

Diagnostic techniques in electrophysiology

Cardiology continuing education,
2004

- # Electrophysiological study
 - Indications
 - Techniques
 - Conduction system study
 - SVT/VT study
- # Pharmacological tests in EP
- # Tilt table test/ CSM

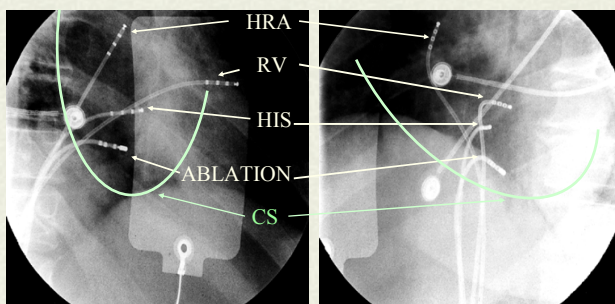
Electrophysiological study

Too long and complicated
to enjoy it?!

Electrophysiological study - indications

- Guidelines - 1995 (hopelessly old...)
- # Diagnoses
 - Syncope of unknown origin, SCD
 - Palpitations
 - # Risk stratification
 - CAD, EF<40%, NSVT on Holter
 - Brugada syndrome
 - WPW
 - # Therapy (RFA)
 - documented arrhythmia

Electrophysiological study - catheters



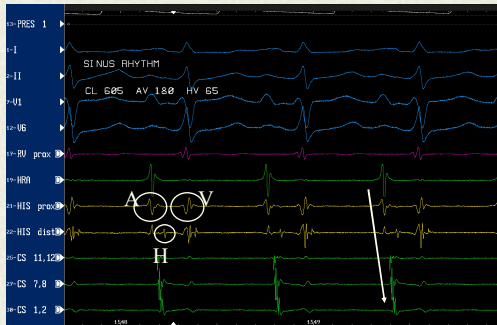
RAO

LAO

Electrophysiological study - protocol

- # Endocardial recordings during NSR, arrhythmia and pacing maneuvers
- # Conduction system study
- # SVT/VT induction by atrial/ventricular pacing & premature stimulation
- # Pharmacological tests
- # Mapping maneuvers

Electrophysiological study - - endocardial tracings



Conduction system (1)

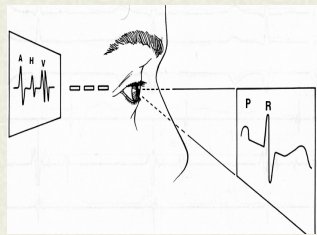
⚡ Sinus node dysfunction:

- SNRT (>1400 msec)
- CSNRT (> 500 msec)
- SACT
- SNERP

Conduction system (2)

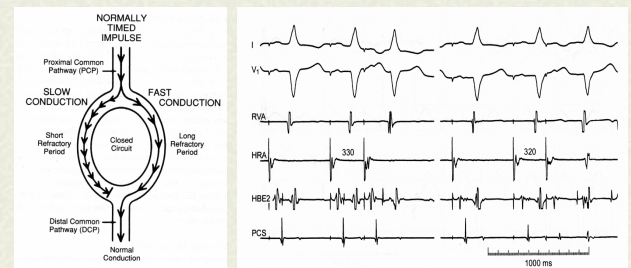
⚡ AV node dysfunction

- AH interval
- **Wenckebach: >500 msec**
- Dual nodal physiology



Conduction system (3)

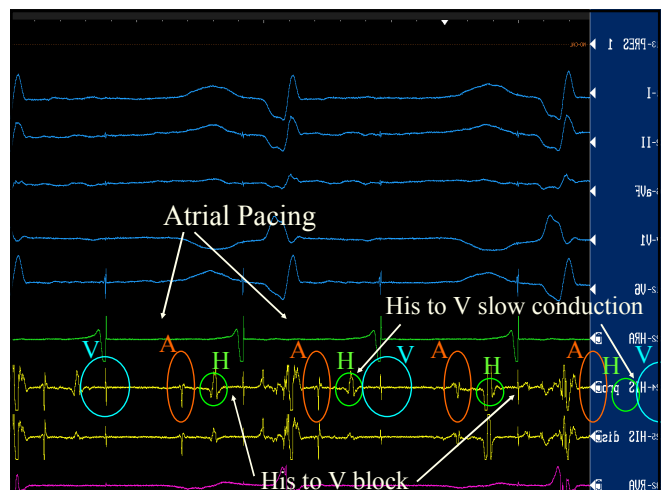
Dual nodal physiology



Conduction system (4)

⚡ His-Purkinje disease

- BB block
- HV prolongation (>70 msec)
- Infrahisian block

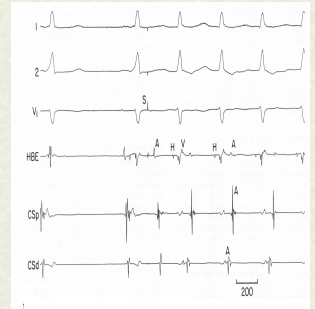


SVT/VT study

- ▣ Tachycardia initiation
- ▣ Mechanism determination
- ▣ Focus/circuit mapping
- ▣ RF Ablation

Tachycardia initiation

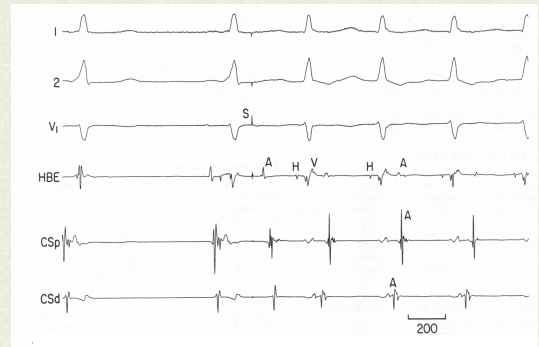
- ▣ Atrial/ventricular pacing
- ▣ Atrial/ventricular premature stimulation
- ▣ Isoproterenol infusion



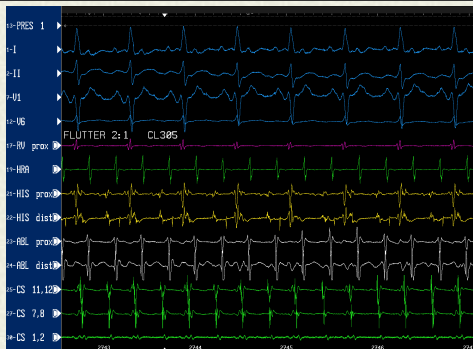
Mechanism determination

- ▣ Initiation pattern
- ▣ Atrioventricular relationship
 - 1:1 conduction
 - VA interval
- ▣ Earliest activation
- ▣ Activation sequence
- ▣ Pacing maneuvers
- ▣ Termination pattern

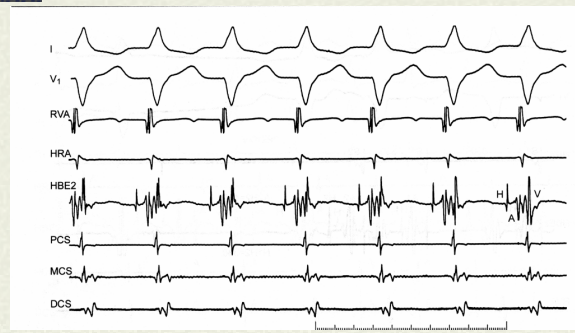
Tachycardia initiation with APC



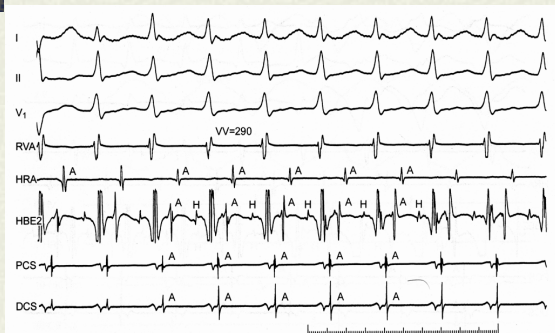
VA relationship



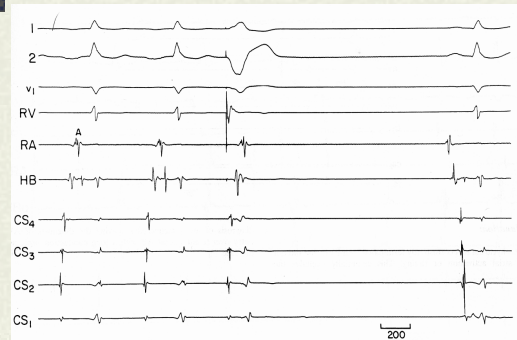
VA interval & earliest activation (1)



VA interval & earliest activation (2)



Pacing maneuvers



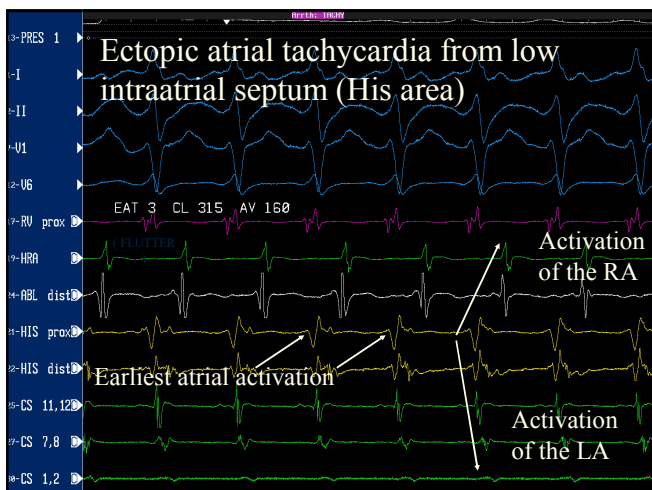
SVT termination with P



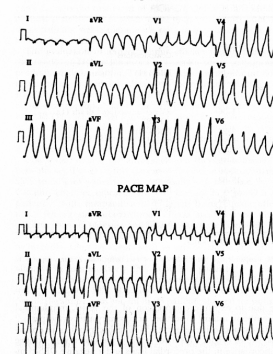
Tachycardia mapping

- Earliest activation
- Pace mapping
- Mapping of complex anatomical substrate:
 - multipolar catheters
 - entrainment
 - 3D mapping systems

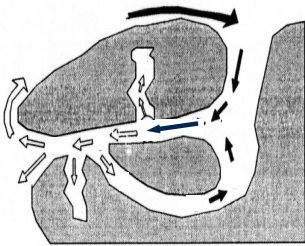
Ectopic atrial tachycardia from low intraatrial septum (His area)



Pace mapping

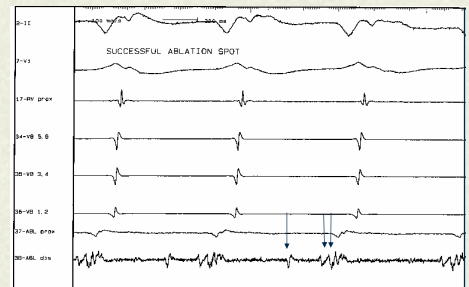
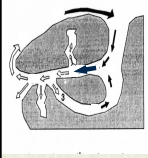


Scar-related arrhythmia



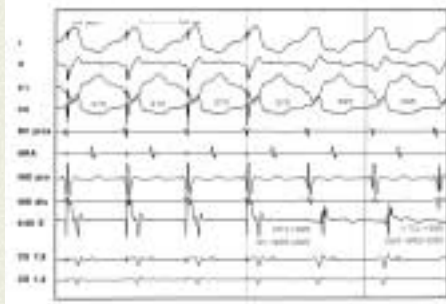
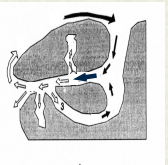
- Complexity of substrate
- Multiple potential circuits
- Multiple/changing tachycardia

Slow conduction zone

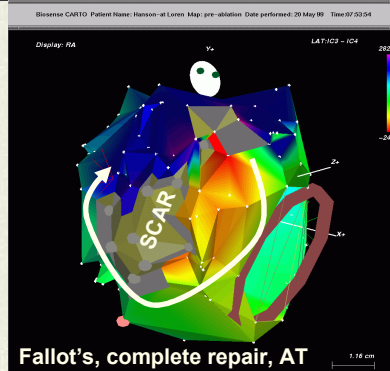


↓ Mid-diastolic potential ↓↓ Fractionated potential

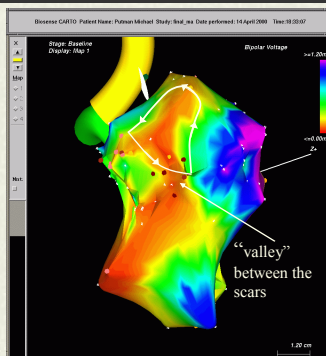
Entrainment of arrhythmia circuit



“Carto” activation map



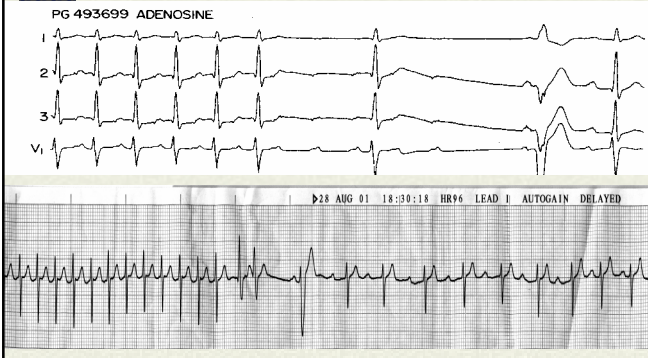
“Carto” voltage map



Pharmacological tests in EP (1)

- Adenosine in sinus :
 - dual AV node physiology
 - preexcitation (WPW)
 - Afib
 - AV node disease
- Adenosine during SVT:
 - dif diagnosis

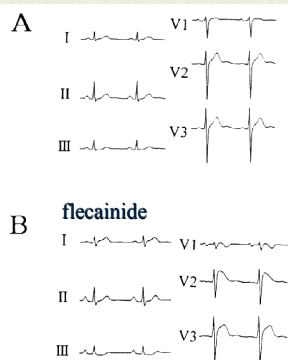
Adenosine during SVT



Pharmacological tests in EP (2)

- Procainamide:
 - His-Purkinje “stress test”
- Flecainide:
 - Brugada “stress test”
- Isoproterenol:
 - catecholamine’s sensitive arrhythmia

Flecainide for Brugada



Tilt test for syncope



- Diagnosis of VV syncope
- CSM in up-right position
- Tilt training

