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The Heart Hospital & UCL

PEARLS & PITFALLS OF PACING MANOEUVRES

Pacing manoeuvres

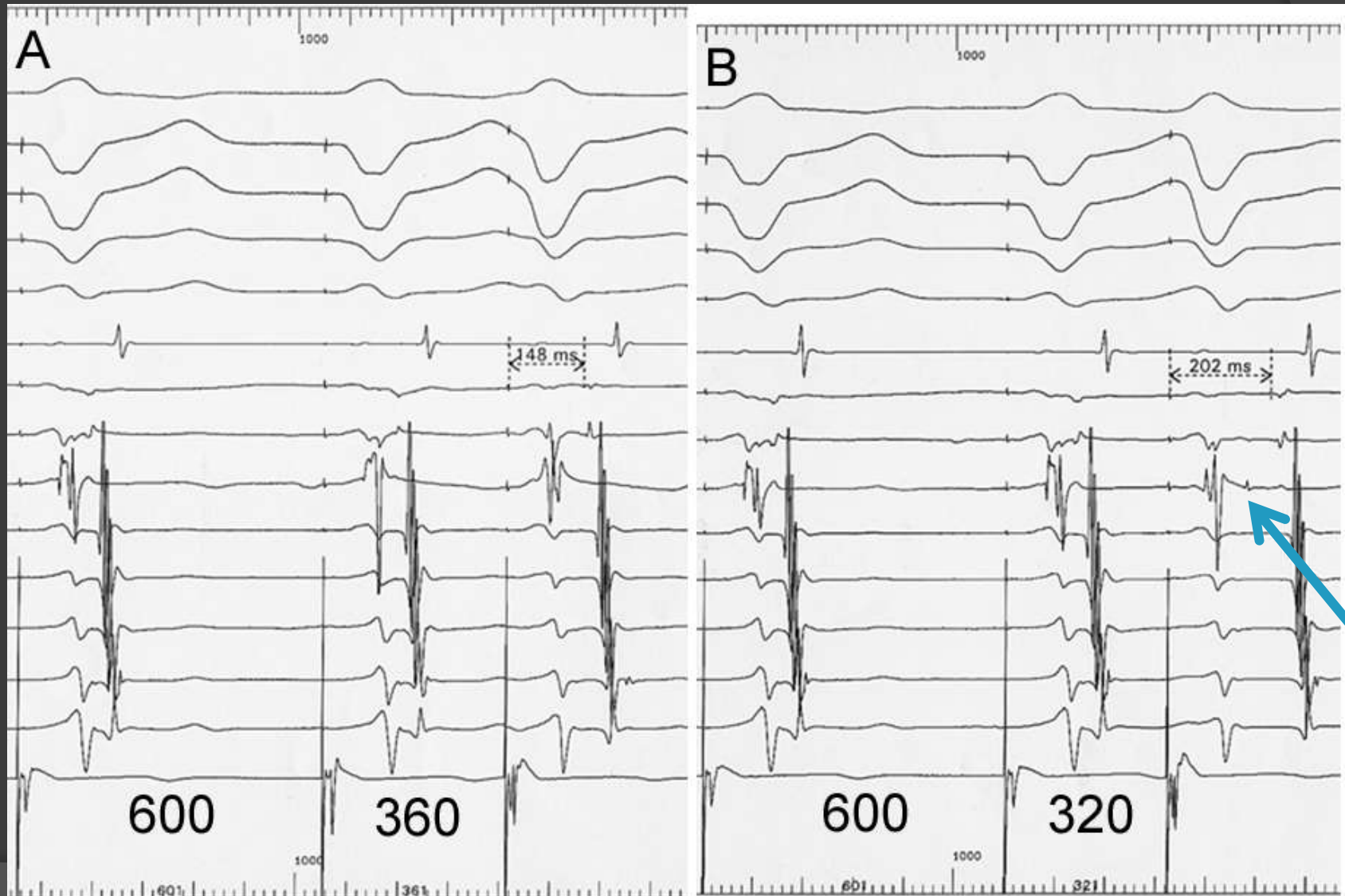
- ⦿ The normal conduction system
 - Anterograde
 - Retrograde
 - SA node
- ⦿ Induce tachycardia
- ⦿ Terminate tachycardia
- ⦿ Test tachycardia
- ⦿ Proximity to circuit

Warning

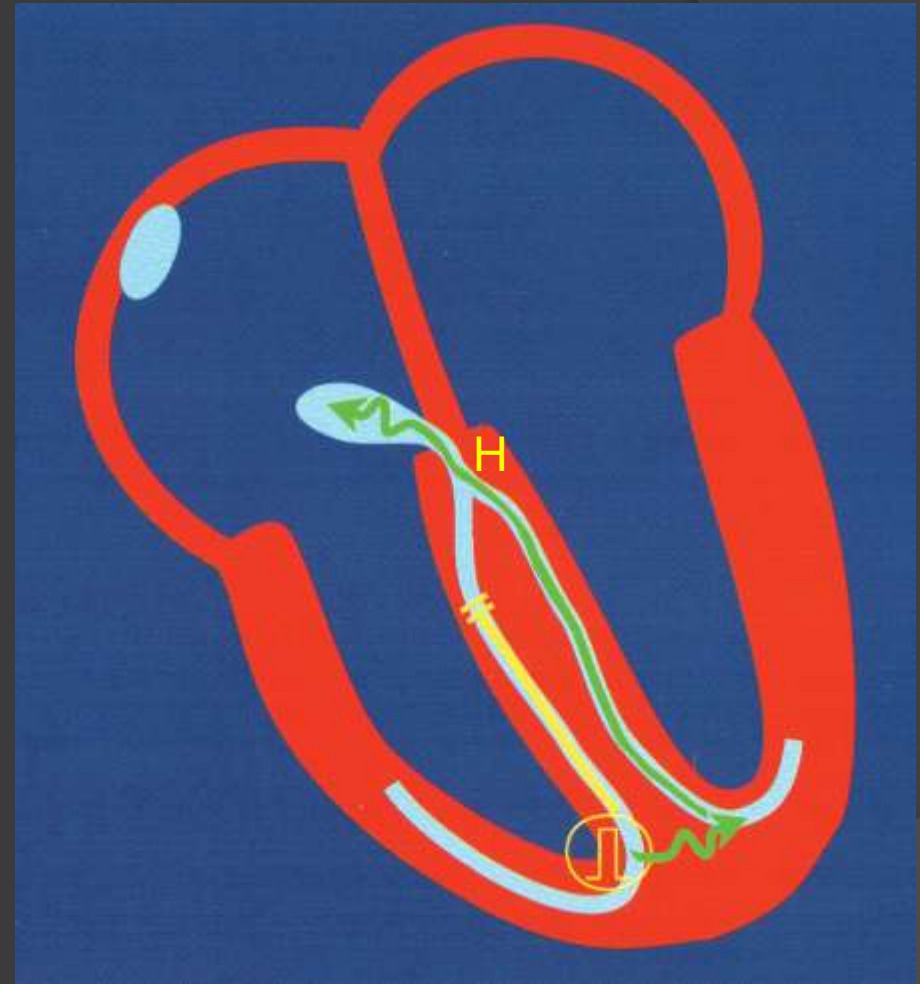
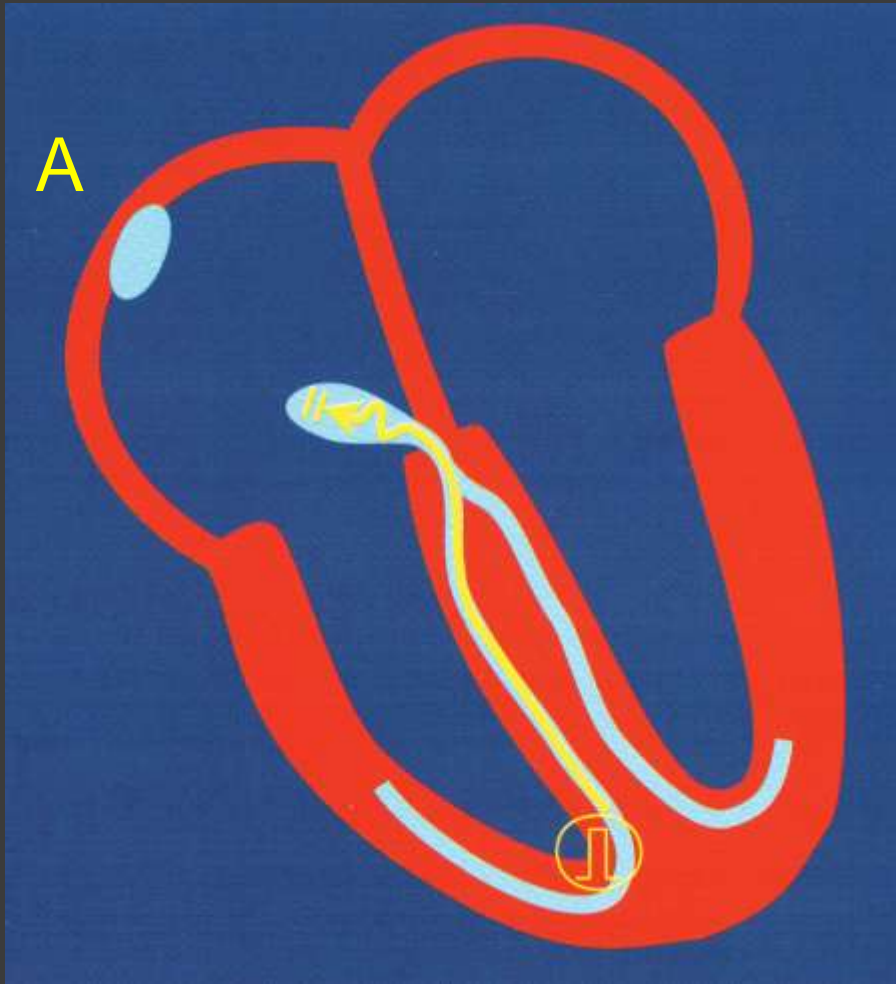
- ⦿ Like all tests, they are not infallible
- ⦿ Does the result make sense?
- ⦿ Is it repeatable?
- ⦿ Is the answer clear or is an alternate test required for confirmation?
- ⦿ Is there an alternative explanation?

ADVICE – BE SCEPTICAL

Ventricular pacing



Retrograde His

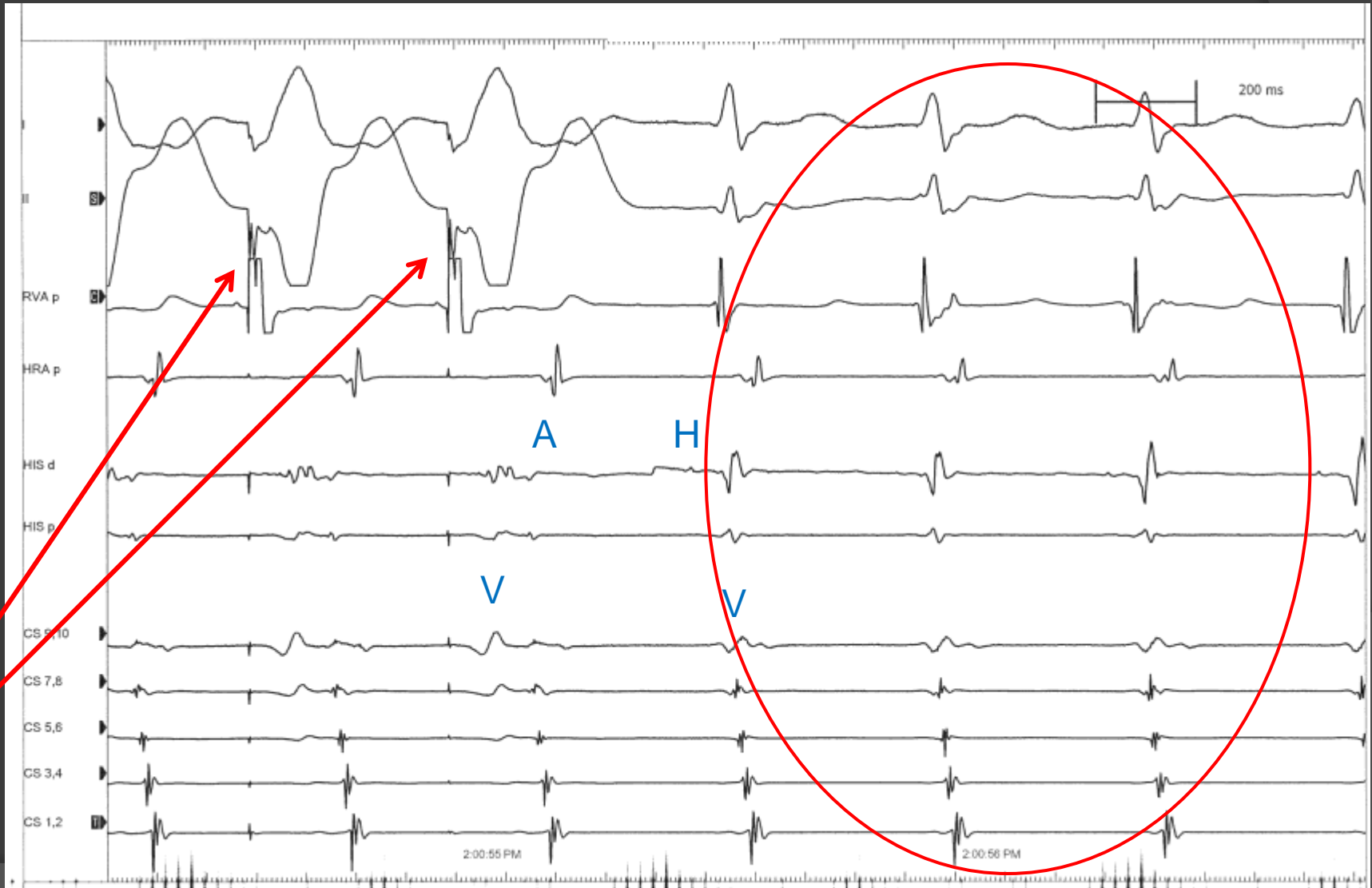


VH jump does **not** imply the presence of a slow pathway

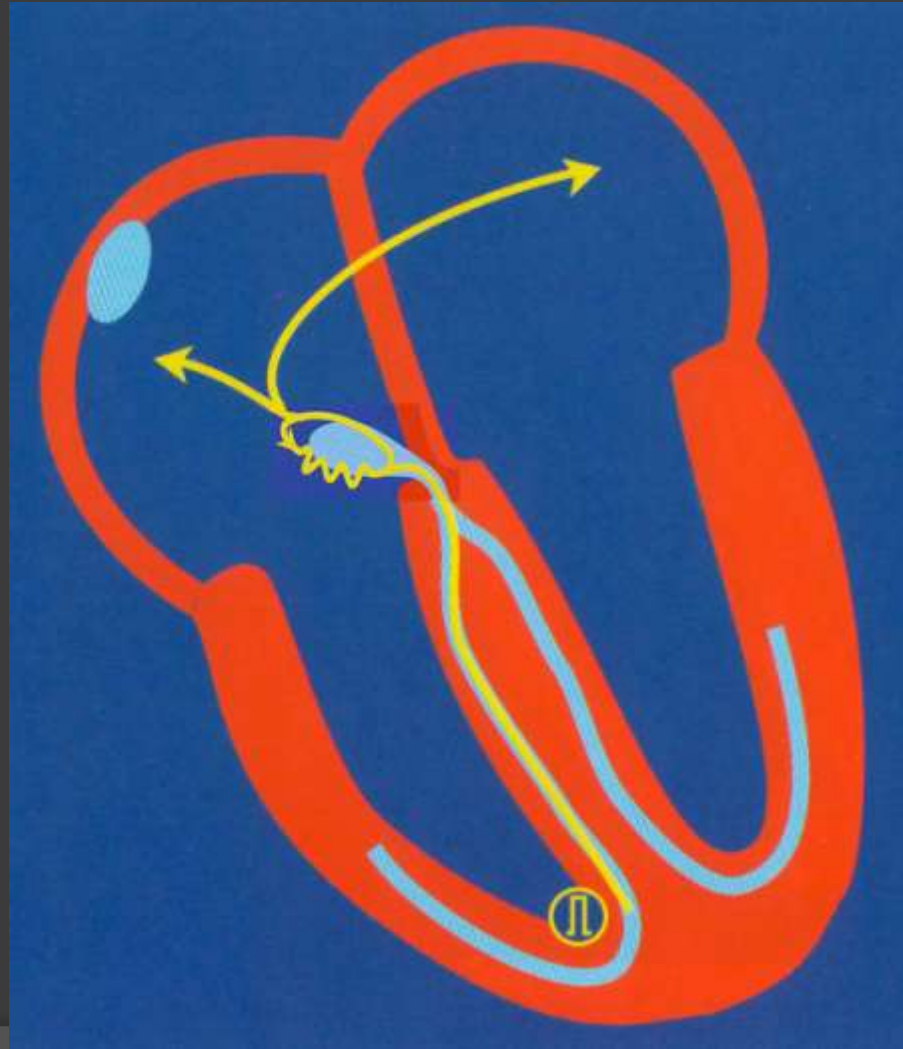
Entrainment - SVT

- ⦿ Various entrainment manoeuvres designed to discriminate types of SVT
- ⦿ Usually straightforward AT vs AVNRT/ORT
- ⦿ Most difficult discrimination is for long RP tachy and concentric atrial activation:
 - Atypical AV node reentry
 - Slowly conducting septal accessory pathway

Entrainment of SVT from RVA



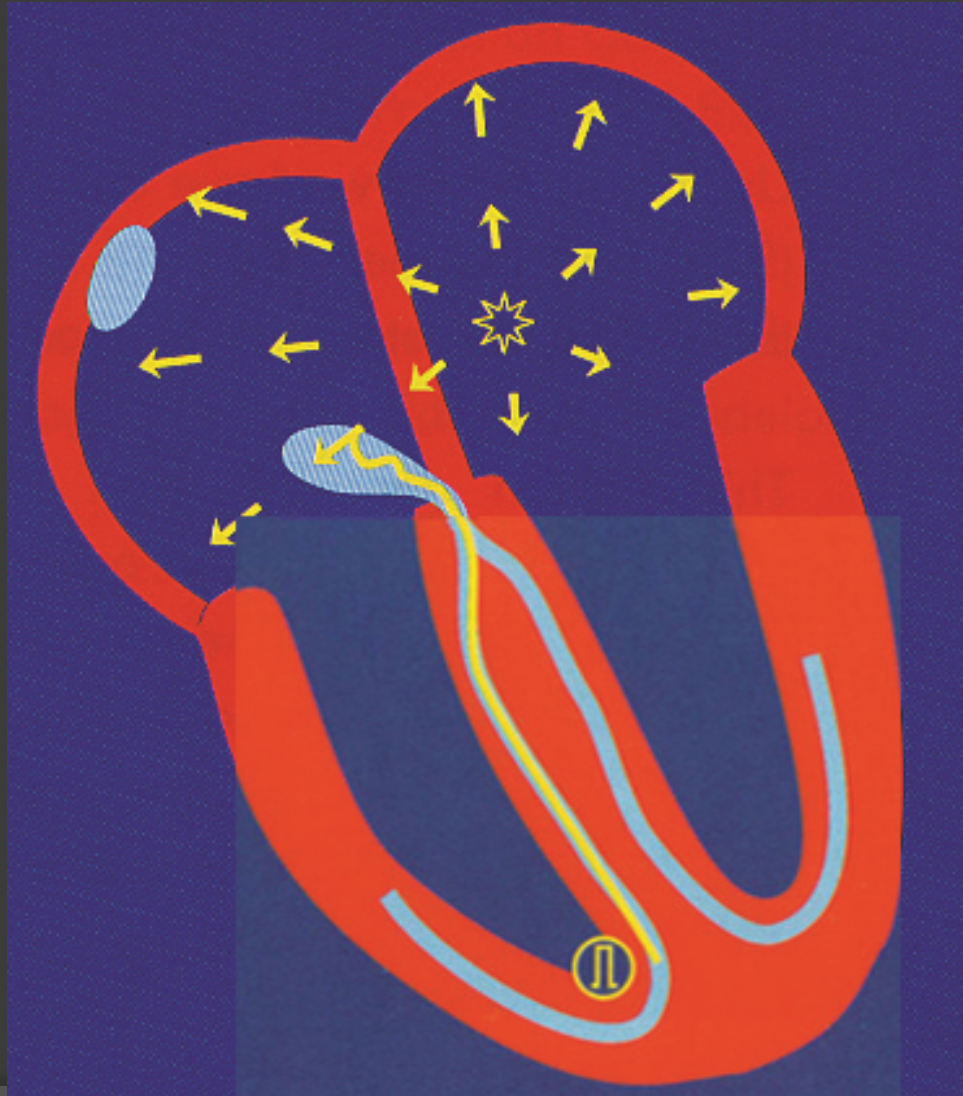
Entrainment of AVNRT from RVA



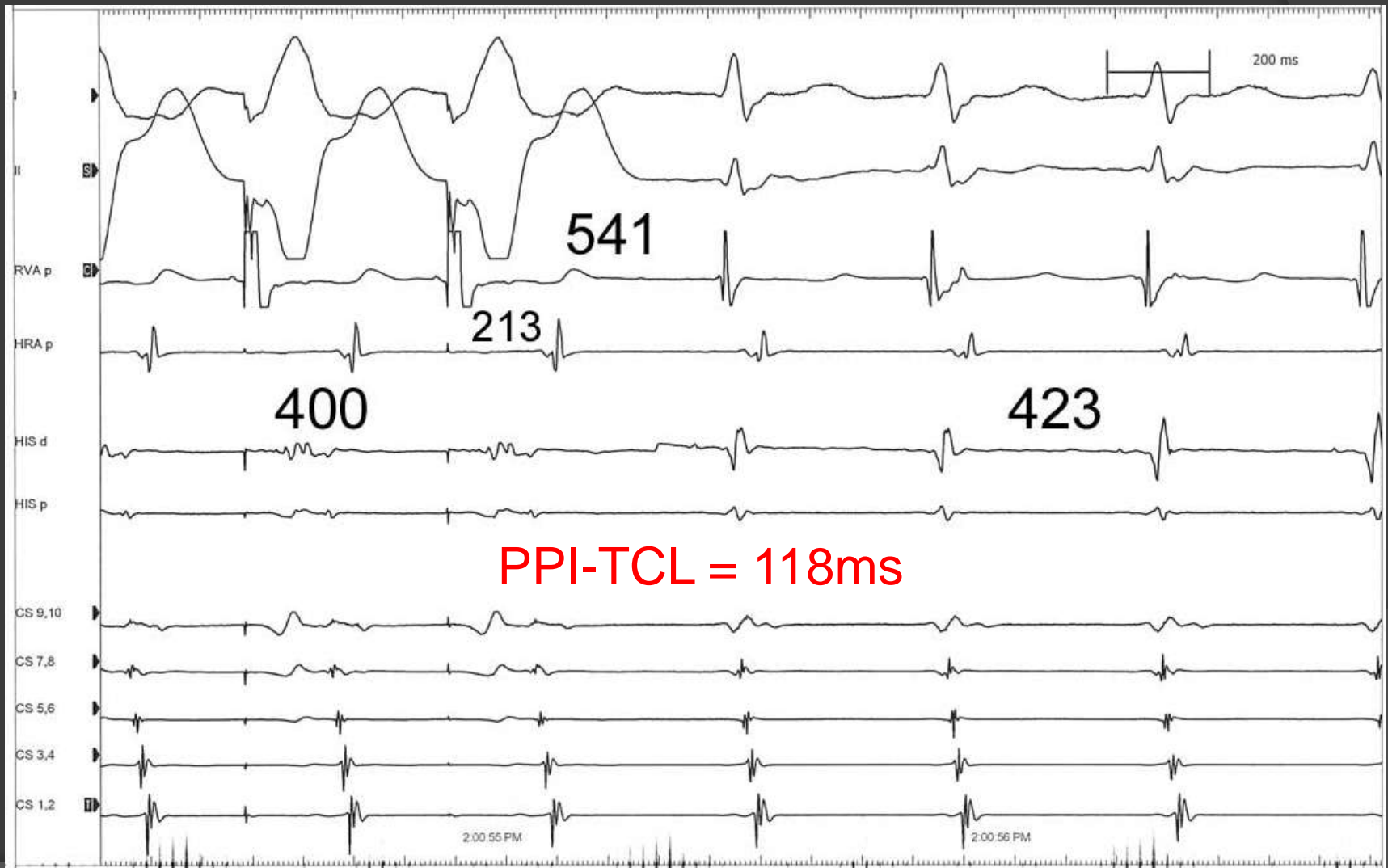
Entrainment of SVT from RVA



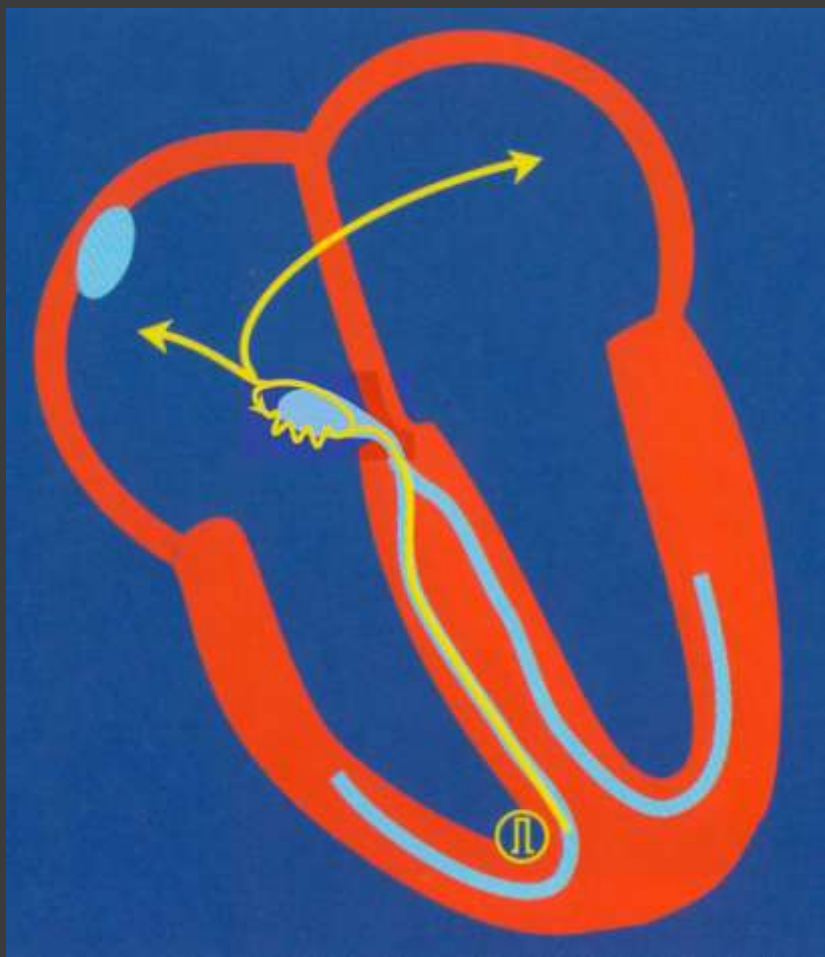
Entrainment of AT from RVA



Entrainment of SVT (PPI)



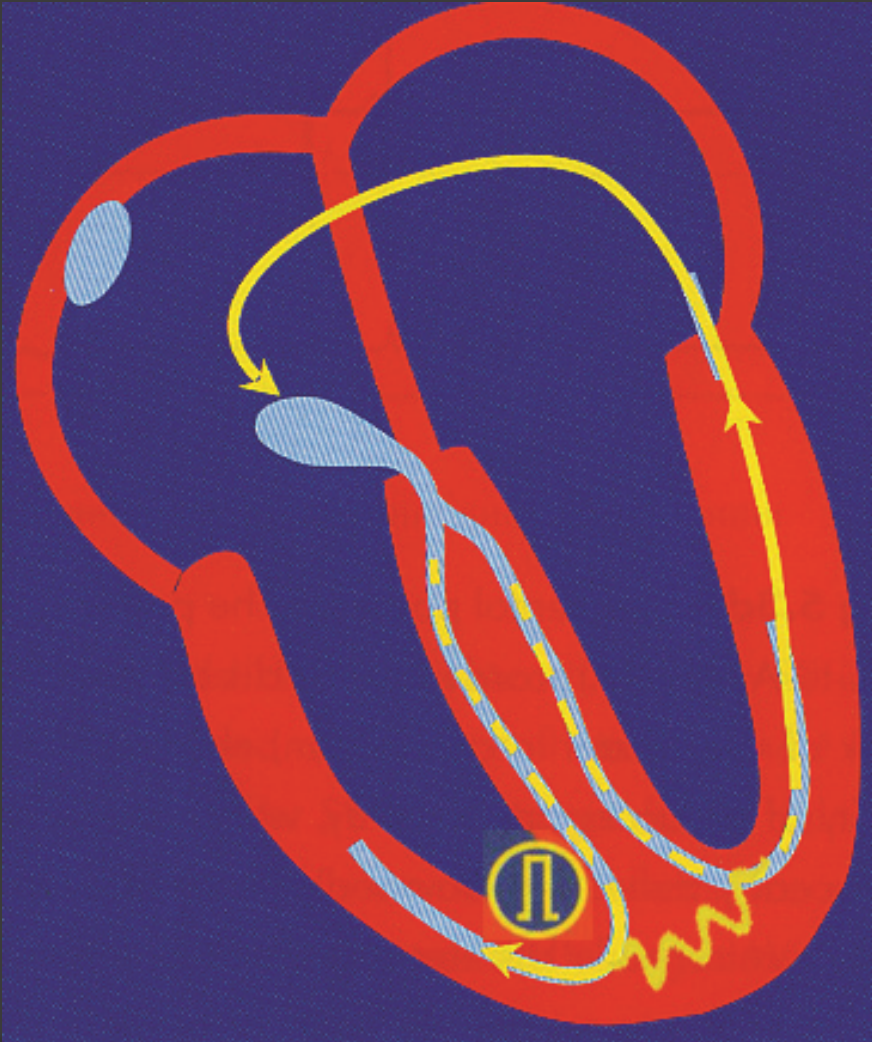
Entrainment AVNRT - PPI



Entrainment ORT (RAP)- PPI



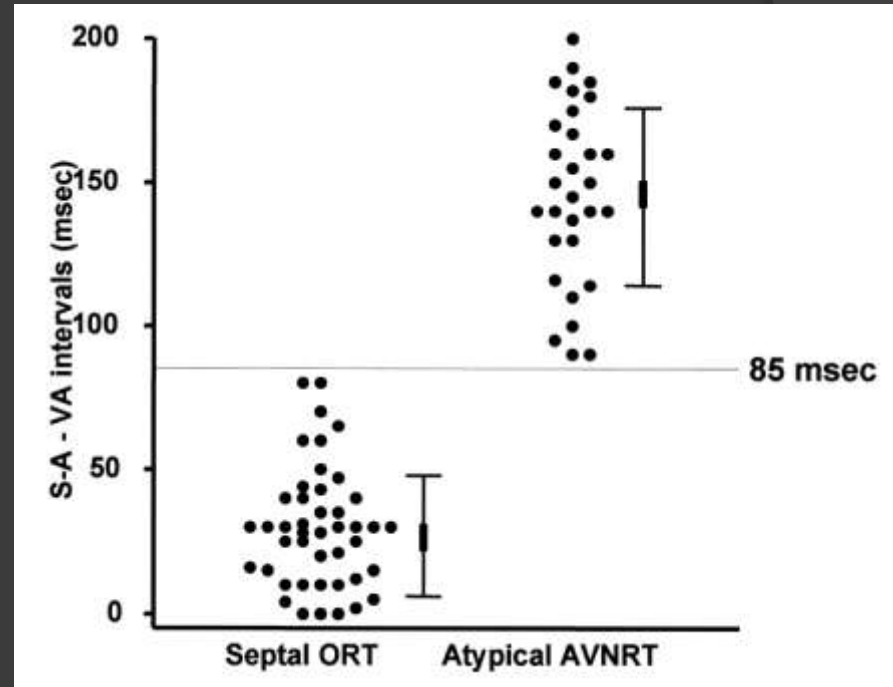
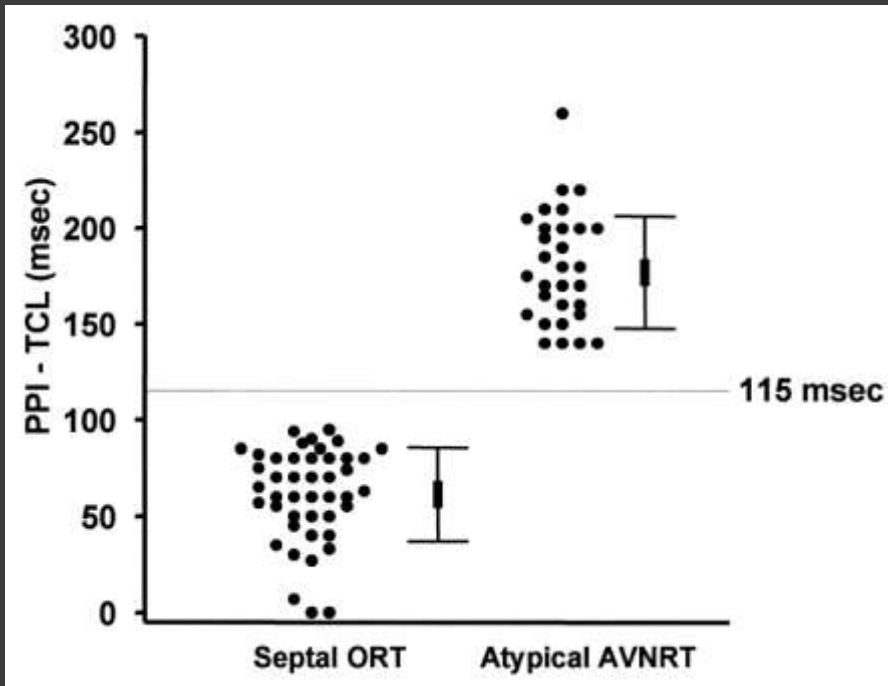
Entrainment ORT (LLAP) - PPI



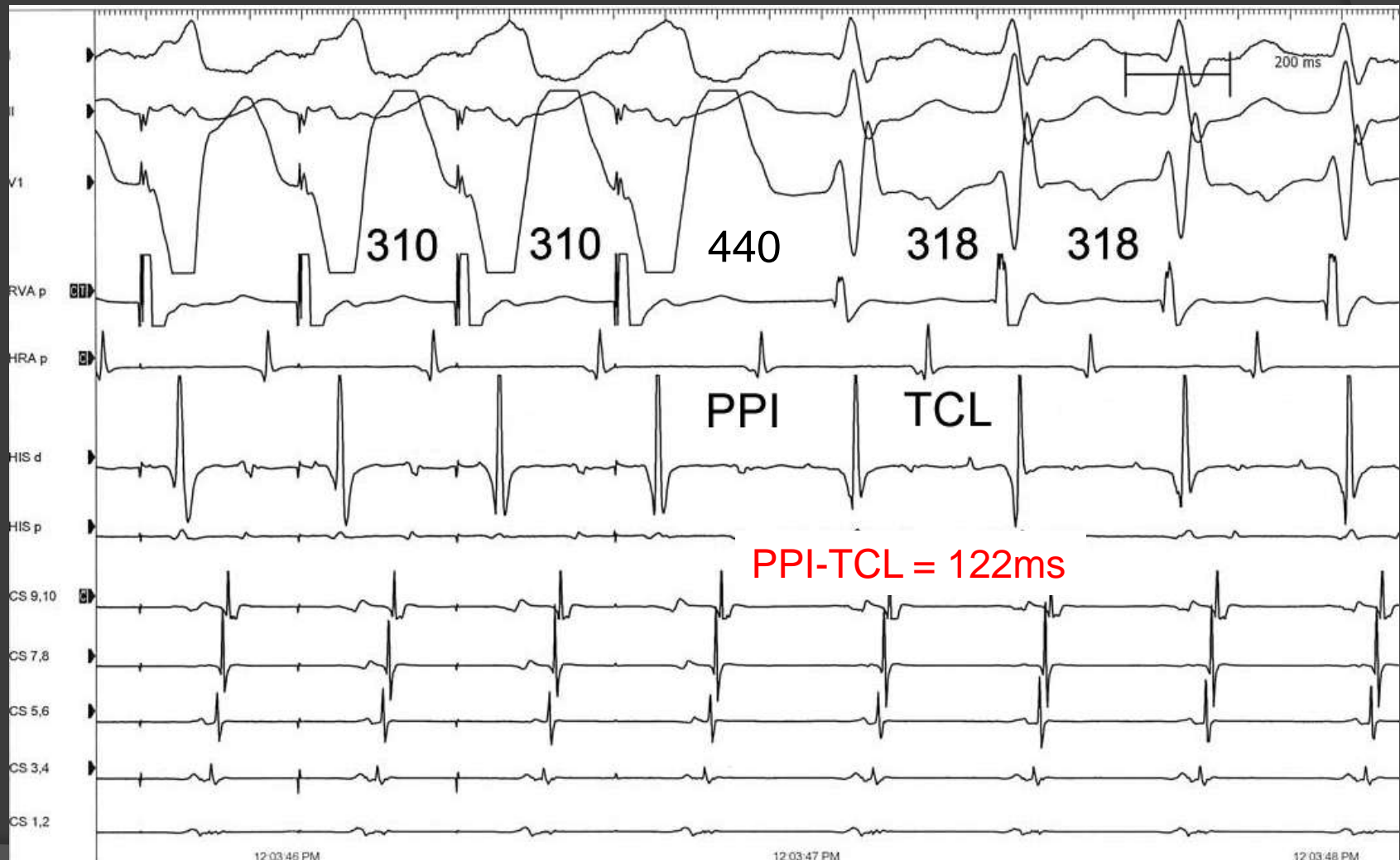
PPI during entrainment of SVT

- PPI values based on Michaud et al.'s paper for:
- discriminating **atypical AVNRT** from **ORT using a septal accessory pathway**
- **PPI-TCL >115ms = atypical AVNRT**
- **SA-VA <85ms = ORT c septal AP**

Michaud et al.



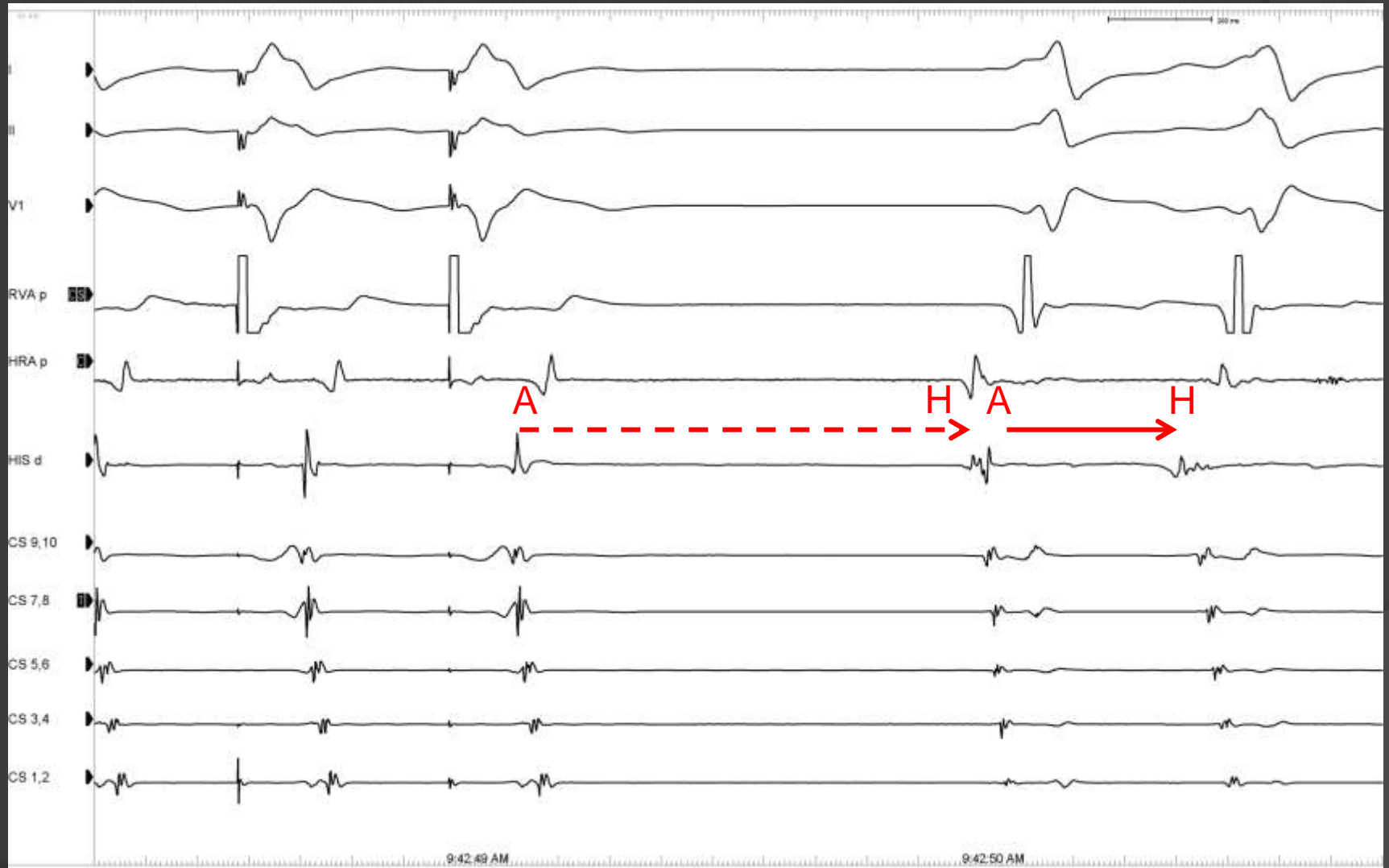
PPI during entrainment of ORT with left lateral pathway



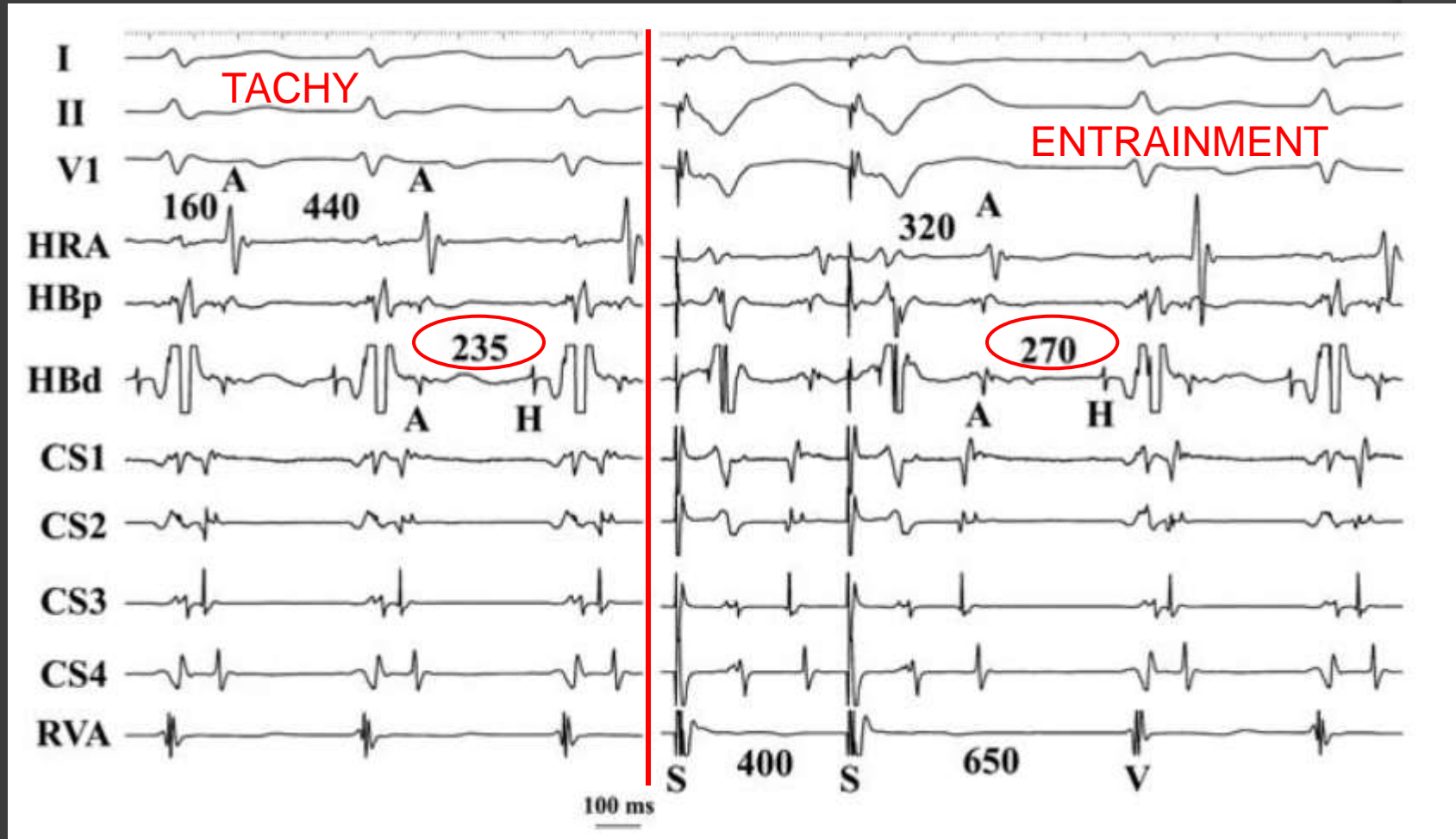
Entrainment of SVT from RVA

- ◎ If retrograde conduction is eccentric:
 - Use response to entrainment (eg. VAV, VAAV), not absolute PPI values
 - In other words, the PPI will be long with ORT using left lateral pathways

Pitfall....



How do you overcome AH decrement?

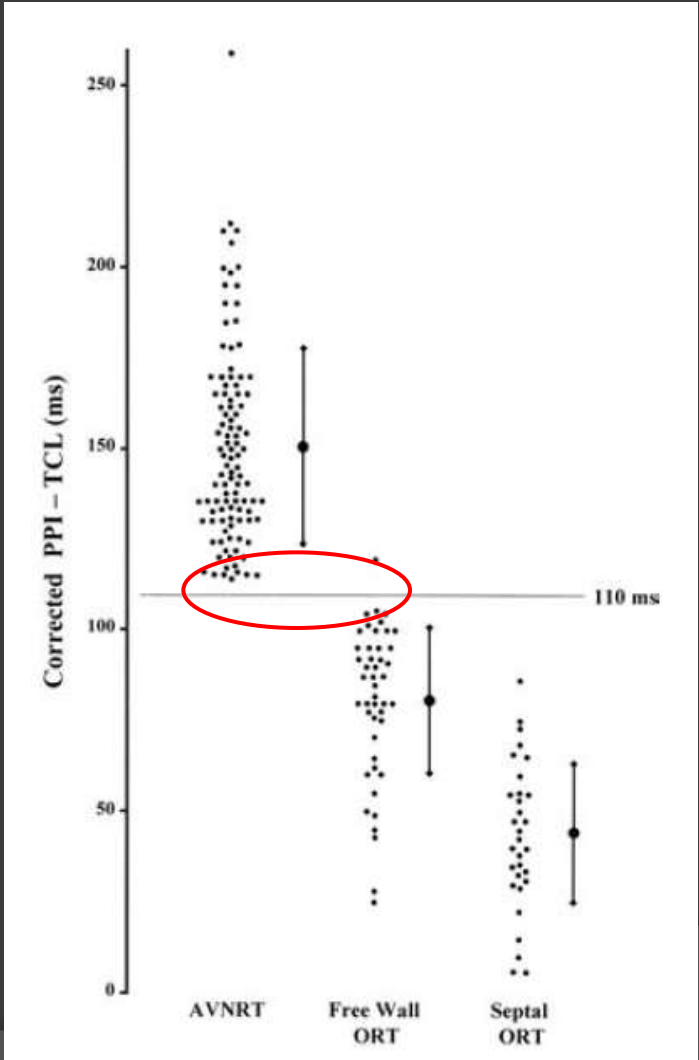


González-Torrecilla E et al. First postpacing interval after tachycardia entrainment with correction for atrioventricular node delay: A simple maneuver for differential diagnosis of atrioventricular nodal reentrant tachycardias versus orthodromic reciprocating tachycardias. *Heart Rhythm* 2006;3:674-679

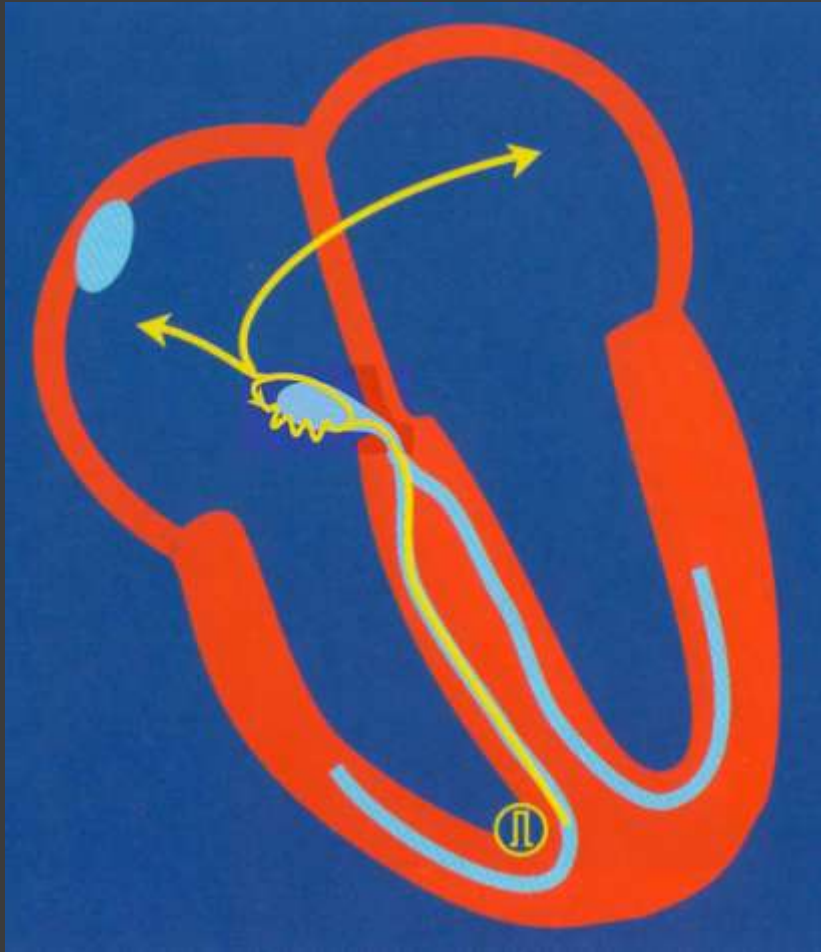
Corrected PPI-TCL

- ⦿ corrected PPI-TCL interval:
- ⦿ $\text{PPI} - \text{TCL} - (\text{AHe} - \text{Aht}) = \text{cPPI-TCL}$
- ⦿ $650 - 440 - (270 - 235) = 175\text{ms}$

cPPI-TCL.....pitfall



How do you overcome absolute PPI values?

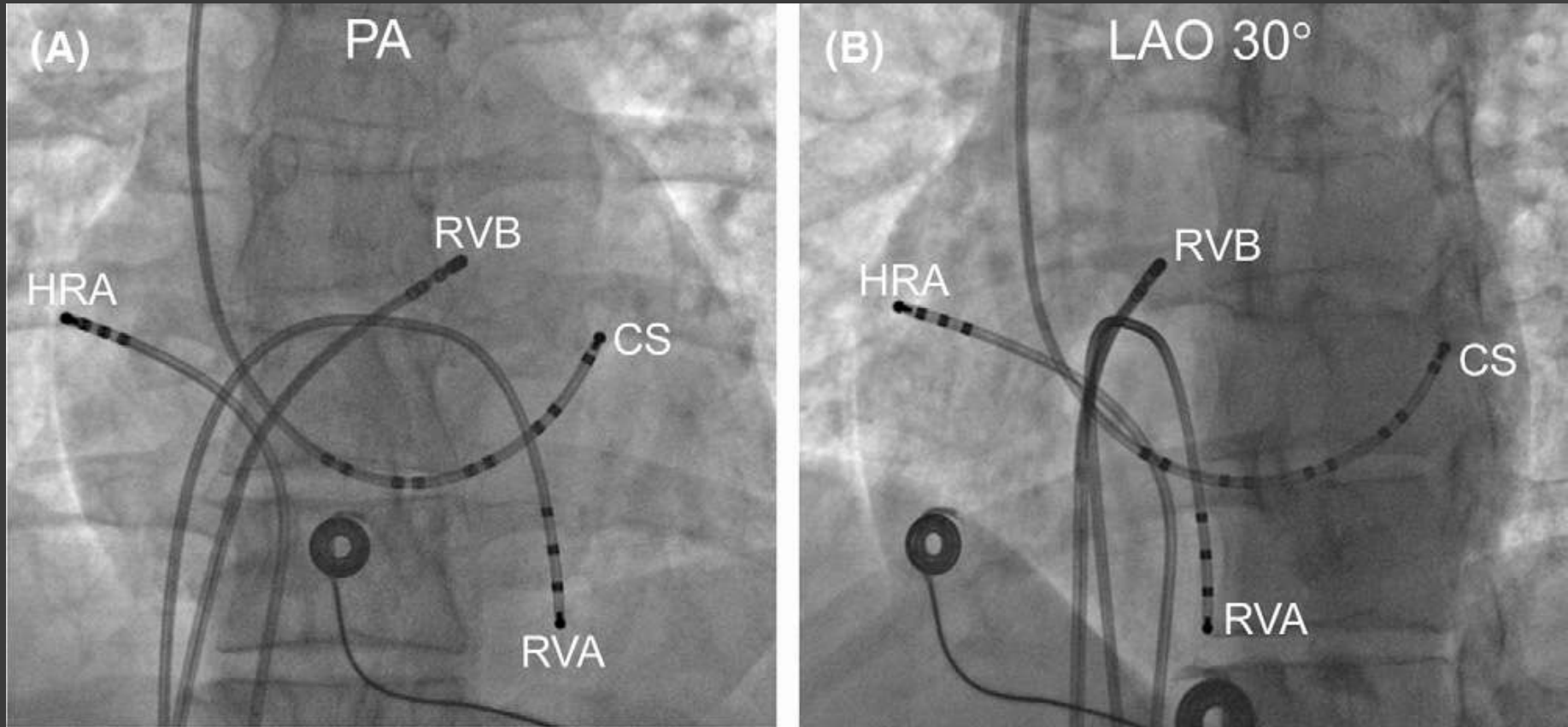


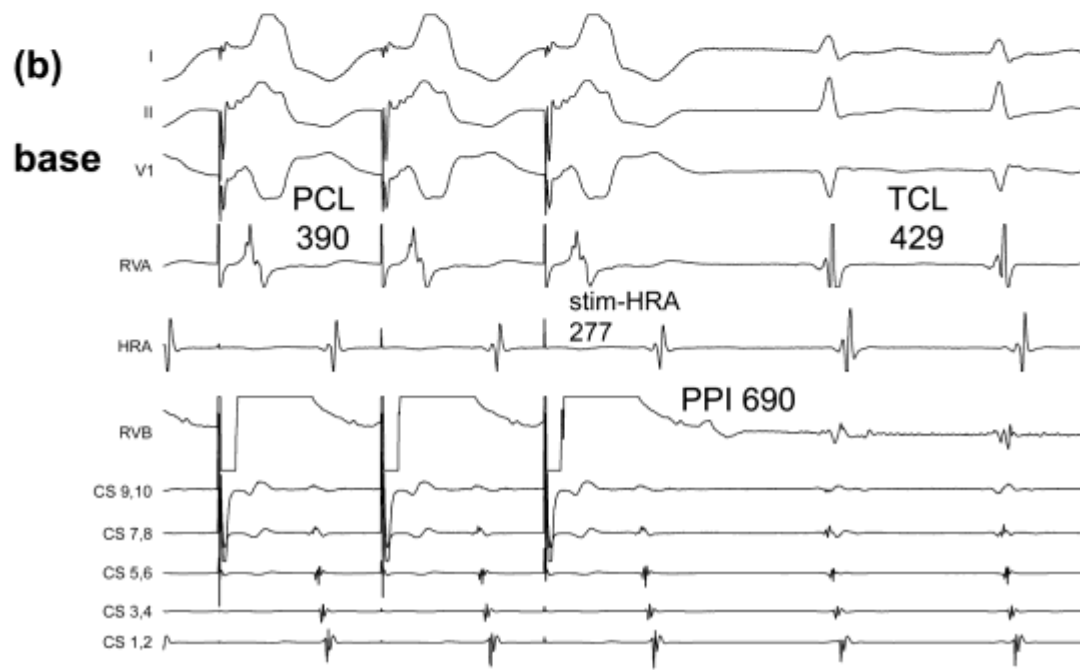
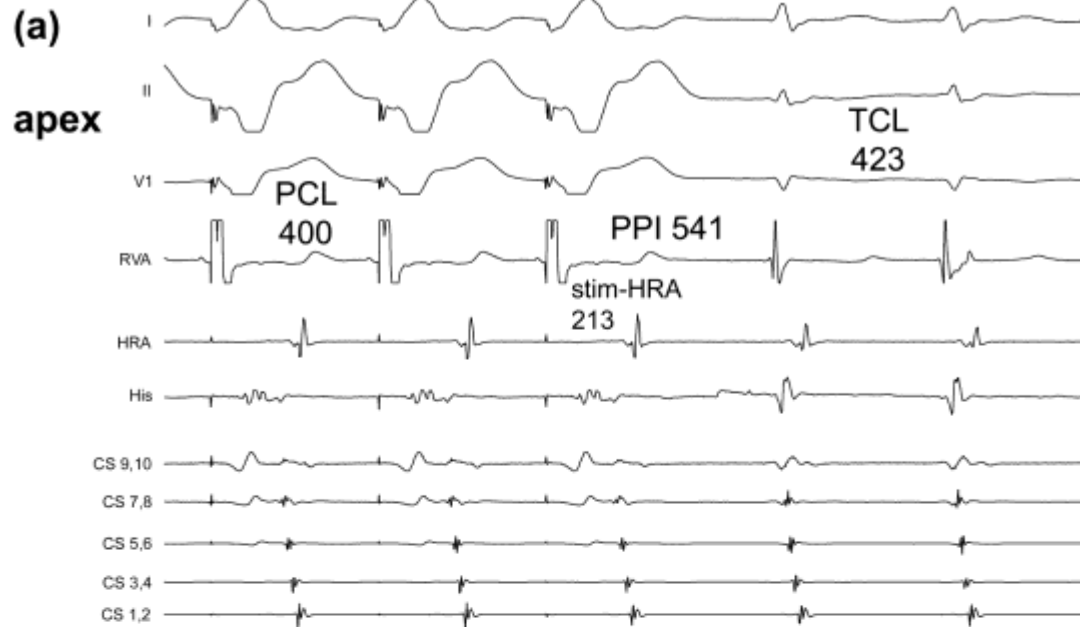
Apex



Base

Differential entrainment SVT

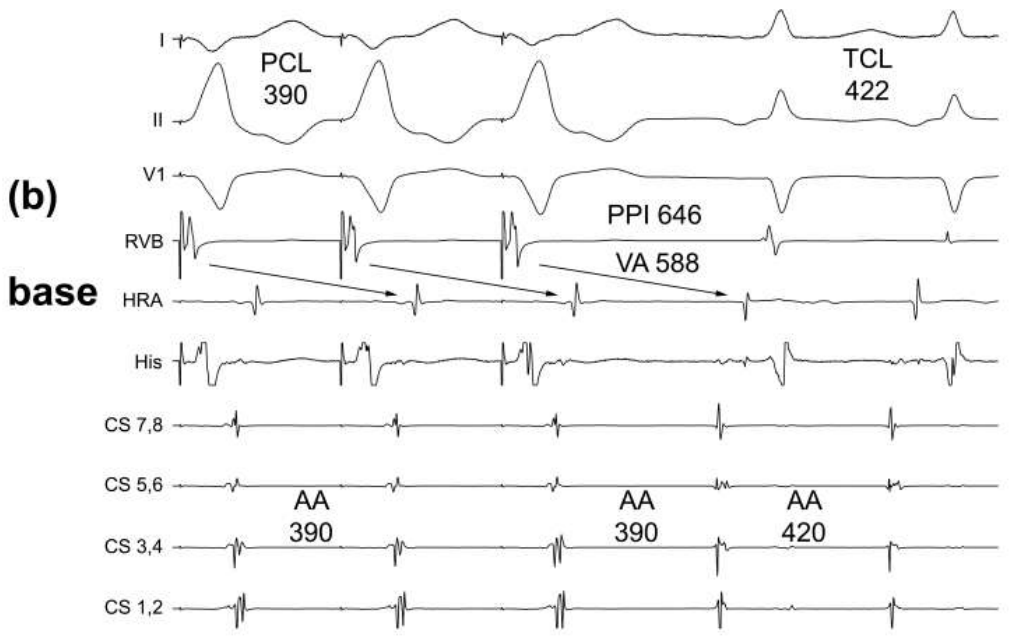
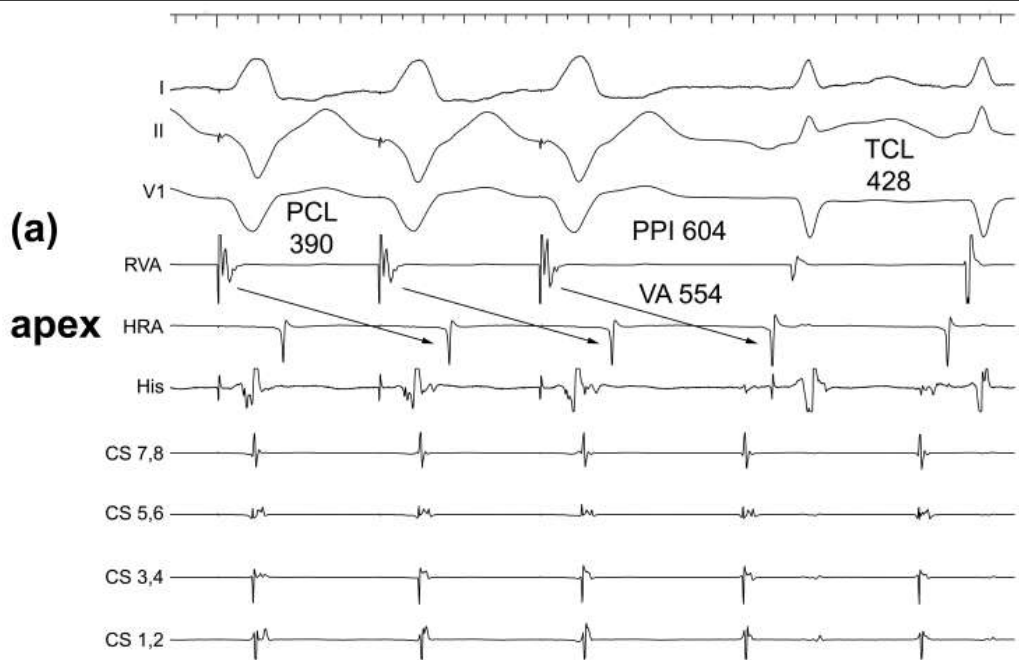




Differential
entrainment
– AVNRT

Diff cPPI-TCL =
43ms

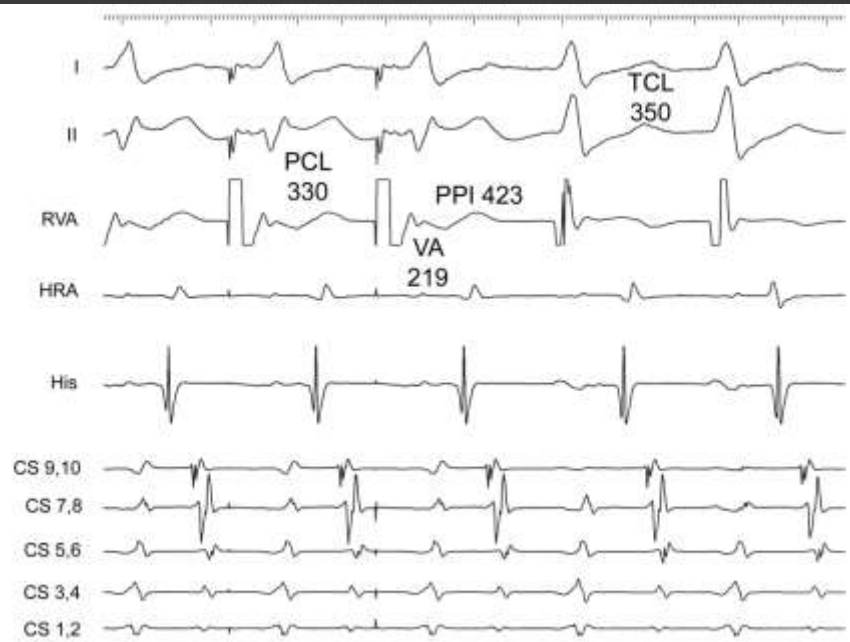
Diff VA time =
64ms



Differential
entrainment
- atypical
AVNRT

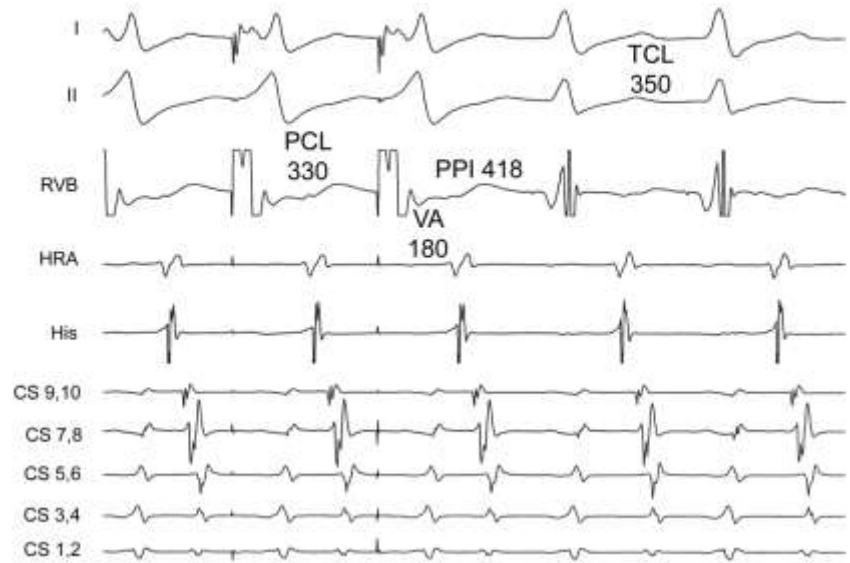
Diff cPPI-TCL =
42ms

Diff VA time =
34ms



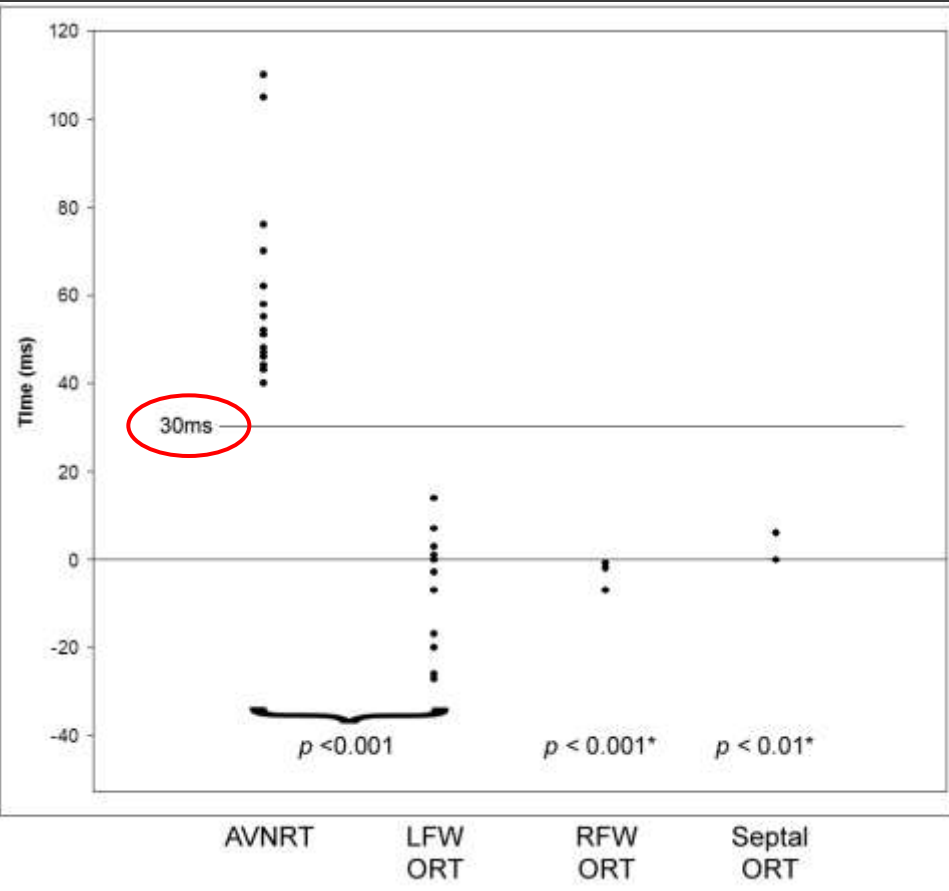
Differential
entrainment –
ORT (RFW AP)

Diff cPPI-TCL =
-5ms

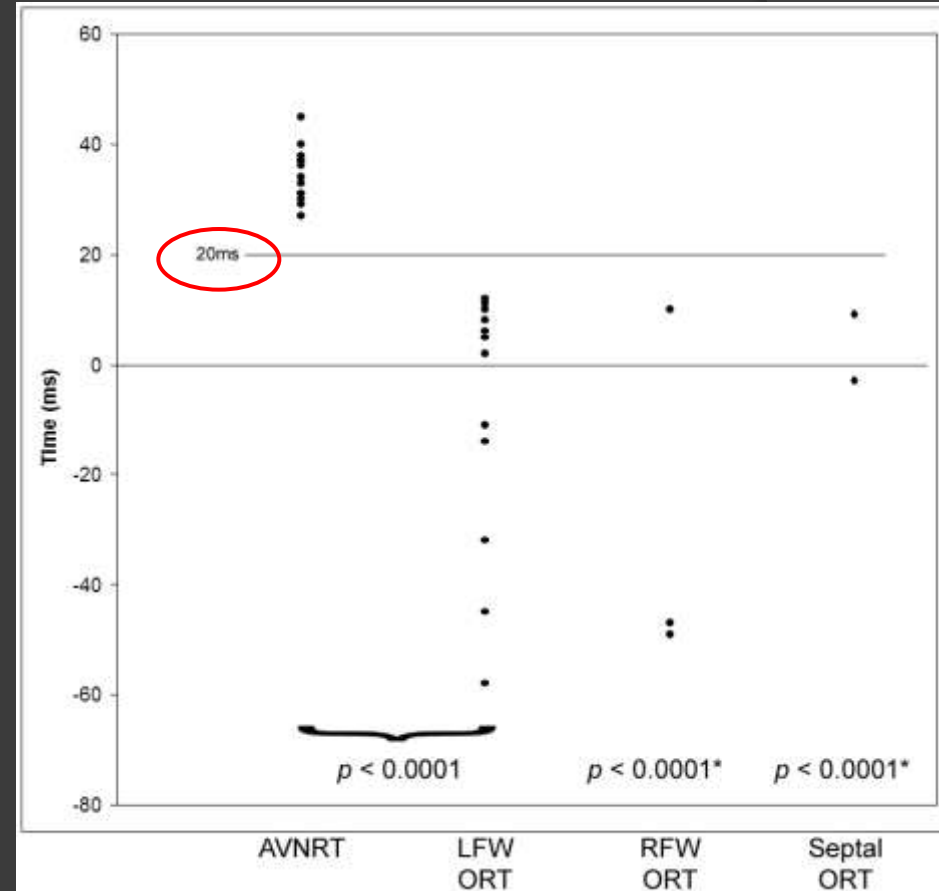


Diff VA time =
-39ms

Diff entrainment

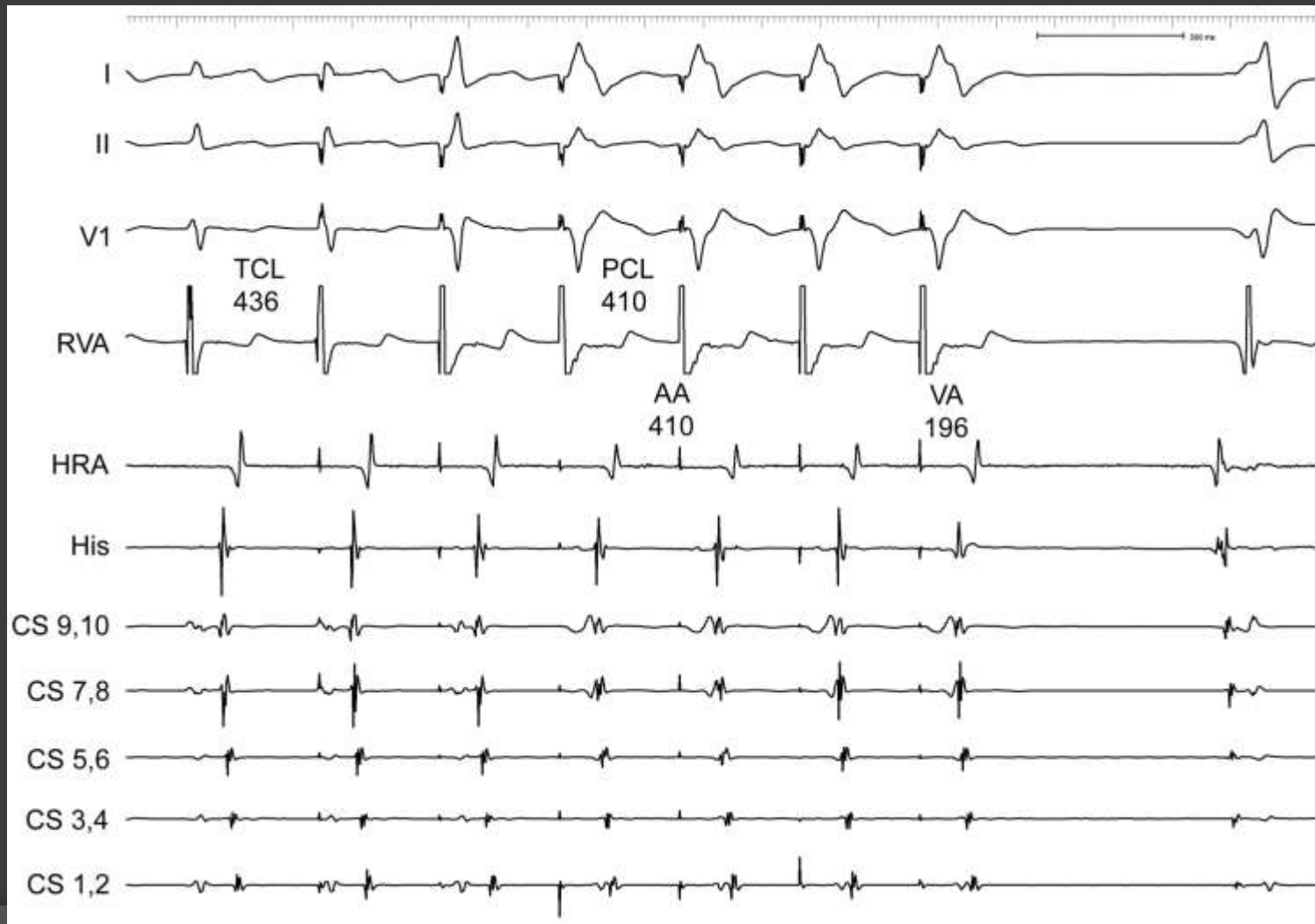


Diff cPPI-TCL

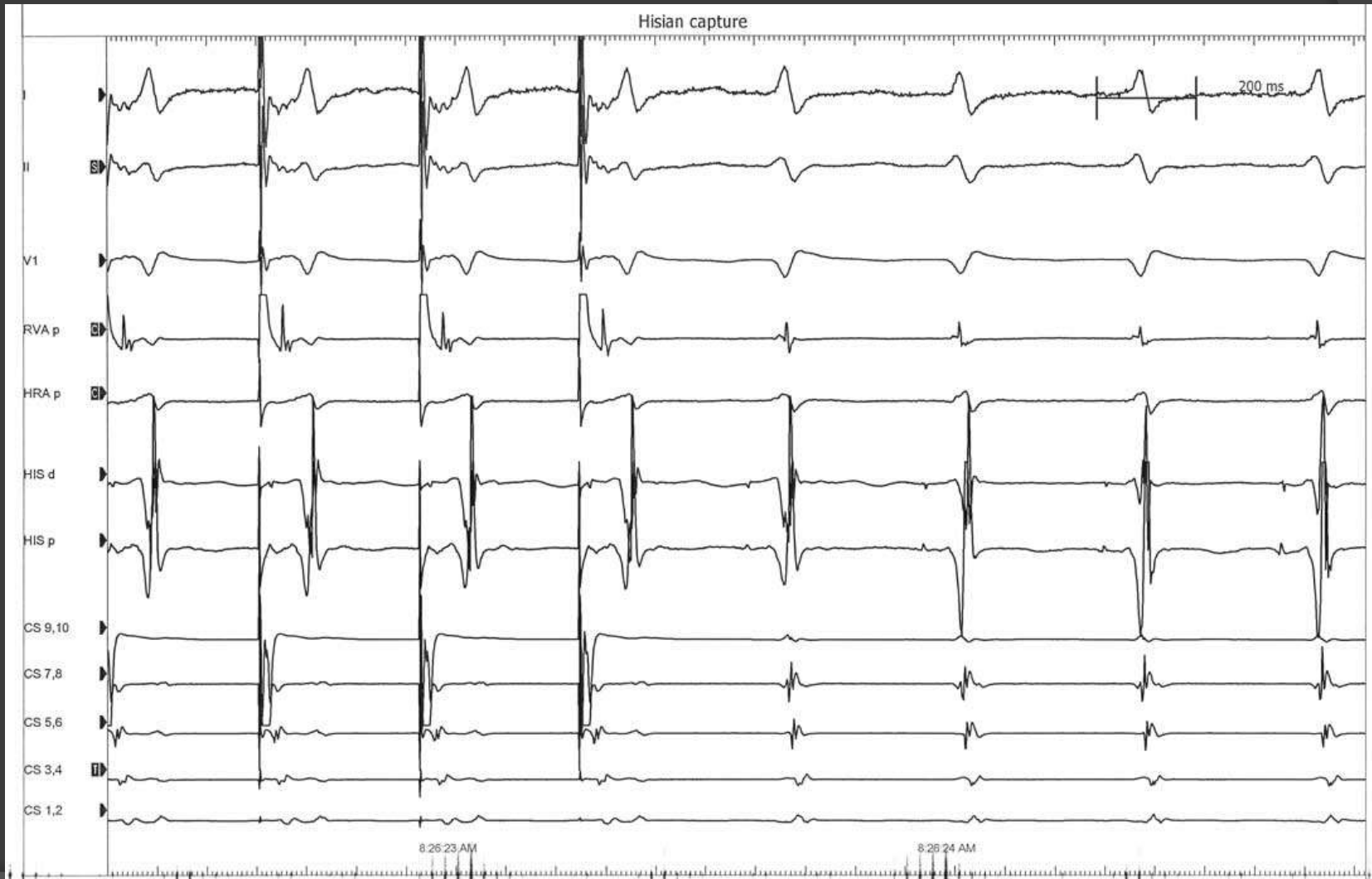


Diff VA time

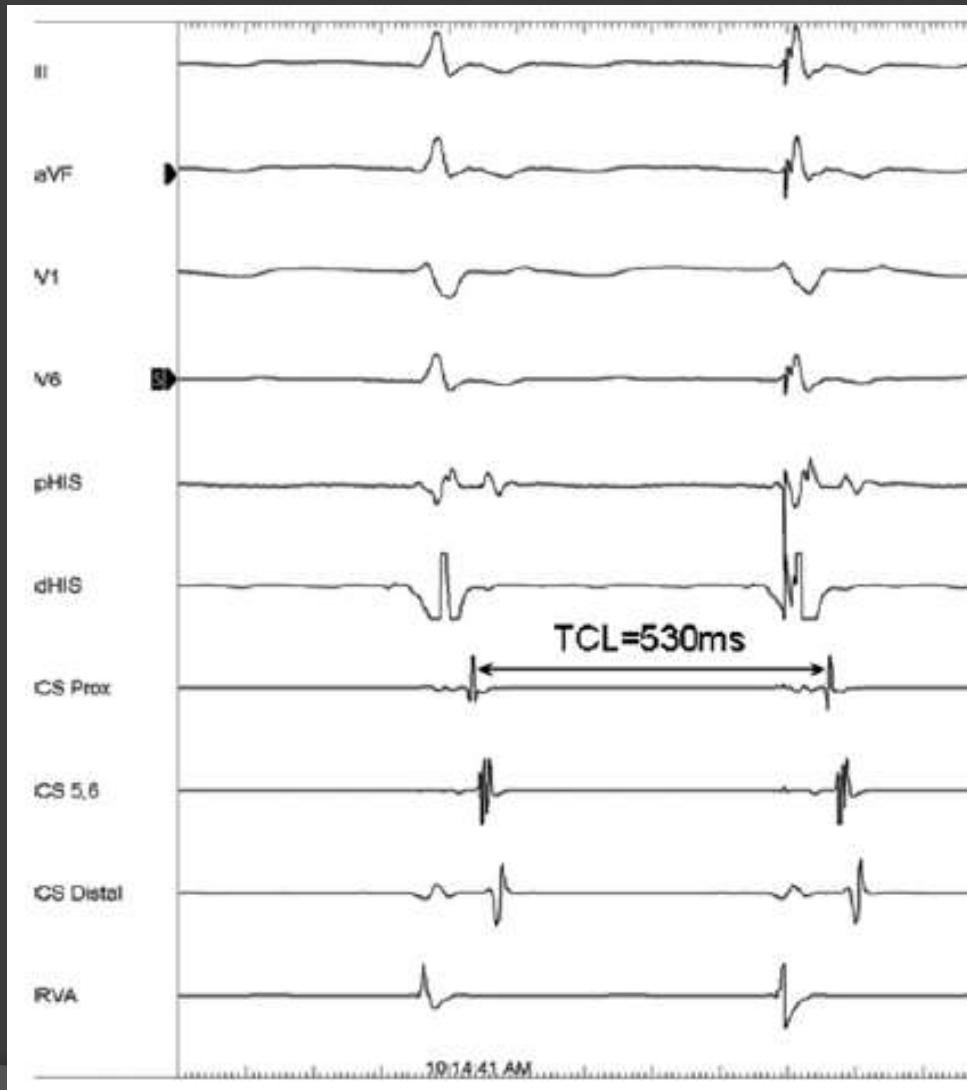
Pearl..... (VA time)



Pitfall..... (Hisian capture)



Example



Narrow complex tachycardia

VA = 80ms

Palps since 6 yo

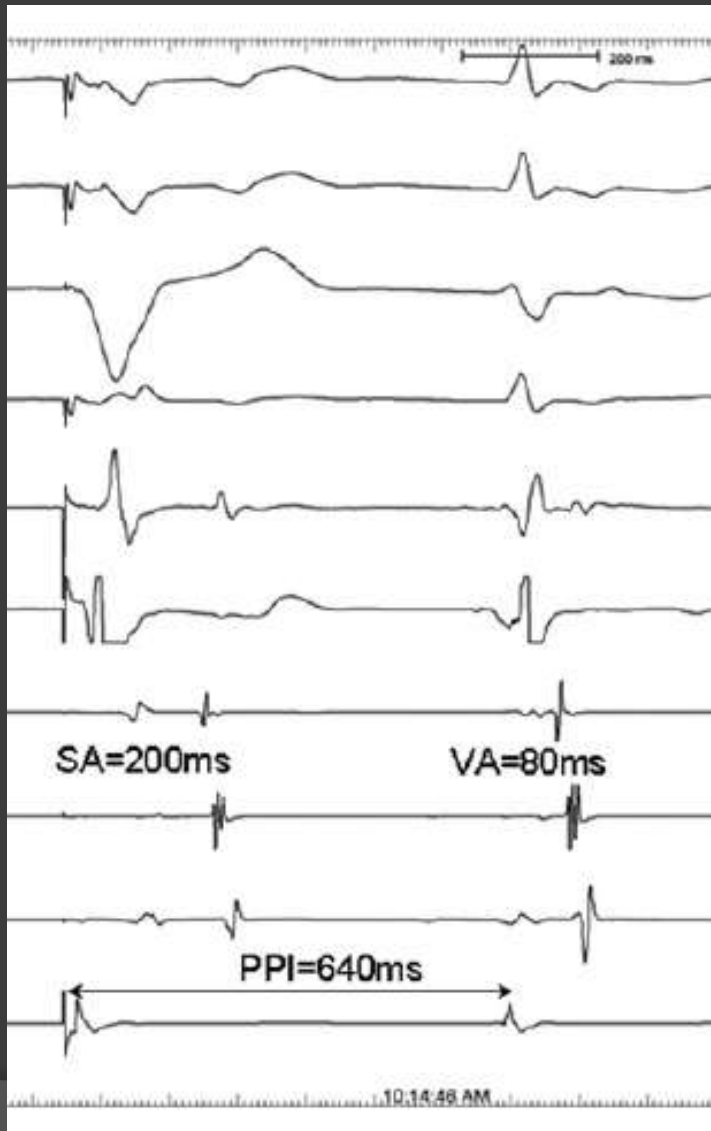
No AH jump

Tachy easily induced with any V stimulation

Site of earliest atrial activation
pCS

= ORT using a posteroseptal
AP?

Entrain RVA



VAHV response

PPI = 640ms

PPI-TCL = 110ms

cPPI-TCL = 120ms

? diagnosis

Basal RV entrainment



PPI-TCL =
190ms

cPPI-TCL=
190ms

Diff PPI-TCL =
70ms

which is >30ms

Diff VA = 40ms

which is >20ms

Diagnosis = AVNRT!

Beware.....

- ⦿ Entrainment with concealed fusion can mimic failure to capture
- ⦿ Pacing isorhythmic to SVT can mimic constant fusion
- ⦿ High output pacing at the RV base can capture the His bundle
- ⦿ Pseudo VAAV response with long RP tachys



Thank You



Para-Hisian pacing

