Mesa redonda: Ablação de Flutter atrial atípico

Estratégias de mapeamento e ablação

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AT mapping and ablation

• Mechanism, incidence and relationship to type of intervention (surgery/previous ablation) or substrate

• Surface ECG can help to recognize of AT origin

• Systematic approach to Entrainment/activation mapping and ablation of AT
Attempt of classification of atrial arrhythmias

Type

- Atrial arrhythmias with completely dysorganized electrical activity
- Partially organized atrial arrhythmias, but with unstable activation wavefront(s)
- Well organized atrial arrhythmias with stable CL or minimal variations (<30 ms) of the CL
Approach to AT ablation
(mechanism/origin)

1. **Examine P wave ECG**
2. Examine intracardiac activation (distal to prox CS) and decide on whether activation or entrainment mapping
   (prefer RA/LA activation map: AT changing with ET or ET faster)
3. Entrain to from >2 sites to determine if macroreentrant or focal reentry
   - from CT isthmus (RA flutter)
   - from proximal and distal CS
     - if both, MA flutter or figure 8 ipsilateral PVs
     - if proximal but not distal – ipsilateral RPVs
     - if distal but not proximal – ipsilateral LPVs
   - from LA posterior roof between veins (+ CS response will confirm ipsilateral veins and/or figure 8)
Surface ECG – PV Atrial Tachy

P positive
- Precordial V1-V6
- Inferior leads

Narrow P wave
- Positive DI
- Neg/pos V1

Wider P wave
- Flat/neg DI
- Pos/Double hump V1
Surface ECG – Mitral AT

**Inferior axis**
- Negative DI
- Negative component in V2

**Superior axis**
- Positive DI
- Negative component in V3-V6
Modification of surface ECG pattern during CCW CTI dependent AFL after left atrial ablation
Approach to AT ablation (mechanism/origin)

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Electroanatomic approach for atypical AFL

• Complete electroanatomic activation mapping (high density map)
• Specific setting of the WOI
• Identification of the reentry course and the MDI
• Entrainment mapping not strictly necessary
• Ablation outcome predicted by the characteristics of the reentrant circuit

De Ponti et al. Europace 2007
EDC, 56y-o male, persistent AT, CABG previous, hypertension, diabetes
High density and activation mapping (multipolar catheter)
AA, 23y-o male, persist AT, CIA surgery, ICT + WPW ablation previous
Approach to AT ablation  
(mechanism/origin)

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   (prefer RA/LA activation map: AT changing with ET or ET faster)

3. Entrain to/from >2 sites to determine if macroreentrant or focal reentry
   
   from CT isthmus (RA flutter)
   
   from proximal and distal CS
   
   - if both, MA flutter or figure 8 ipsilateral PVs
   - if proximal but not distal – ipsilateral RPVs
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   from LA posterior roof between veins (+ CS response will confirm ipsilateral veins and/or figure 8)
Entrainment approach

RA FLUTTER

GOOD PPI
Entrainment approach
Entrainment approach

LPVs

GOOD PPI

GOOD PPI

TV

MV
Entrainment approach

MITRAL AT
OR
8 FIGURE

GOOD PPI
Entrainment approach

R or LPVs

8 FIGURE
Entrainment approach

MITRAL AT

TV

MV

GOOD PPI
Variable activation of coronary sinus – “bystander”
ENTRAINMENT

1) PPI-CFT=100ms
2) PPI-CFT=110ms
3) PPI-CFT=50ms
4) PPI-CFT=64ms
1) PPI-CFT=100ms
2) PPI-CFT=110ms
3) PPI-CFT=50ms
4) PPI-CFT=64ms
5) PPI-CFT=0ms

ENTRAINMENT
Double potential in roof and septal (functional block line)
Approach to AT ablation
(mechanism/origin)

1. Examine P wave ECG

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   from LA posterior roof between veins (+ CS response will confirm ipsilateral veins and/or figure 8)

4. Assessment of LA-PV conduction
Mechanism and incidence

- **PV electrical isolation (no Lines)**
  - AT incidence 4.9%
  - FOCAL: 87% (27 from PVs, 7 other LA sites)
  - Macreentrant: 13% (4 ipsilateral PVs)

Gerstenfeld et al. Circ 2004
Ouyang et al. Circ 2005
Karsh et al Circ 2005
Shah et al JCE 2006
Mechanism and incidence

- **Circumferential PV ablation (plus/minus lines)**
  - AT incidence 15.4%
  - FOCAL: 26.5% (7 from PVs, 13 around lines, 5 other LA sites)
  - Macrencestral: 73.5% (40 mitral annular, 29 around ipsilateral PVs)

Kottkamp et al. HR 2004
Pappone et al. Circ 2004
Chugh et al HR 2005
Deisendorf et al Europace 2006
LA-PV macroreentrant tachycardia after CPVA related to double conduction gaps

5.2% pts had LA AT
17% of them had LA-PV AT

Satomi et al. Heart Rhythm 2008
Localization of Gap in Ablation Line

Circumferential and lines approach

Voltage increasing during follow-up
Location of gaps and foci of post-ablation AT

SC, 56y-o male, persistent AT post-PVI ablation, normal heart

1st procedure (after PVI)

2nd procedure (Tachy mapping)
SC, 56y-o male, persistent AT post-PVI ablation, normal heart
SC, 56y-o male, persistent AT post-PVI ablation, normal heart
SC, 56y-o male, persistent AT post-PVI ablation, normal heart
DC, 72y-o female, recurrent AF/AT, enlarged LA

Low voltage
DC, 72y-o female, recurrent AF/AT, enlarged LA

Low voltage
DC, 72y-o female, recurrent AF/AT, enlarged LA

Low voltage
DC, 72y-o female, recurrent AF/AT, enlarged LA

Low voltage
DC, 72y-o female, recurrent AF/AT, enlarged LA
DC, 72y-o female, recurrent AF/AT, enlarged LA
RM, 64y-o male, recurrent AT, enlarged LA (54mm) hypertension, diabetes, SOAS, Obesity
RM, 64y-o male, recurrent AT, enlarged LA (54mm) hypertension, diabetes, SOAS, Obesity
RM, 64y-o male, recurrent AT, enlarged LA (54mm) hypertension, diabetes, SOAS, Obesity
Summary

• Atypical AFL ablation is variable and complex (some cases)

• Individualized approach is necessary by activation and entrainment mapping

• Effective ablation depend of find critical isthmus or focus of arrhythmia

• High density activation map coupled to voltage information help to define the substrate mainly in complex cases