ELECTRA & RHYTHM

18-21 MAY 2022

Arythmie ventriculaire du sommet

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Inserm

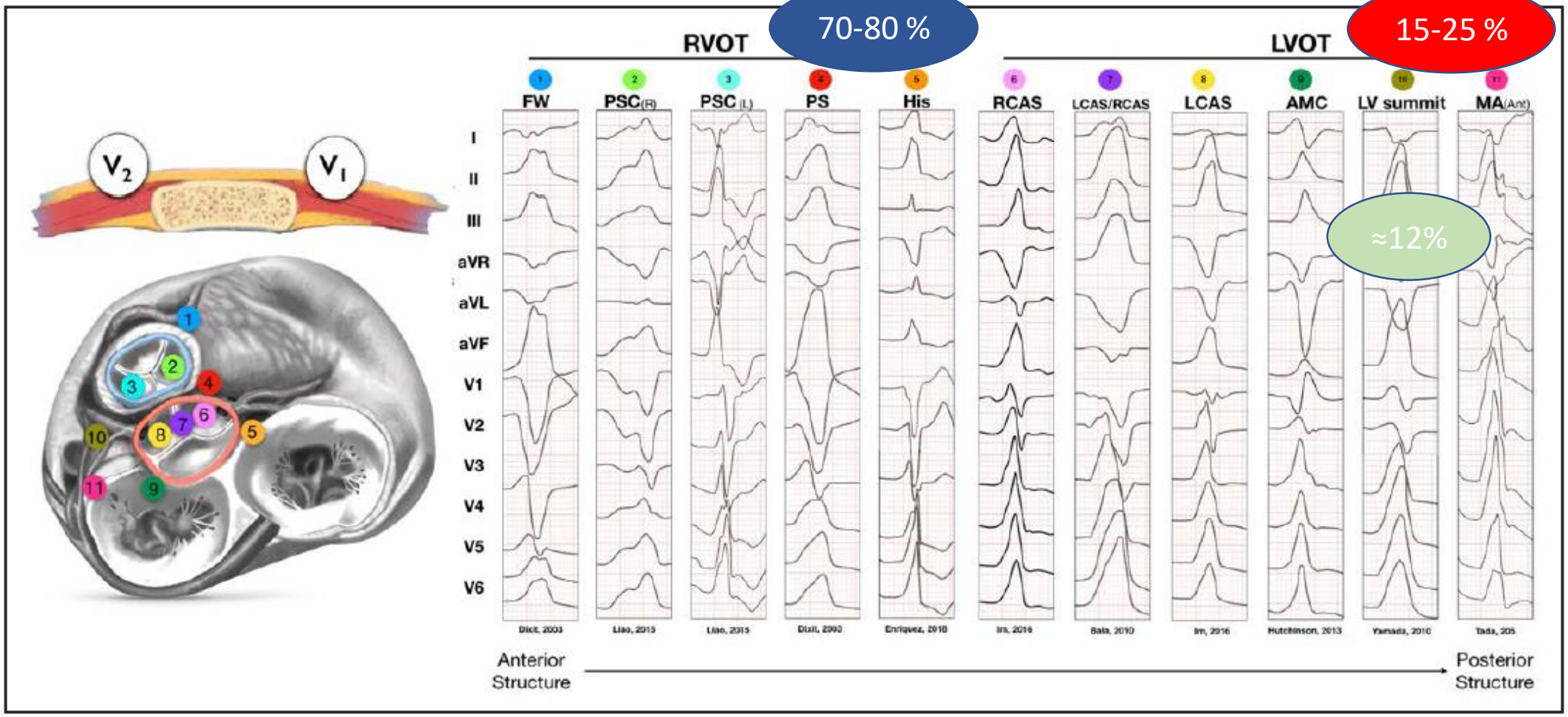
INSTITUT DE CARDIOLOGIE
Groupe Hospitalier Pitié-Salpêtrière

Hôpitaux Universitaires
Pitié Salpêtrière - Charles Foix

Liens d’intéret

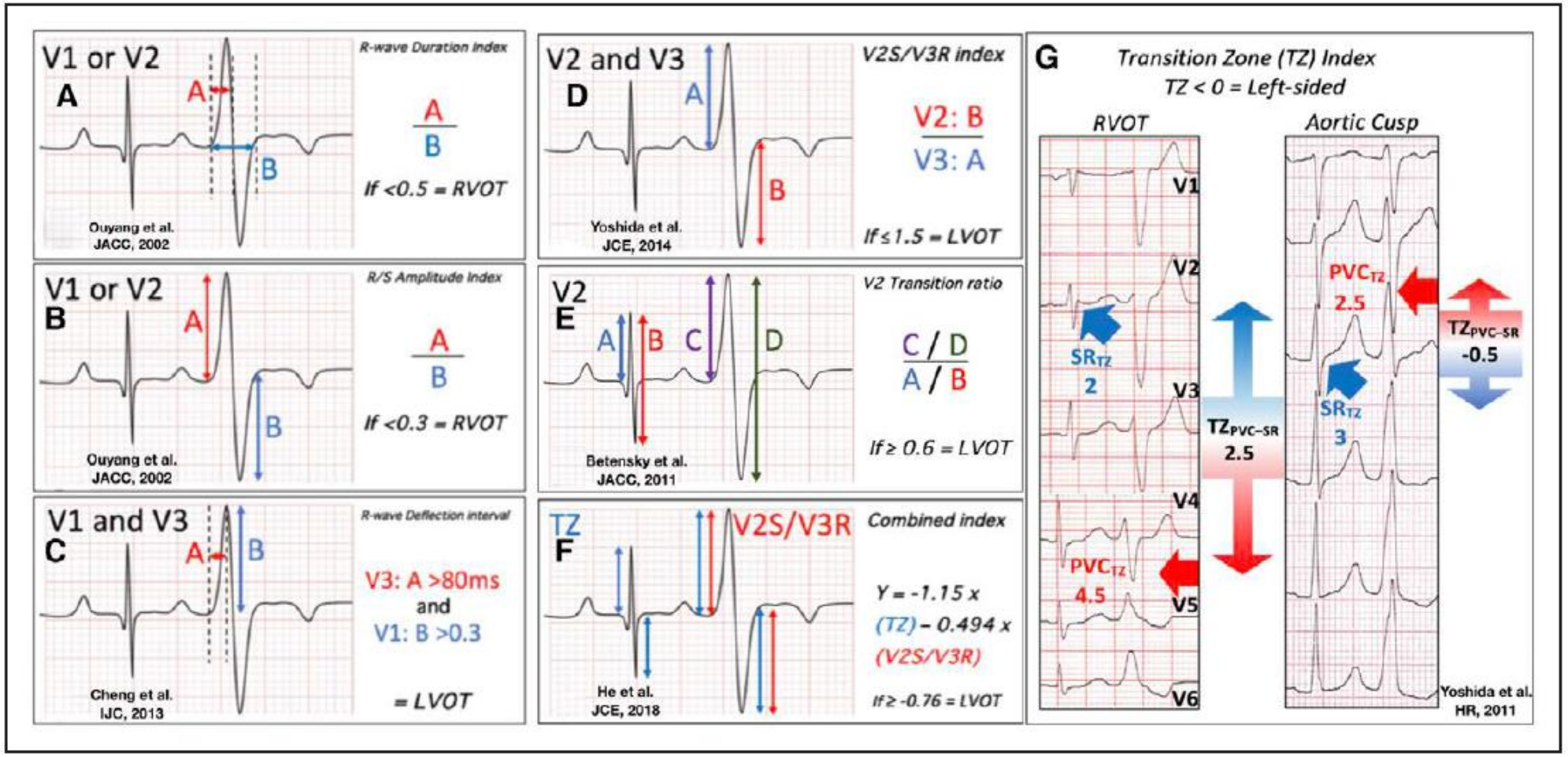
- Abbott
- Biosense Webster
- Medtronic
- Boston Scientific

TV/ESV idiopathiques



Anderson et al, Circ Arrhythm Electrophysiol 2019

TV/ESV idiopathiques : algorithmes ECG



Anderson et al, Circ Arrhythm Electrophysiol 2019

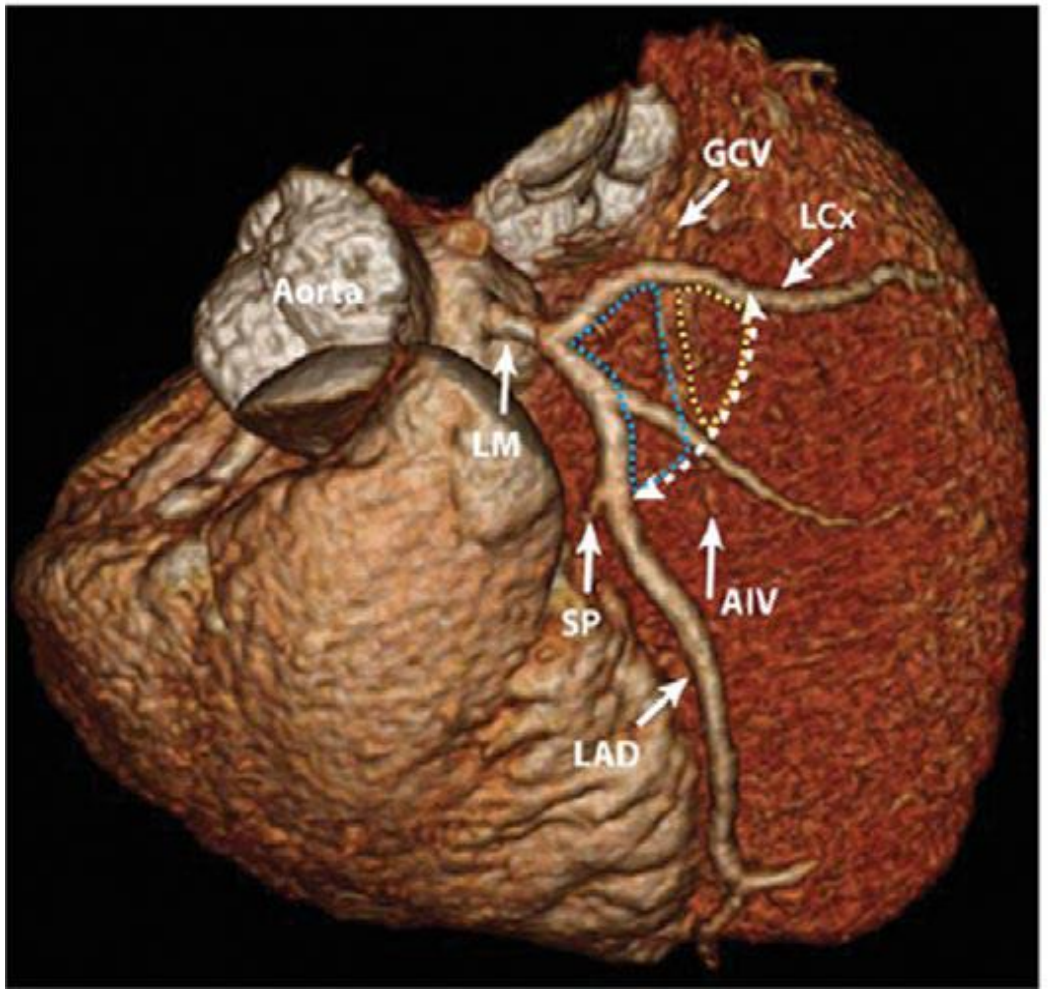
Sommet du VG

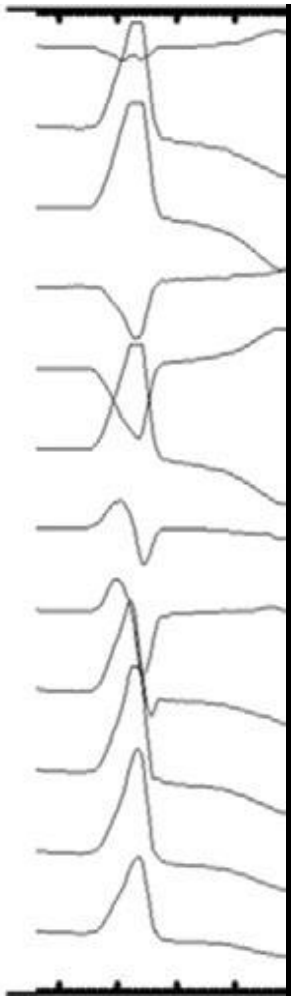
<u>Sites d'approche:</u>

- VG sous les cusps aortiques
- Sinus de Valsalva
- RVOT septal
- GVC et/ou Veine Ant. IV
- Abord épicardique direct
- LAA

<u>Limites:</u>

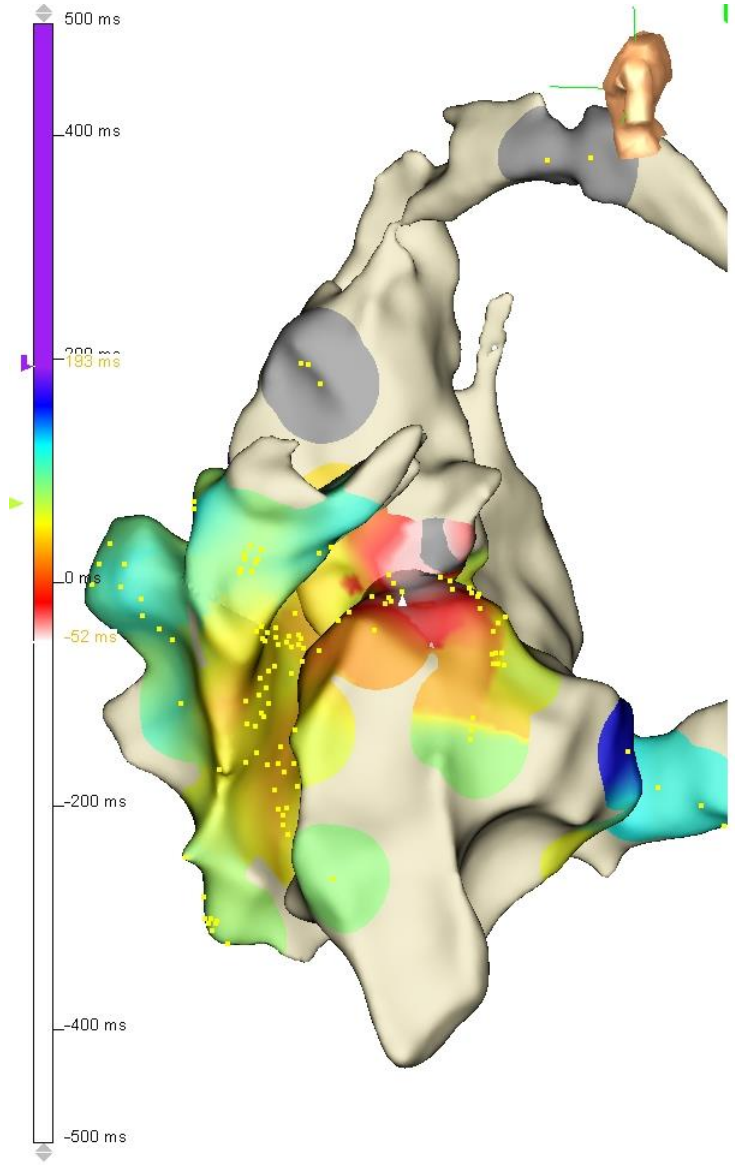
- **Proximité artères coronaires**
- **Graisse épicardique**

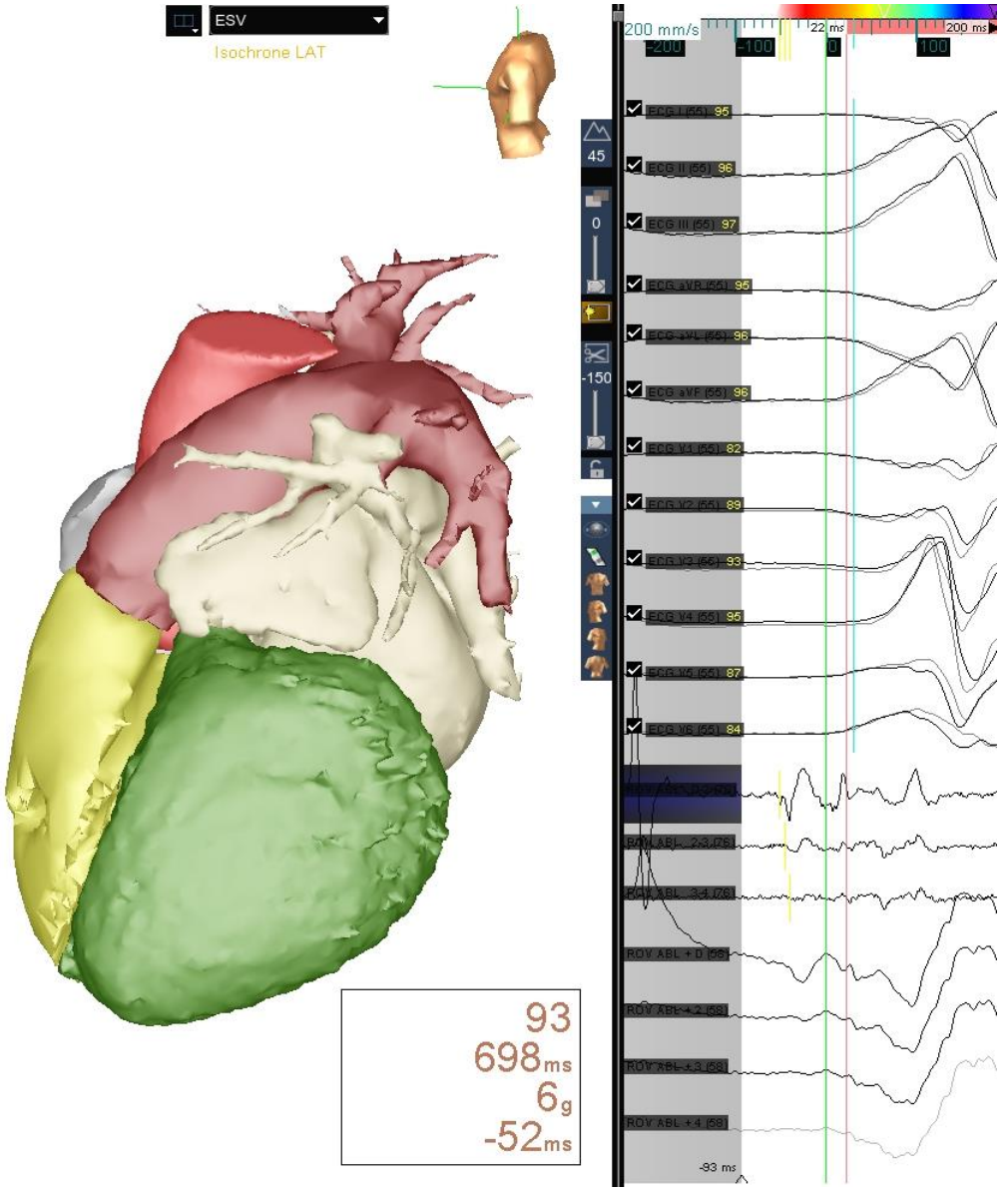




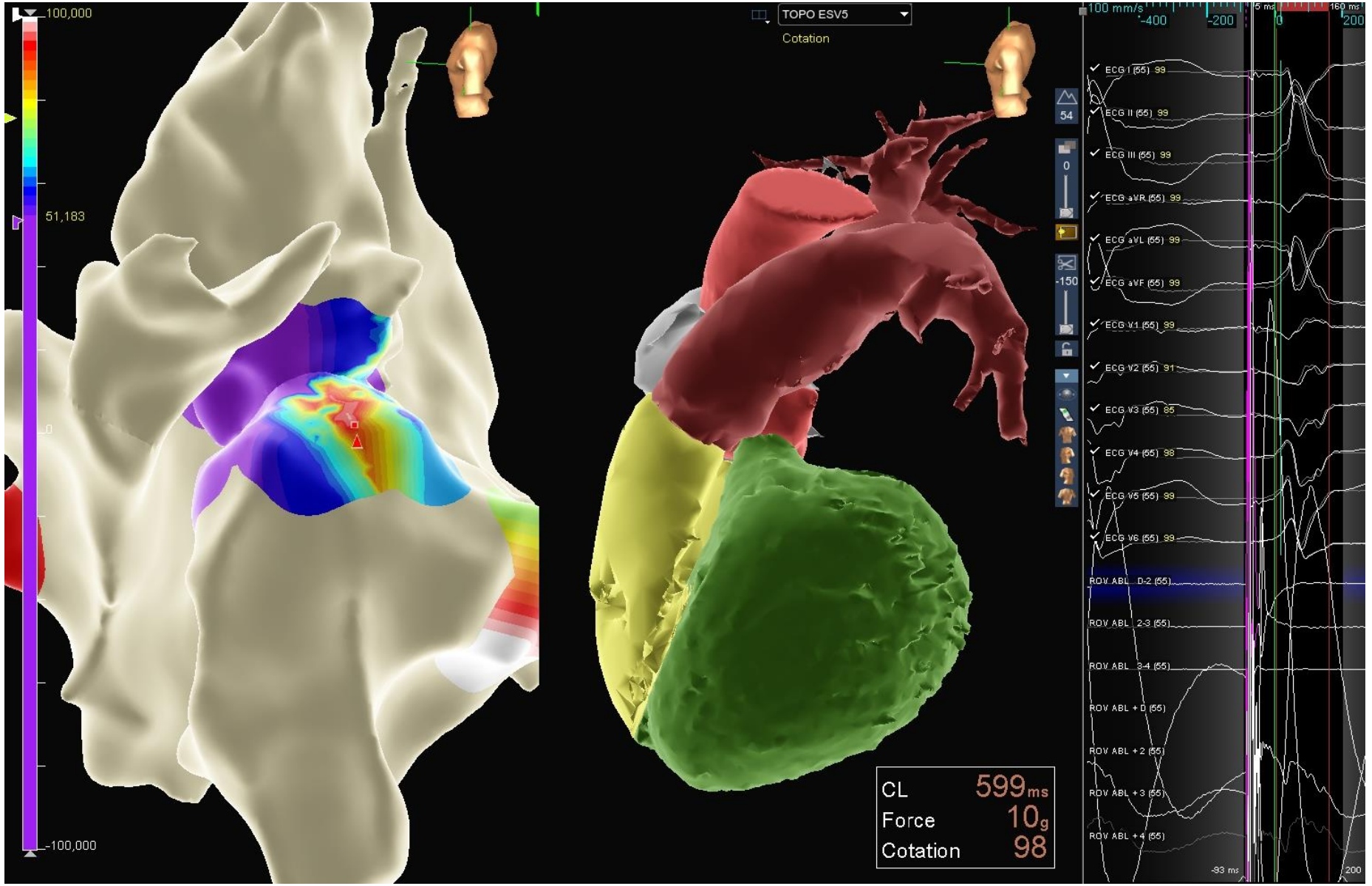
Sommet du triangle formé par IVA-Cx

Liang JJ et al, Arrhytmia & Electrophysiology Review 2019

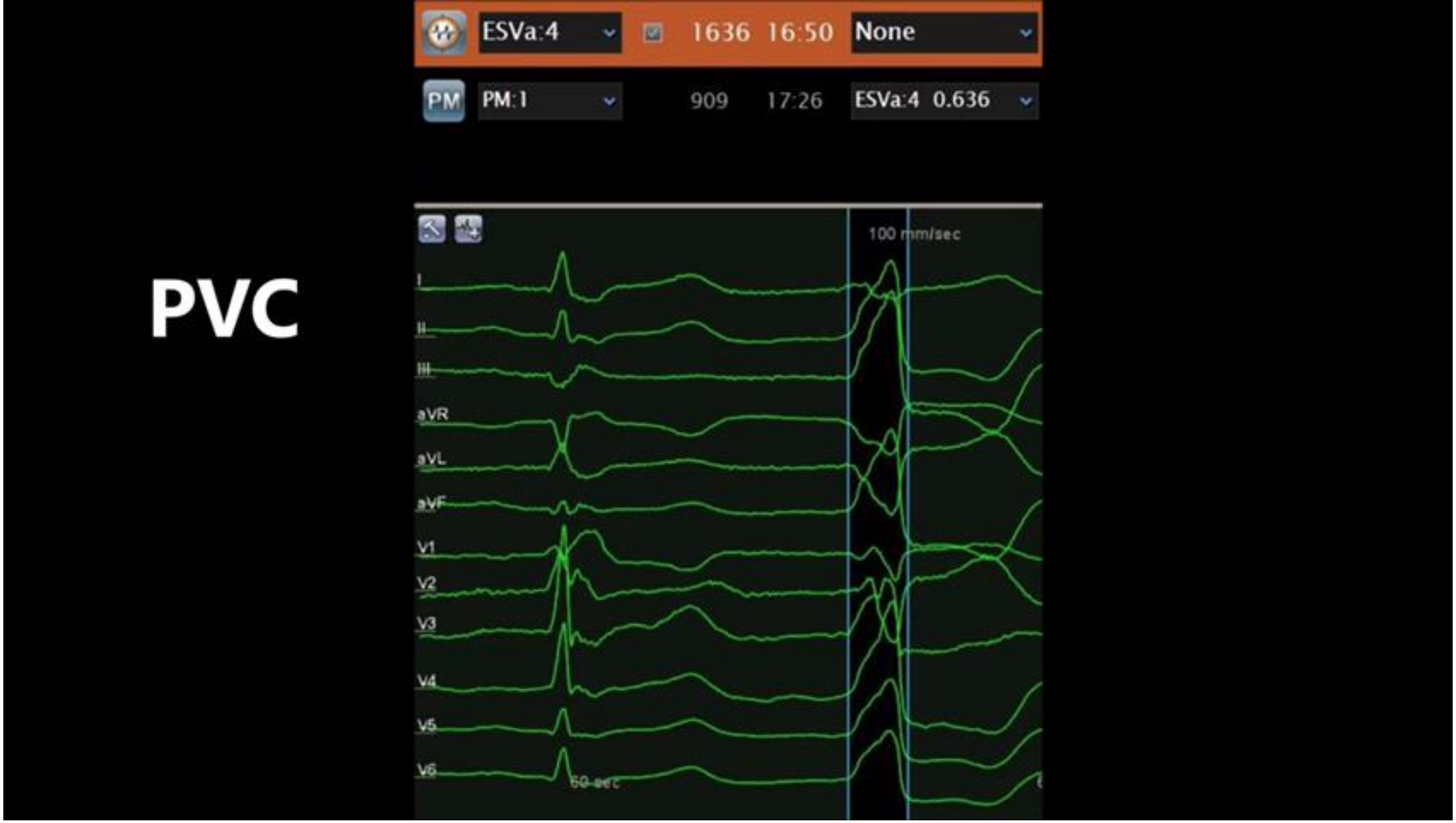




Carte d’activation

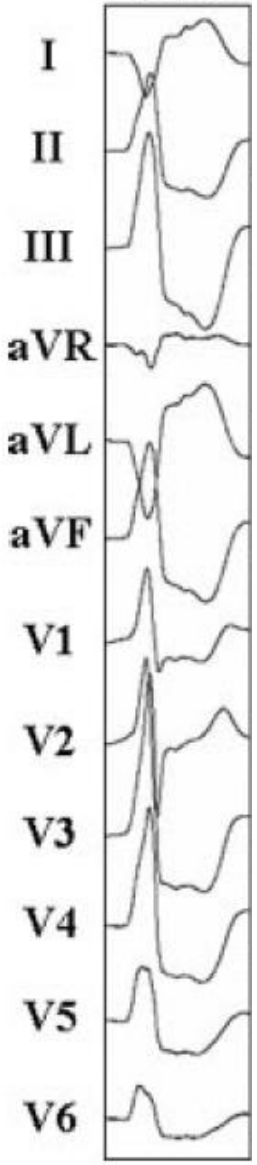


Carte de topostimulation



Courtesy Dr X. Waintraub

Localisation par ECG 12 dérivations

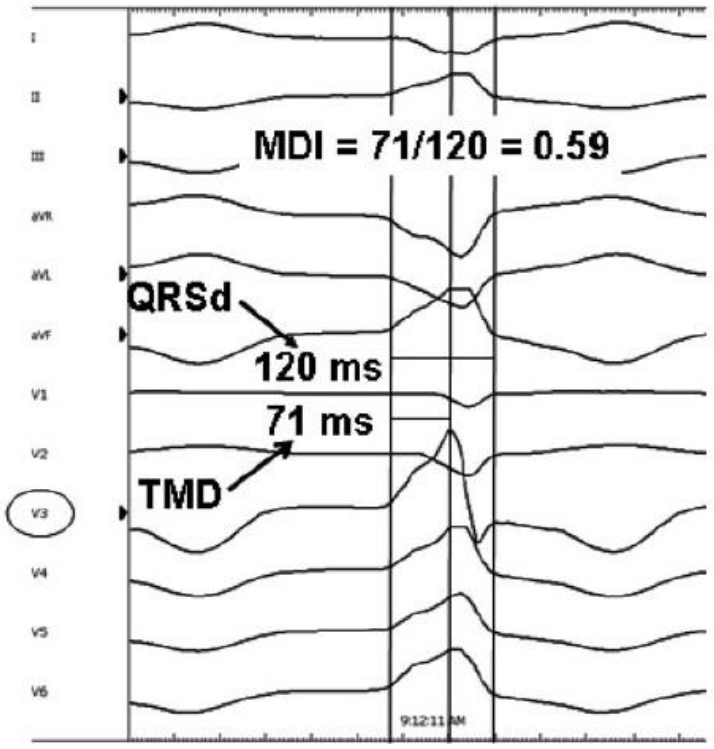


<u>Caractéristiques des arythmies du sommet du VG</u>

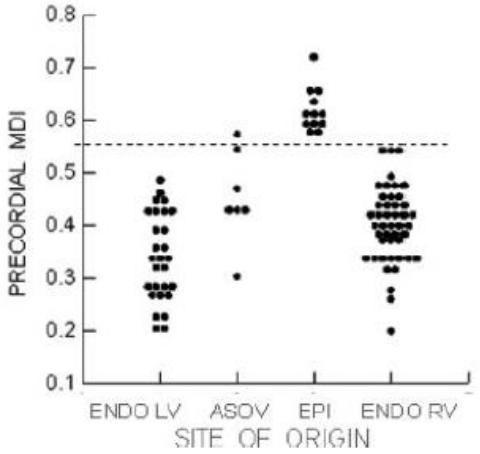
- Aspect de retard droit ou gauche avec transition précoce (V2 ou V3)
- Axe inférieur
- Q en DI
- Ratio DIII / DII > 1.25
- Ratio QS aVL / aVR > 1.75

Yamada et al, Circ Arrhythmia Electrophysiol 2010

ECG et site d’ ablation épicardique



- Temps de déflexion intrinsecoid (TDI V2 > 85 ms)
- **Index de déflexion maximale > 0.55**

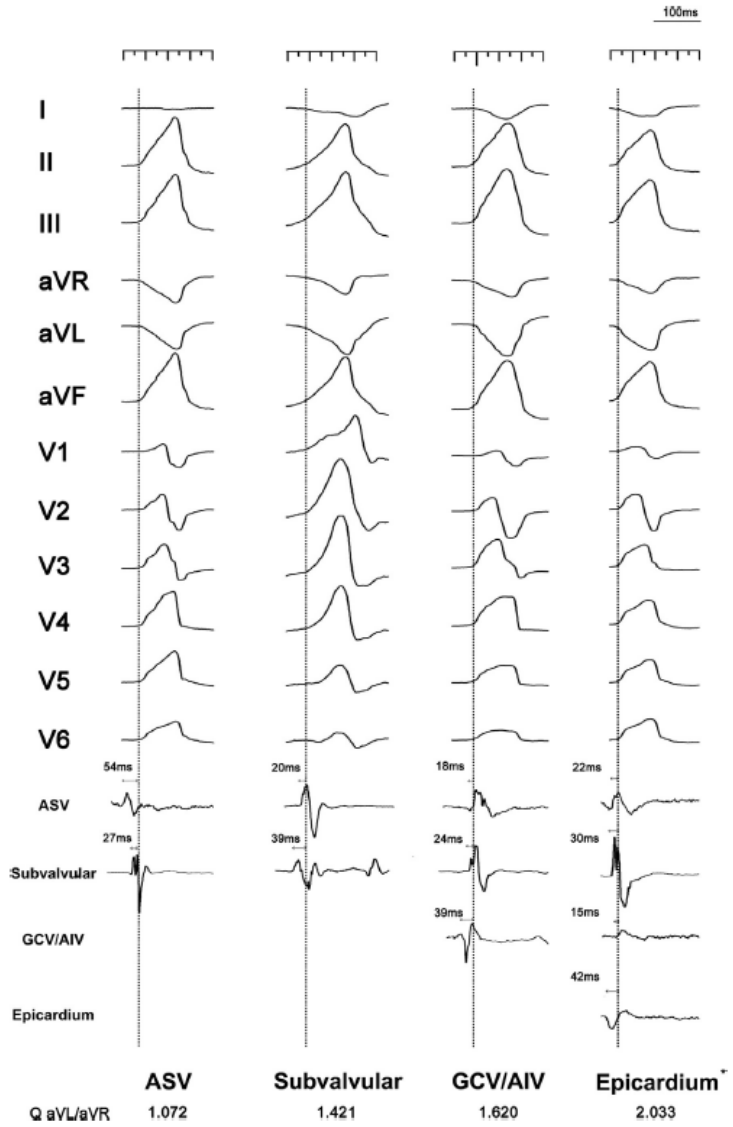


- Proximité de l’IVA:

« pattern break » en V2: perte de l’onde R en V2 comparée à V1 et V3

Liang JJ et al, Arrhytmia & Electrophysiology Review 2019
Daniel DV et al, Circulation 2006
Hayashi et al, J Cardiovasc Electrophysiol 2017

Caractéristiques ECG et localisation épicardique



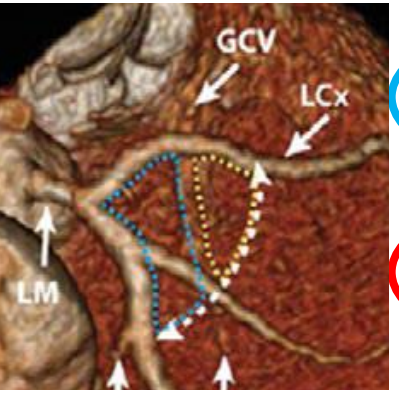
- **<u>Ratio Q aVL / Q aVR</u>**

< 1.415 :	Sinus de Valsalva
1.416 -1.535 :	sous cusps
1.536- 1.740:	GVC et/ou Veine Ant. IV
> 1.74:	**abord épicardique direct**

Lin et al, Heart Rhythm 2016

Comment mieux cibler les ESV accessibles à une ablation?

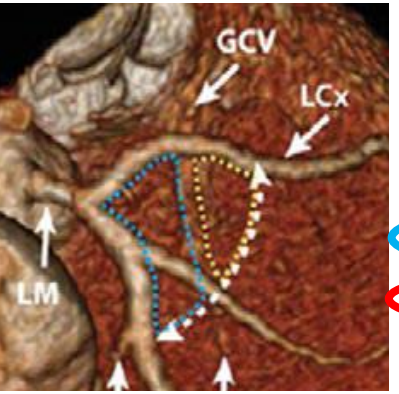
Caractéristiques ECG et localisation épicardique



Origin	Age	Sex, Male/Female	Type (SVT/NSVT/PVC)	QRSd, ms	QRS Morphology	Transition	Lead I	R Amp in Inferior Leads, mV
GCV+AIVV (n=12+7)	49 (42 to 55)	9/10	5/4/10	175 (166 to 184)	RBBB+ RIA; 14 LBBB+ RIA; 5	<V_1; 13 V_2-V_3; 5 V_3; 1	QS; 4 rS; 15	1.5 (1.2 to 1.8)
Accessible area (n=4)	42 (35 to 48)	1/3	1/2/1	182 (139 to 225)	RBBB+ RIA; all	<V_1; 3 V_2-V_3; 1	QS; 3 qrs; 1	1.0 (0.3 to 1.7)
Inaccessible area (n=4)	51 (34 to 67)	2/2	1/2/1	181 (150 to 212)	RBBB+ RIA; 1 LBBB+ RIA; 2 LBBB+ LIA; 1	V_2-V_3; 4	QS; 1 rS; 2 rsr′; 1	1.9 (0.6 to 3.2)
P value	0.568	0.682	0.638	0.758	0.052	0.126	0.006	0.092

Yamada et al, Circ Arrhythmia Electrophysiol 2010

Caractéristiques ECG et localisation épicardique

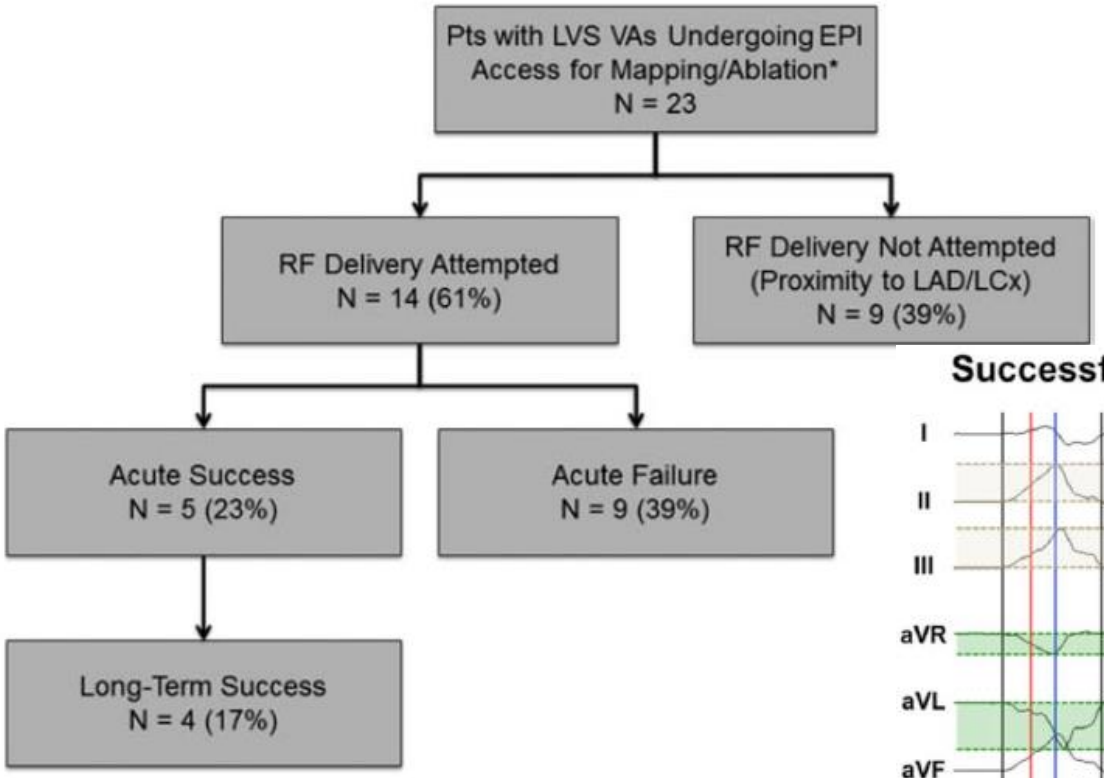


Origin	III/II Ratio	aVL/aVR Ratio	S (+) in V_5 or V_6	MDI (% of >0.54)	Pre-P (+)	V-QRS, ms	No. of Radiofrequency Lesions
GCV+AIVV (n=12+7)	1.2 (1.1 to 1.3)	1.5 (1.2 to 1.8)	5 (26%)	0.53 (0.49 to 0.57) (47%)	16 (84%)	−32 (−28 to −36)	2.1 (1.4 to 2.8)
Accessible area (n=4)	1.4 (1.2 to 1.6)	2.3 (1.6 to 3.0)	1 (25%)	0.53 (0.49 to 0.57) (50%)	3 (75%)	−38 (−18 to −58)	3.0 (1.7 to 4.3)
Inaccessible area (n=4)	1.1 (0.9 to 1.3)	0.9 (0.6 to 1.2)	0 (0%)	0.54 (0.38 to 0.70) (50%)	N/A	N/A	N/A
P value	0.010	0.005	0.511	0.963	N/A	N/A	N/A

Site épicardique « favorable pour ablation »:

- Aspect **retard droit et transition < V1**
- Ratio **amplitude aVL/aVR > 1.1**
  - **ratio DIII/DII > 1.25** et **ratio aVL/aVR > 1.75 → ponction épicardique**
- Présence **d'onde S en V5 ou V6**

Yamada et al, Circ Arrhythmia Electrophysiol 2010



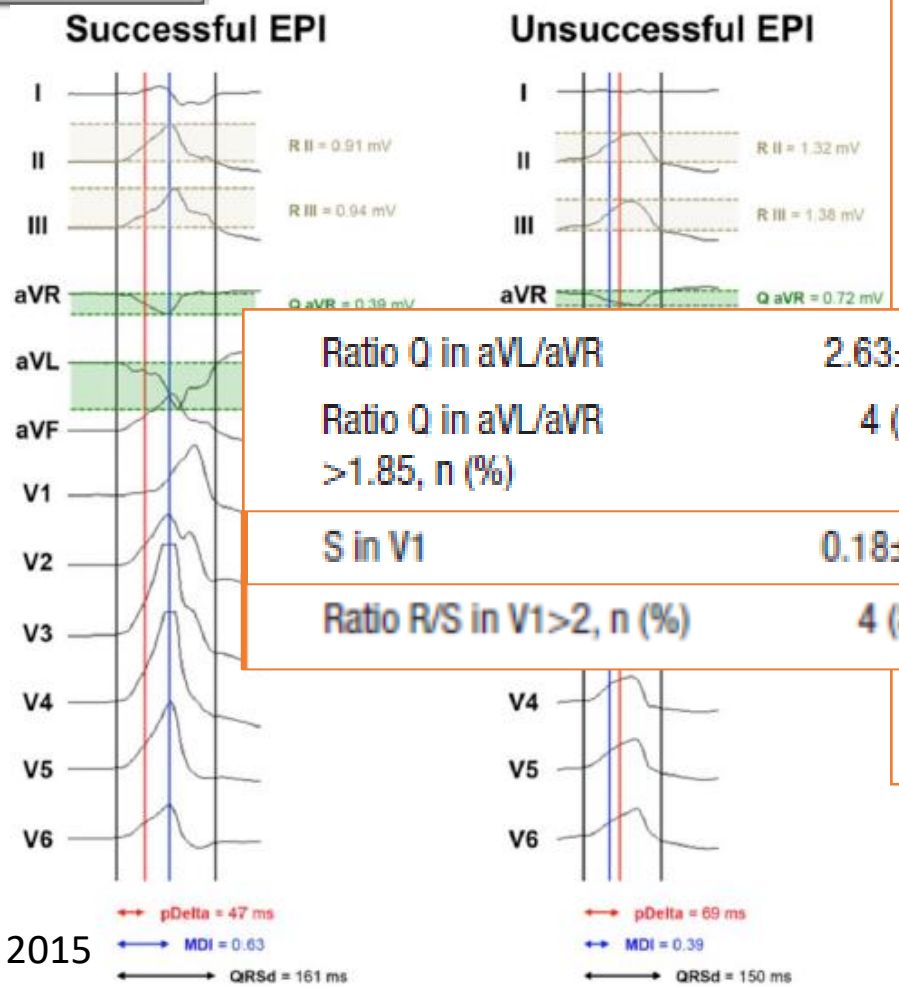
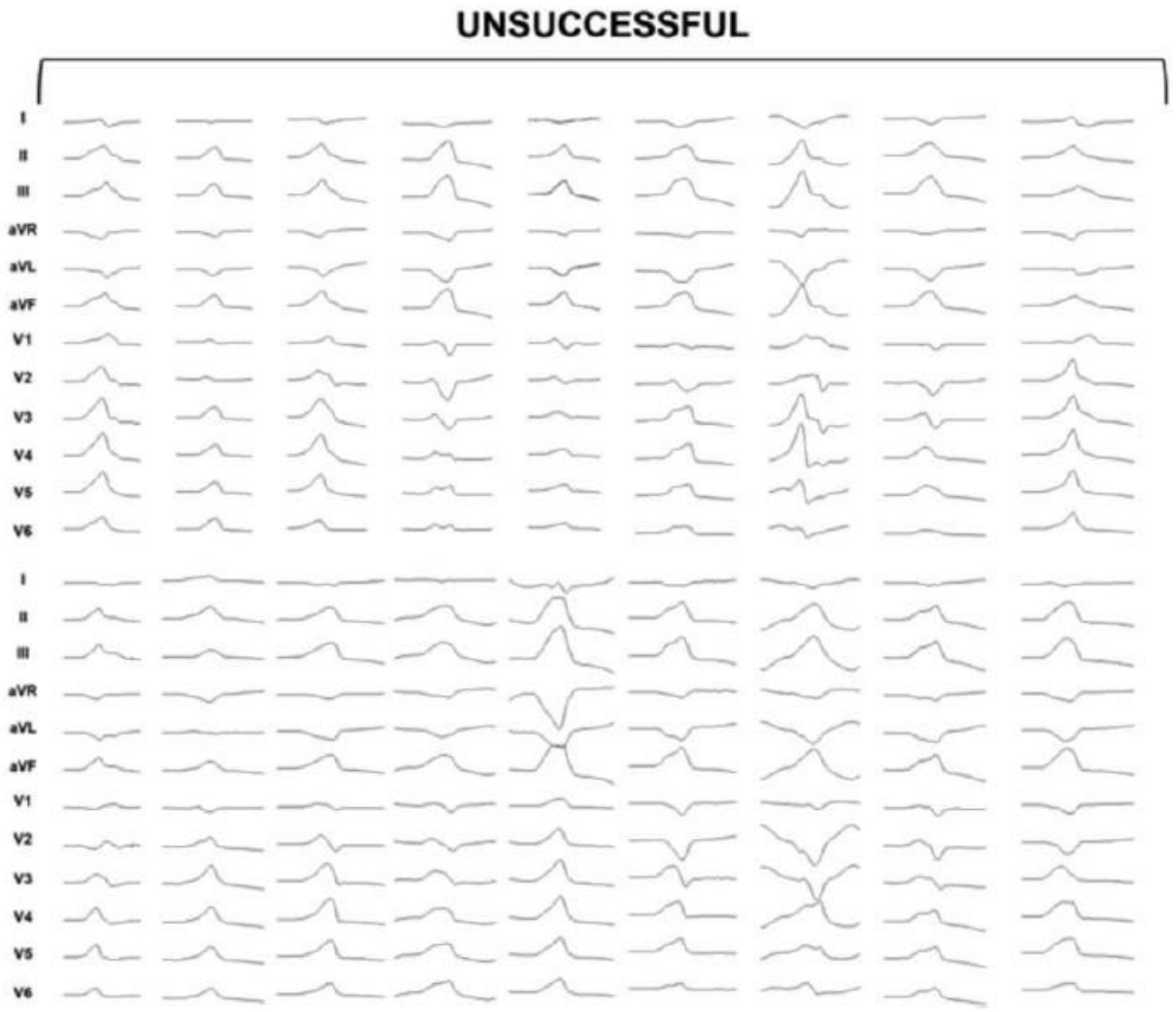


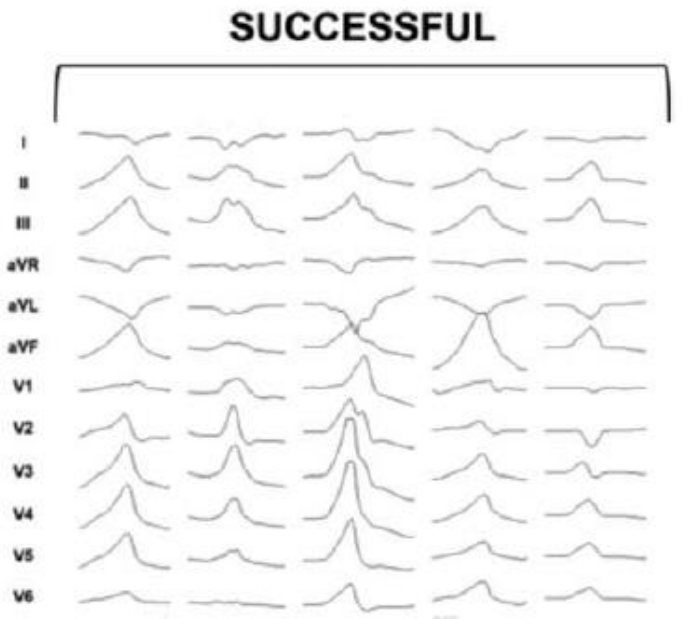
Table 2. ECG Characteristics in the Successful and Unsuccessful Ablation Cases

Variable	Successful Ablation (n=5)	Unsuccessful Ablation (n=18)	*P* Value*
Qualitative findings			
RBBB morphology, n (%)	4 (80)	9 (50)	0.339
LBBB morphology, n (%)	1 (20)	9 (50)	0.339
QS in lead I, n (%)	3 (60)	4 (22)	0.142
Initial q in V1, n (%)	0 (0)	6 (33)	0.272
Duration, ms			
QRSd	147±16	149±26	0.970
PdW	44±5	55±12	0.086
IDT	76±5	88±24	0.079
MDI	0.51±0.07	0.52±0.11	0.794
Limb leads, mV			
R in II	1.25±0.52	1.51±0.38	0.456
R in III	1.59±0.61	1.68±0.46	0.823
R in aVF	1.33±0.59	1.57±0.41	0.433
Ratio R in II/III	0.79±0.16	0.93±0.20	0.248
Q in aVL	1.03±0.41	0.91±0.29	0.391
Q in aVR	0.46±0.23	0.71±0.22	0.052
Ratio Q in aVL/aVR	2.63±1.31	1.39±0.58	0.017
Ratio Q in aVL/aVR >1.85, n (%)	4 (80)	2 (11)	0.008
S in V1	0.18±0.16	0.47±0.36	0.057
Ratio R/S in V1>2, n (%)	4 (80)	5 (28)	0.056

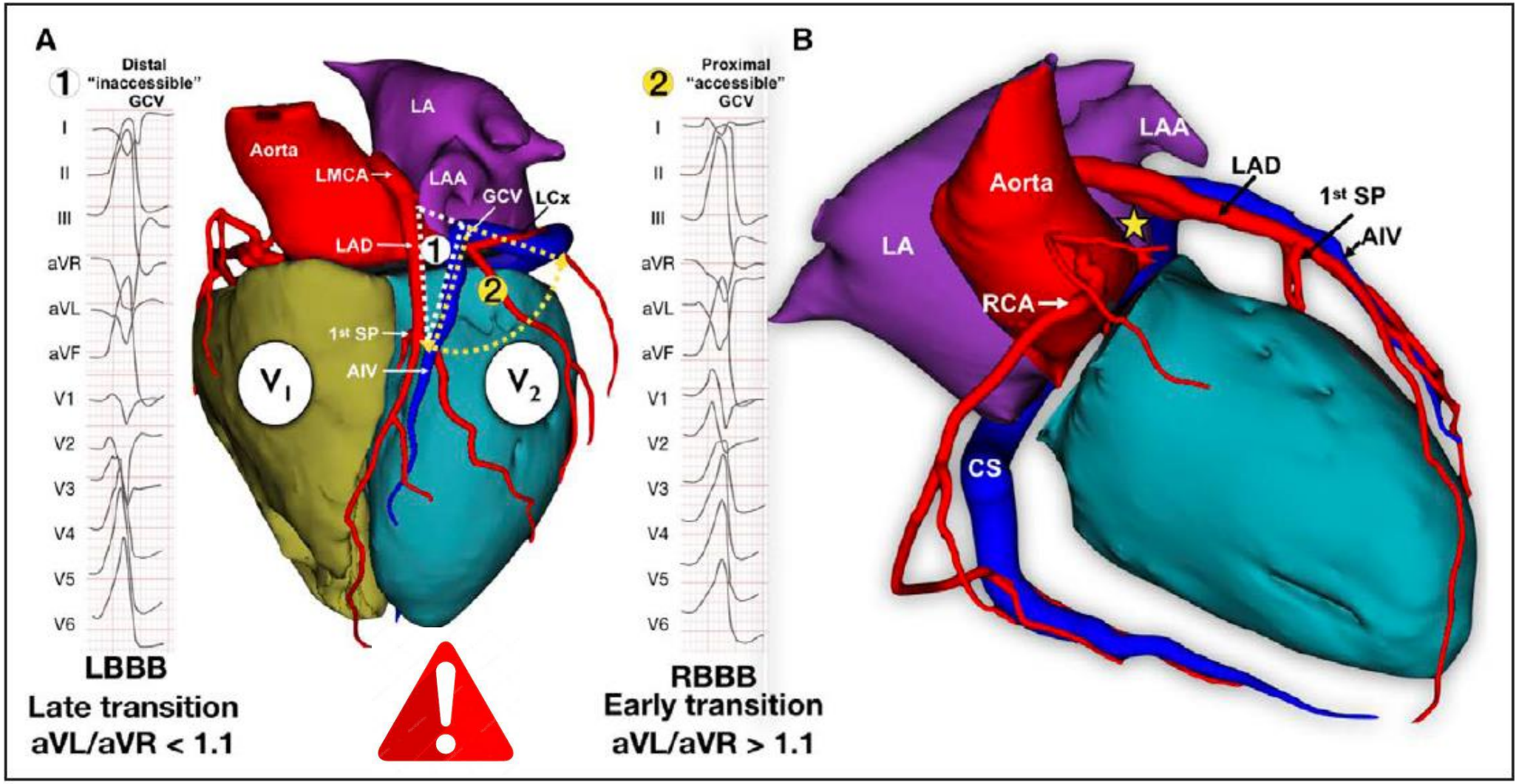
IDT indicates intrinsicoid deflection time; LBBB, left bundle branch block; MDI, maximum deflection index; PdW, pseudodelta wave; QRSd, QRS duration; and RBBB, right bundle branch block.
*Comparison between successful and unsuccessful ablation cases.

Santangeli et al, Circ Arrhythm Electrophysiol 2015





Santangeli et al, Circ Arrhythm Electrophysiol 2015



< 5 mm coronaires

Anderson et al, Circ Arrhythm Electrophysiol 2019

Cryoablation

Safety and outcomes of cryoablation for ventricular tachyarrhythmias: Results from a multicenter experience

Luigi Di Biase, MD, PhD, FHRS,[*,†,‡] Amin Al-Ahamad, MD,[§] Pasquale Santangeli, MD,[‖] Henry H. Hsia, MD,[§] Javier Sanchez, MD,[*] Rong Bai, MD, FHRS,[*] Shane Bailey, MD,[*] Rodney Horton, MD,[*] G. Joseph Gallinghouse, MD,[*] David J. Burkhardt, MD, FHRS,[*] Dhanunjay Lakkireddy, MD,[¶] Yanfei Yang, MD,[#] Nitish Badhwar, MD,[#] Melvin Scheinman, MD,[#] Roderick Tung, MD,[‡‡] Antonio Dello Russo, MD,[**] Gemma Pelargonio, MD,[**] Michela Casella, MD,[**] Gery Tomassoni, MD,[††] Kalyanam Shivkumar, MD,[‡‡] Andrea Natale, MD, FACC, FESC, FHRS[*]

- Sécurité des structures adjacentes
- Éfficacité limitée
- diffusion de l'énergie meilleure sous la graisse que RF
- Stabilité du catheter

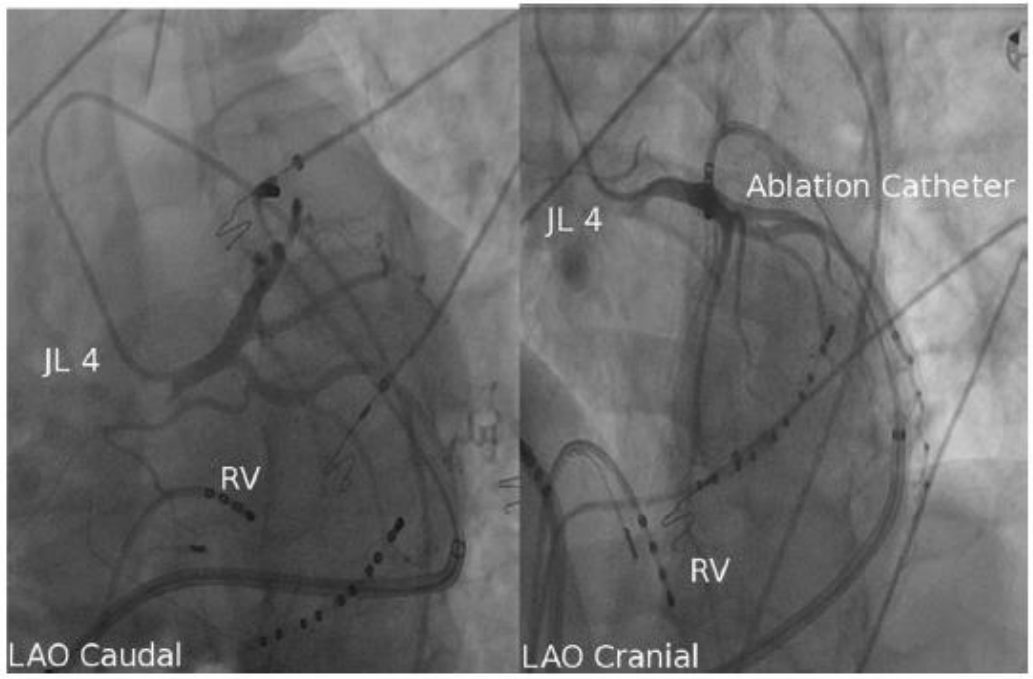
Di Biase L et al, Heart Rhythm 2011

Chirurgie mini-invasive

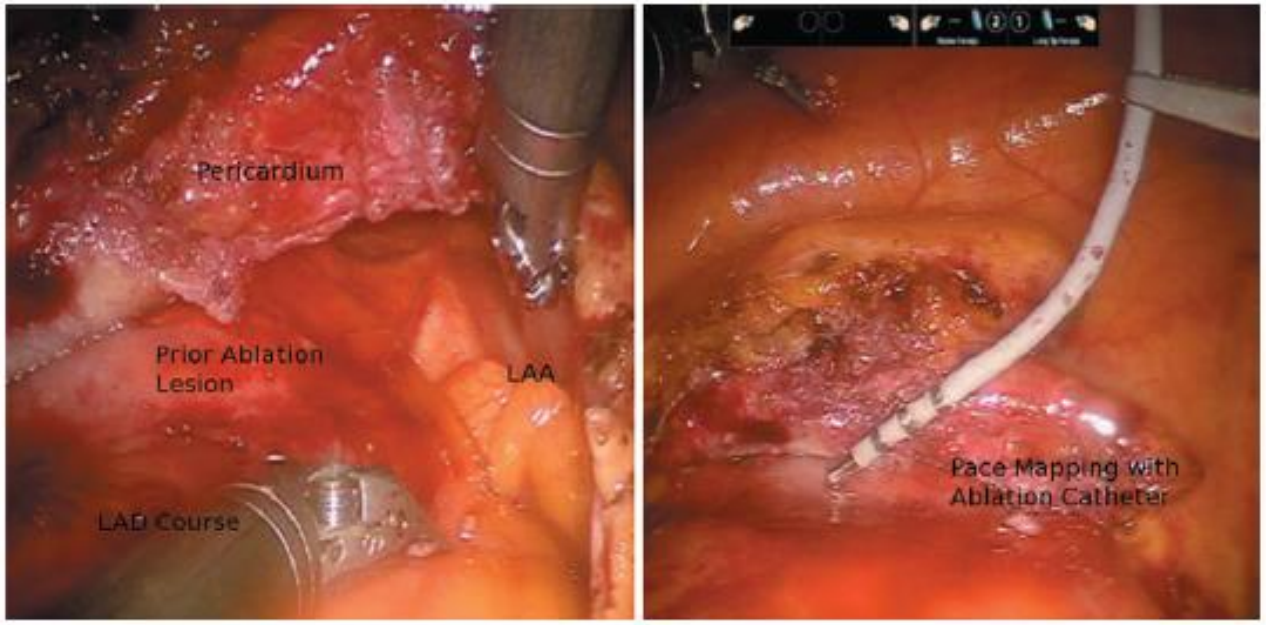
Images and Case Reports in Arrhythmia and Electrophysiology

A Novel, Minimally-Invasive Surgical Approach for Ablation of Ventricular Tachycardia Originating Near the Proximal Left Anterior Descending Coronary Artery

Siva K. Mulpuru, MD; Gregory K. Feld, MD; Michael Madani, MD; Navinder S. Sawhney, MD

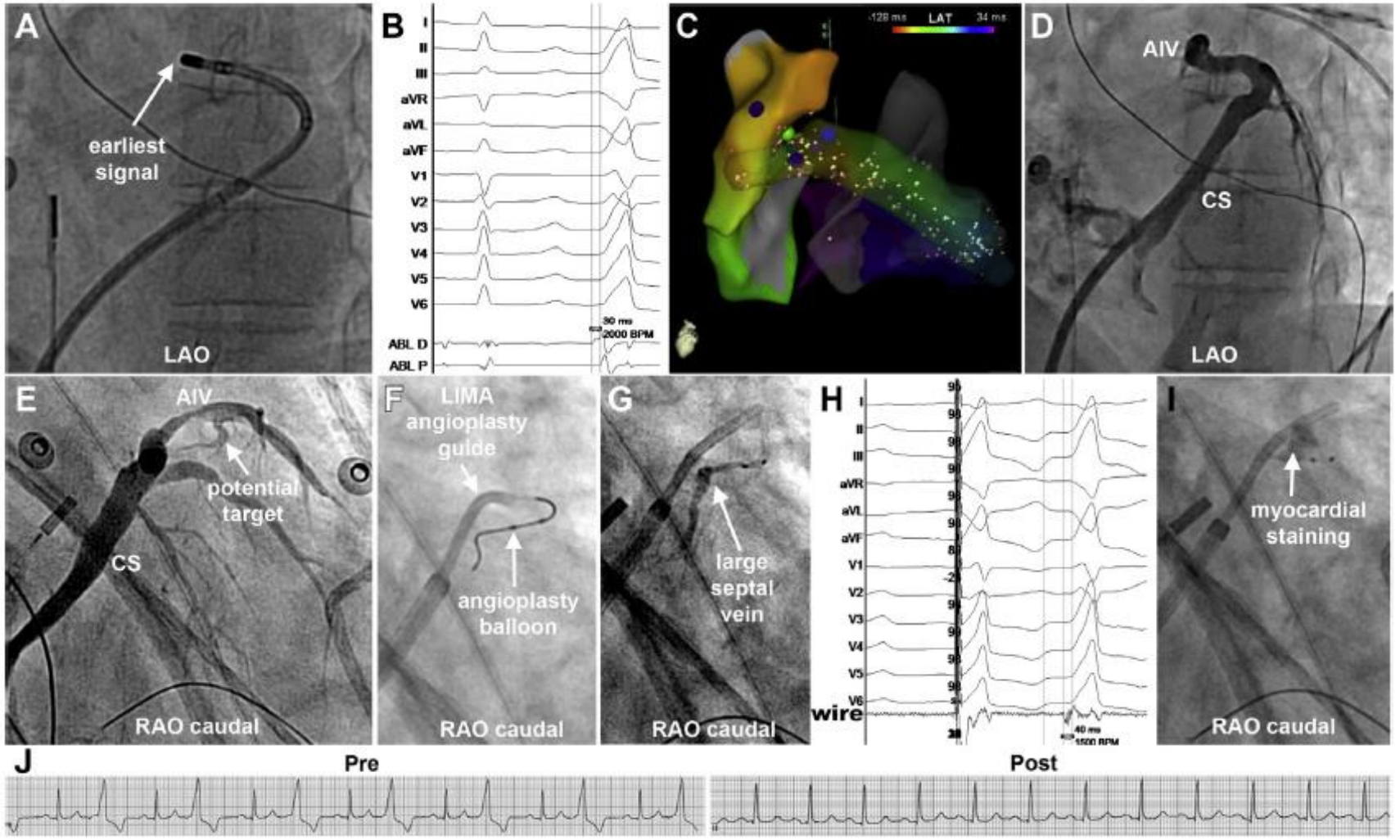


Mulpuru SK et al, Circ Arrhythmia Electrophysiol 2012



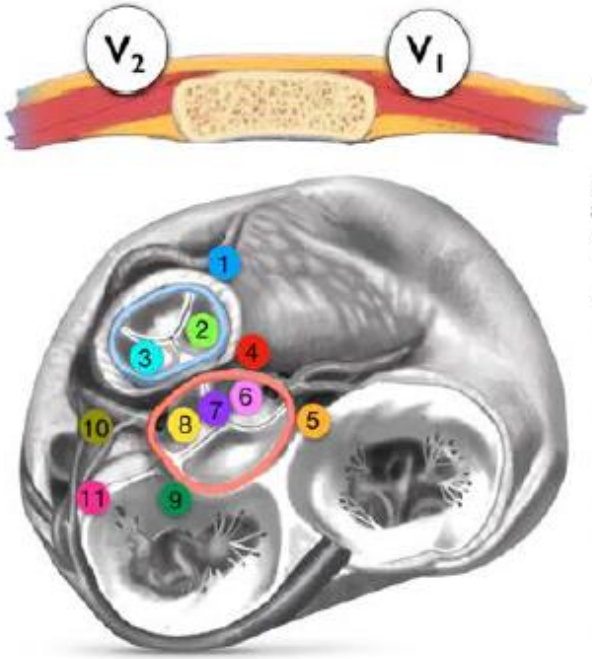
CryoICE ablation system (AtriCure Inc)

Alcoolisation



Tavares L, Heart Rhythm 2019

Arythmie ventriculaire du sommet
Conclusion



- Ablation difficile
- Anatomie: IVA et CX proximale et graisse épicardique
- Caractéristiques ECG:
- Localisation sommet du VG
- Prédiction succès d'ablation: zone accessible ou GVC
- RF, cryo, alcoolisation, chirurgie ?

Arythmie ventriculaire du sommet

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