SVT-WCT with no overt preexcitation

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Disclosures

• I have no conflict of interest to declare
18 yo student presented at emergencies with palpitations since 10 hours ago.
Previous cardiology history insignificant.

Terminated by adenosine.
MCQ1

• *DD of tachycardia mechanism*

• 1. Atypical AVNRT
• 2. BBRVT
• 3. Orthodromic AVRT
• 4. Antidromic AVRT
• 5. RVOT VT
• 6. AT with preexisting LBBB
MCQ1 Answer

• *Answer 4. Antidromic AVRT*
SR 12 Leads ECG
Ventricular pacing showed 1:1 retrograde decremental concentric conduction via the AV node.
Atrial programmed stimulation

- **Burst and Incremental atrial pacing**
  - gradual increase of QRS widening (preexcitation), associated with PR
  - AV interval progressive prolongation, AH interval lengthens, HV interval shortens and QRS widens until a steady value was achieved.

- During absence of pre-excitation, the HV interval was positive, whereas during preexcitation it was negative

- Wenckebach accessory pathway 250ms, Wenckebach AVN 280ms
Burst Atrial Pacing

During atrial pacing, maximal preexcitation is associated with retrograde conduction over the RB, His bundle and A-V node.
Antidromic Mahaim tachycardia

By Atrial S1/S2 400ms easily induction of clinical WCT, TCL 364ms, self-terminated or overdrived.

Tachycardia was induced by atrial catheter movements as well.

Assessment of the role of the accessory pathway in the tachycardia circuit: active or bystander by delivering single late lateral right atrial extrastimuli
"M" potential accurately localizes the anatomic site of the pathway.

Ablation catheter carefully moved along the TA searching for M potentials during SR in LAO & RAO avoiding bumps on the tissue.
Mahaim fibre was localized at right atrial free wall of tricuspid annulus (8 o’clock).

3 RFA lesions at the site with M potentials.
Site where Mahaim fiber was located and ablated
MAT During RFA

Mahaim Automatic tachycardia recorded during RFA delivery.

Hallmark for successful RFA ablation.
Three mapping strategies

- (i) **M potential**
  - defined as a discrete deflection between atrial and ventricular signal *with the interval between the M potential and ventricular electrogram remaining constant during the AV delay produced by atrial pacing*

- (ii) **Shortest stimulus-to-preexcitation (STP) interval**
  - defined by the shortest interval from a paced atrial site to the pre-excited QRS, and

- (iii) **Mechanical trauma induced loss of conduction**
  - over Mahaim fibre.
  
  (located very close to the endocardium and thus catheter movement-related mechanical trauma resulting in transient loss of conduction is not uncommon).
SR 12 leads pre RFA
SR 12 Leads ECG post RFA
The Importance of an “rS” Pattern in Lead III in pts with Mahaim

- In young patients with tachycardias, the finding of a narrow QRS with an rS pattern in lead III during SR should raise the suspicion of the presence of a Mahaim fiber, especially in those showing an absence of q wave in lead I.
Conclusions
Atriofascicular (Mahaim) Pathway

- **Atriofascicular (Mahaim) pathway is an uncommon** low prevalence-about 3% of all accessory pathways- **but distinct form of preexcitation.**

  It exhibits certain unique properties such as

  - **Unidirectional, anterograde conduction,** and
  - **Slow conduction with AV node-like decremental conduction properties.** (Responds to adenosine (92%) and shows accessory pathway automaticity during ablation (91%).

  The usual target for ablation is **at the site of a high-frequency potential (M-potential) along the TA.**

  - Most of Mahaim pathways originate from the RA free wall near the TA and terminate in or near the distal RBB (atriofascicular pathways) or in the RV near the TA (AV pathways).
MCQ 2

All of the following electrophysiologic features of atriofascicular pathways are true except:

1. The baseline QRS morphology is normal
2. Programmed atrial pacing leads to obvious manifest preexcitation following an increase in A-V interval along with shortening of H-V interval at shorter pacing cycle lengths
3. Right bundle electrogram follows His bundle activation during anterograde pre-excitation and supraventricular tachycardia.
Answer 3. Right bundle electrogram follows His bundle activation during anterograde pre-excitation and supraventricular tachycardia.