycardia. An AT was ruled out by VAV response during entrainment by ventricular pacing. Pacing maneuvers were employed such as ventricular pre-excitation during atrial pacing, advancement of atrial activation by a premature ventricular contraction during His refractoriness, recording of an AP, lengthening of VA interval during bundle branch block to rule out the conduction over an AP. Ablation aiming at the slow AV nodal pathway potential was successful in eliminating and preventing tachycardia inducibility in all patients.

Conclusions: Detailed electrophysiological evaluation is required for correct diagnosis and elimination of tachycardia is usually achieved by ablating the slow AV nodal pathway at the right posteroseptal area.

6.4 TACHYCARDIA CARDIOMYOPATHY IN PATIENT WITH DUAL AV ANTEGRADE RESPONSE AND CONCEALED RETROGRADE CONDUCTION

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Dual AV nodal physiology can rarely cause antegrade dissociation resulting in tachycardia. One of the diagnostic criteria has been considered the absence of retrograde conduction over one pathway when the other one is activated. We described a case of clear retrograde conduction (concealed) over the fast pathways, A 52 year female with a 3 years history of heart failure and cardiomyopathy (EF 42%) underwent at our Institute. The ECG showed a stable pattern (HR 113 bpm) of a single p wave followed by two QRS complex and the subsequent P wave conducted to a single QRS. The electrophysiological study confirmed the pattern (A double V, A single V, every V preceded by an H potential). The A-H interval was 190 ms between the A and the first H (fast pathway) and 660 ms between the same A and a second H potential (slow pathway). The subsequent A was followed by a single V with A-H interval of 300 ms.

We assumed that the two consecutive V potential were activated through the fast and slow pathway (double firing activity). The following V was also activated through the fast pathway but the A-H interval was longer due to concealed retrograde conduction of the preceding slow pathways activation. Slow pathway ablation successfully interrupted the tachycardia. After 4 months of follow-up the cardiomyopathy recovered (EF 55%) and the patient was asymptomatic.

One of the diagnostic criteria of AV dissociation is the absence of retrograde conduction over the fast or slow pathways when the counterpart is activated. We reported a case of clear retrograde conduction (concealed) over the fast pathways after that the depolarisation reaches the final common pathway through the slow pathway.

6.5 REDUCED RADIATION EXPOSURE IN ABLATION OF SUPRAVENTRICULAR TACHYCARDIA (SVT)

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Specific objective: We sought to compare the efficacy of the Localisa (L) three dimensional navigation systems in reducing radiation exposure by comparison to a conventional method using fluoroscopy (F) in a consecutive series of patients undergoing Radiofrequency ablation (RFA) of Supraventricular Tachycardia (SVT).

Methods and Results: 55 patients undergoing RFA (31 male) were studied, (mean age 47/[SD ± 16.5]). Patients were randomly assigned to either L (with fluoroscopy as required) or F alone. 52 procedures were completely successful. 26 patients were assigned to F and 29 to L. Indications for RFA were AVNRT in 17 (30.9%), atrio-ventricular nodal ablation in 8 (10.9%), cavo-tricuspid isthmus ablation in 10 (18.2%) and accessory pathway ablation in 20 (36.4%). The mean fluoroscopy time using the F was 20.16 ± 8.3 minutes and 14.90 ± 1.72 minutes using L (p< 0.006). The mean fluoroscopy dosage was 4946 ± 4914 cGy.cm² using F and 3280 ± 4458 cGy.cm² using L (p = 0.07). The mean RFA time was 5 minutes (± 5.6) with no significant difference with either approach.

Conclusion: Routine use of the Localisa results in a significant reduction in fluoroscopy and radiation exposure in patients undergoing routine RFA for SVT.