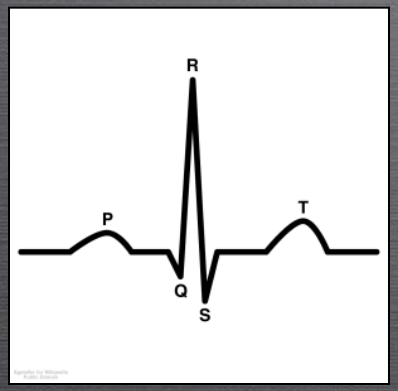
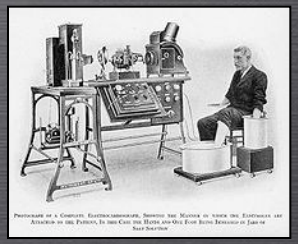
ECG Workshop
“5 ECGs 5”

20’ for ECG lovers…





Adrian Baranchuk MD FACC FRCPC FCCS
Professor of Medicine
Queen’s University
Winter Arrhythmia School 2017

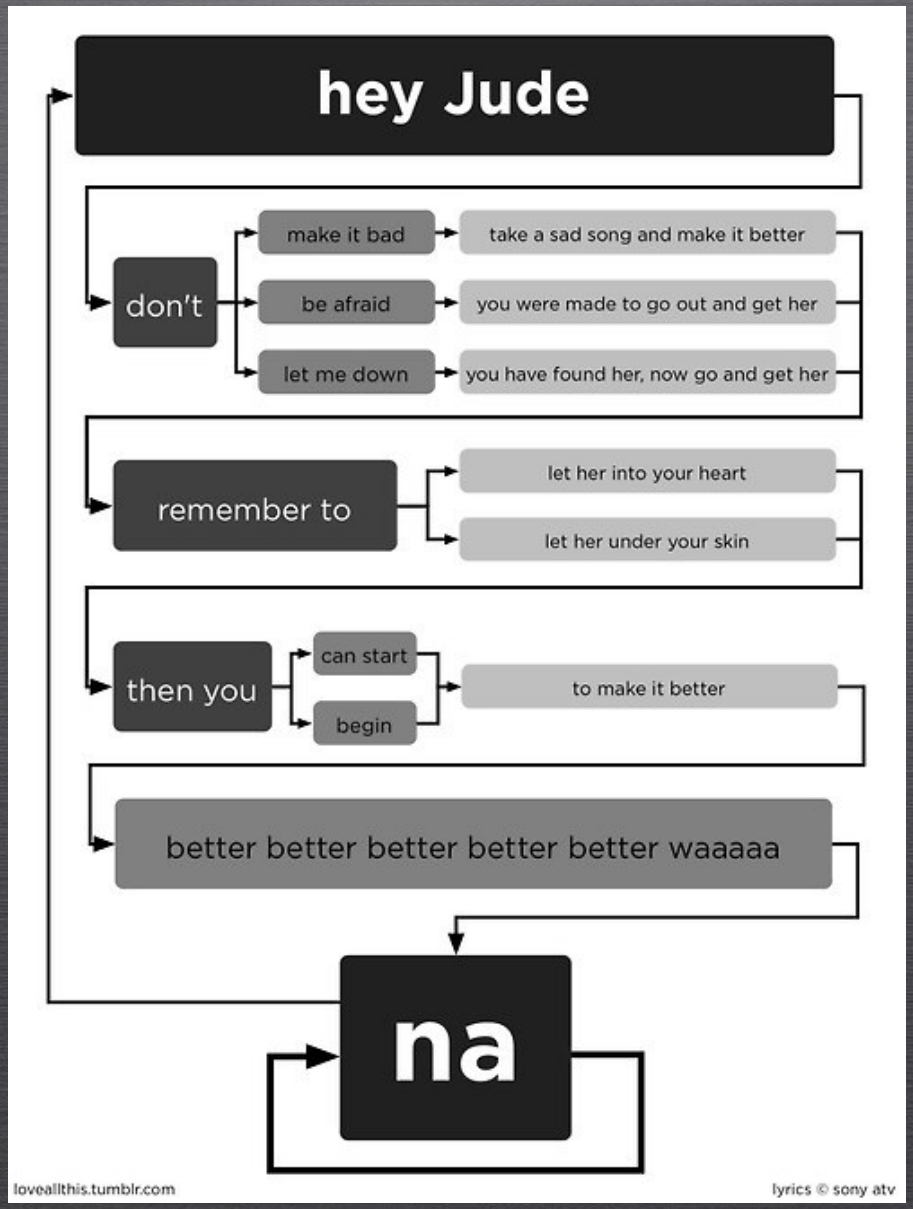
Conflict of Interest

- None to declare
- Teaching how to recognize infrequent ECG patterns is supported by the KecgT Initiative (Knowledge Translation in Electrocardiography)

Overview

- To review infrequent ECG patterns
- To learn some “cool” algorithms
- To review some “pattern recognition” strategies
- To practice some real cases with “extra tips”

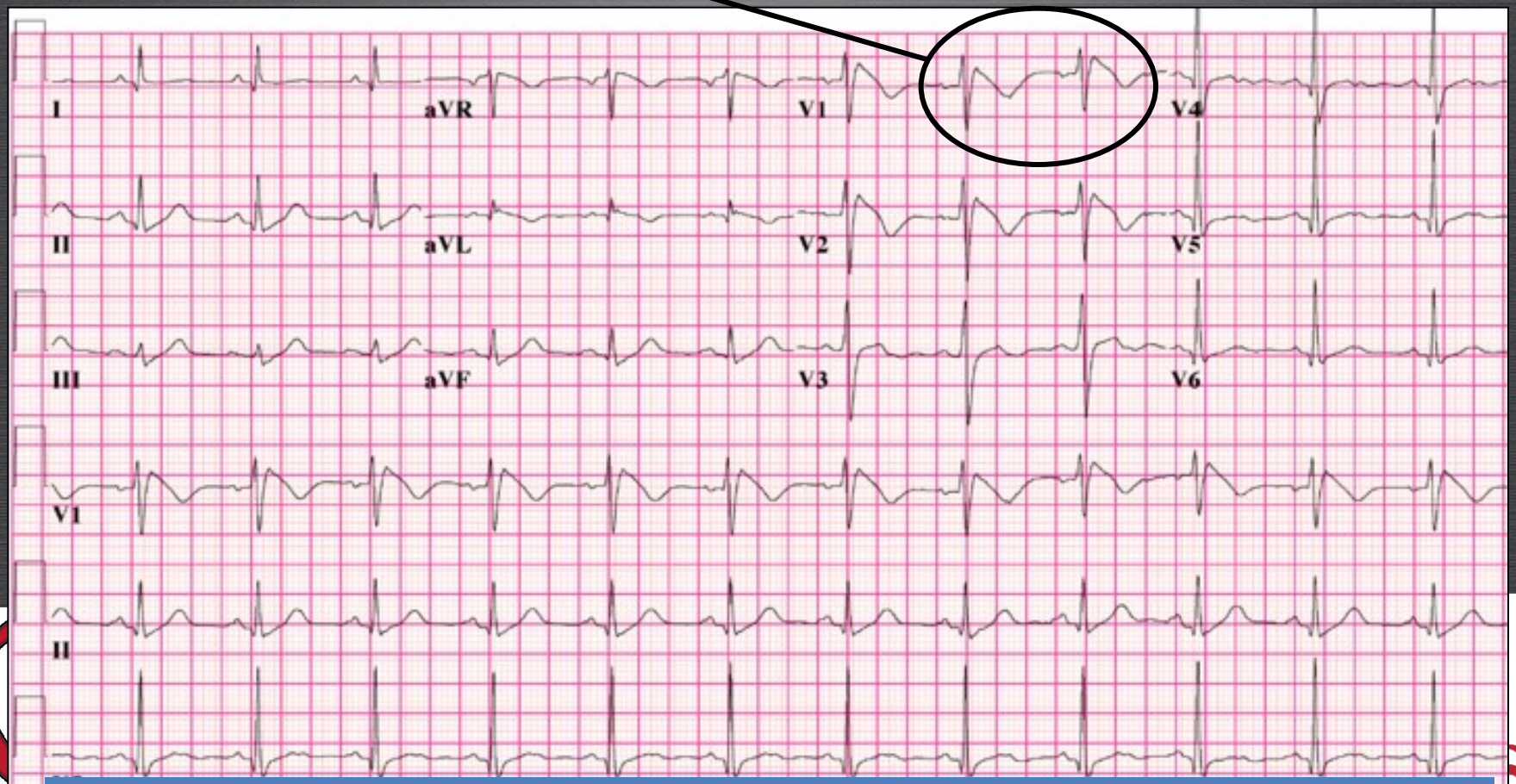
Talking about Algorithms



Case #1

- 18 year old, pre-competitive ECG
- Asymptomatic
- No family history

Type-1 “coved”
Brugada ECG pattern



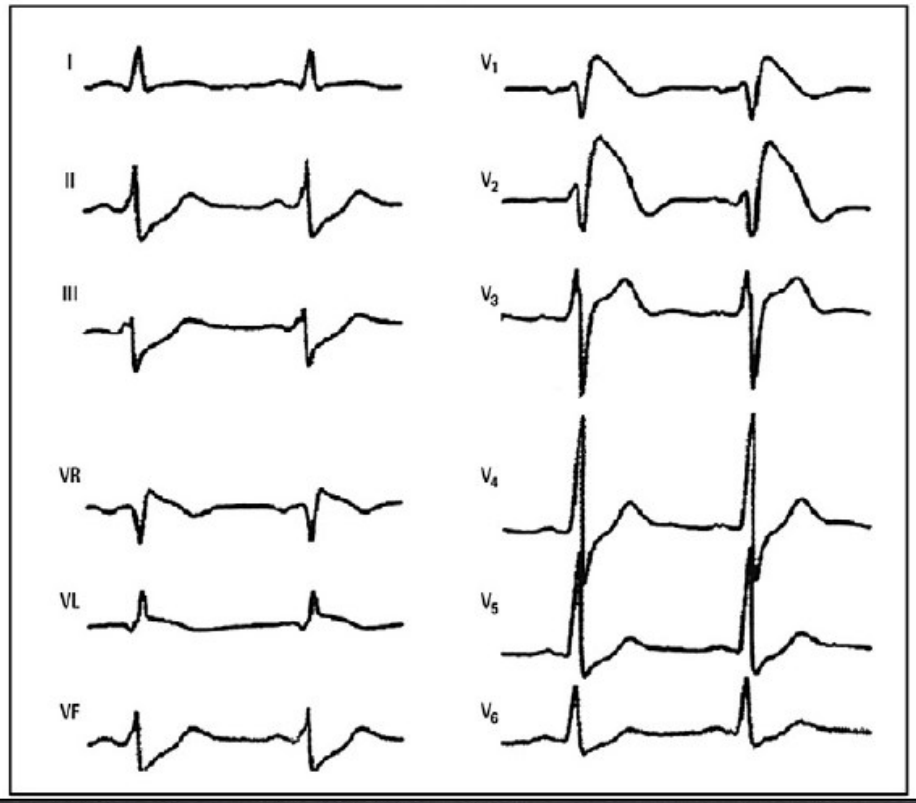
How can we summarize the ECG findings of a Type-1 Brugada ECG pattern?

Current electrocardiographic criteria for diagnosis of Brugada pattern: a consensus report☆

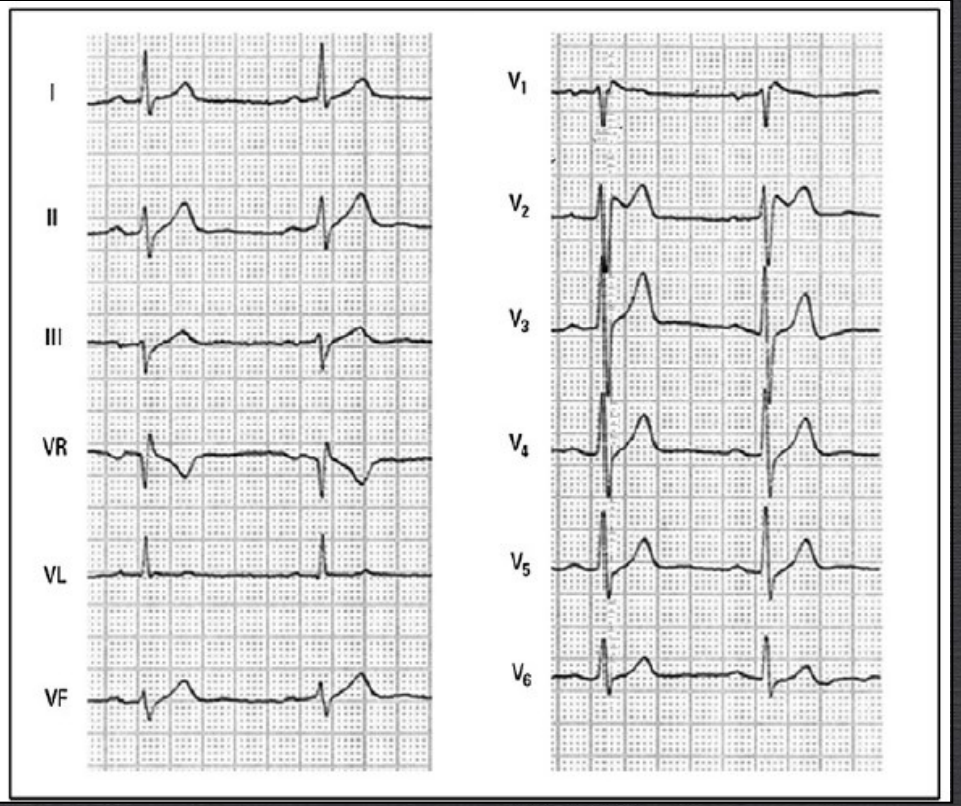
Antonio Bayés de Luna, MD, PhD,[a,*] Josep Brugada, MD, PhD,[b] Adrian Baranchuk, MD,[c] Martin Borggrefe, MD,[d] Guenter Breithardt, MD,[e] Diego Goldwasser, MD,[a] Pier Lambiase, MD,[f] Andrés Pérez Riera, MD, PhD,[g] Javier Garcia-Niebla, RN,[h] Carlos Pastore, MD, PhD,[i] Giuseppe Oreto, MD,[j] William McKenna, MD,[f] Wojciech Zareba, MD, PhD,[k] Ramon Brugada, MD, PhD,[l] Pedro Brugada, MD, PhD[m]

J Electrocardiol 2012

Type-1 or “coved”



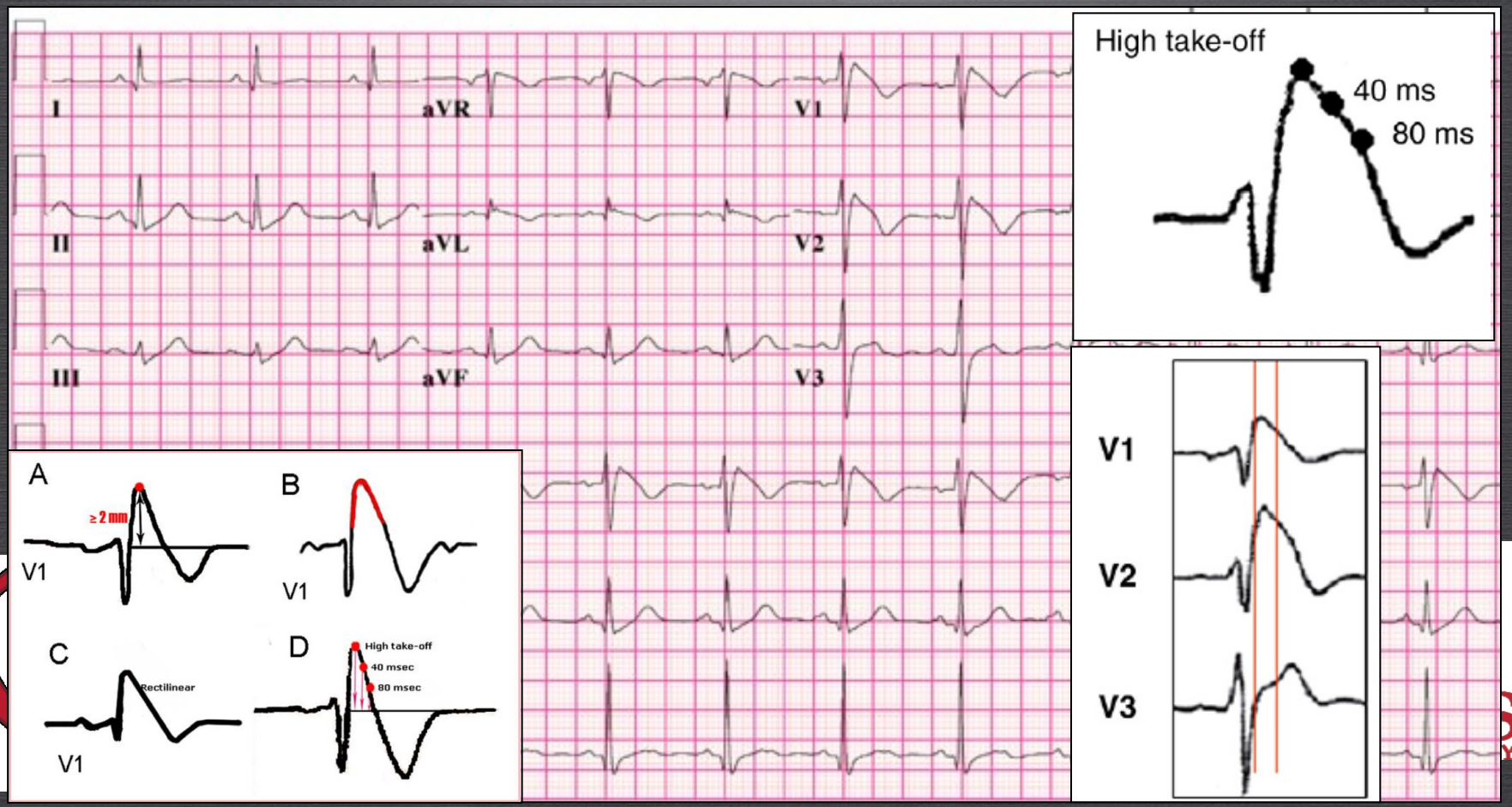
Type-2 or “saddle-back”



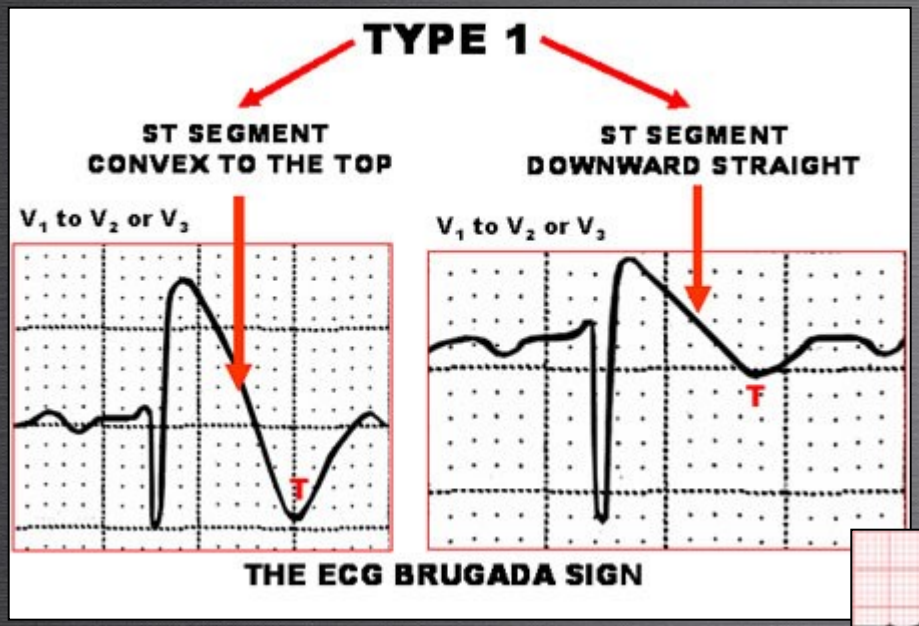
Type-1 Brugada ECG pattern

ECG Features:

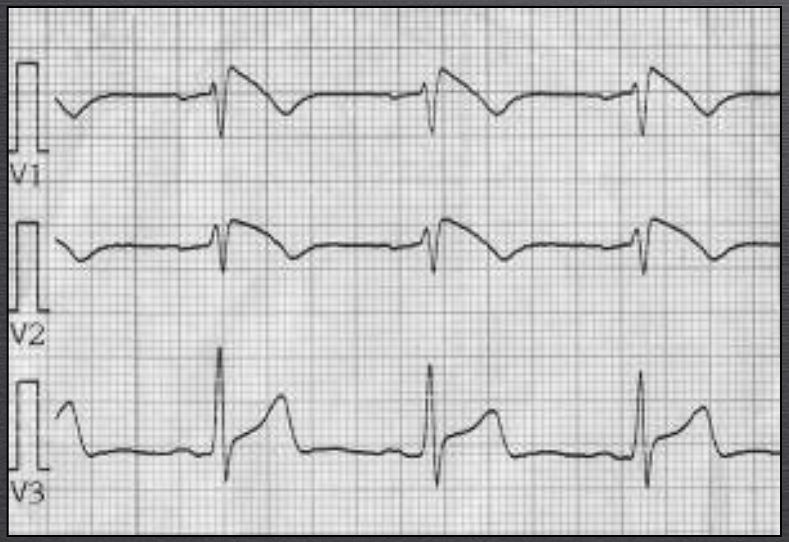
1. ST (J-wave) elevation followed by symmetrical T-wave in leads V1 to V3
2. High take-off in lead V1 is at least 2mm (higher than ST level at 40-80 ms)
3. At 40 ms from high take-off, the decrease in amplitude is less than .4 mV
4. Index QRS-ST elevation at high take-off/height of ST at 80 ms is >1 (Corrado)
5. Mismatch: QRS duration in V1-V2 is longer than in V3-V6



Type-1 Brugada ECG pattern



- It can be “manifested”
- It can be “concealed”
- It can be unmasked by fever or sodium channel blockers



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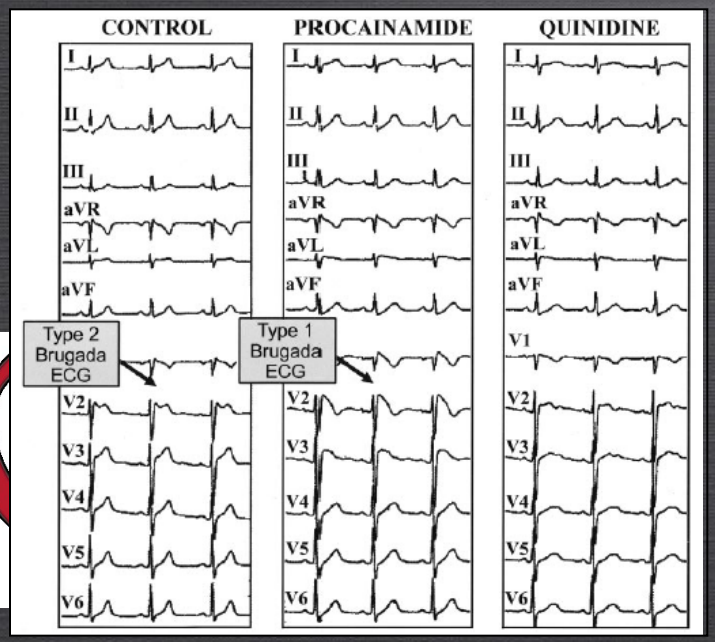
Type-1 Brugada ECG pattern

Fever

Brugada syndrome coinciding with fever and pandemic (H1N1) influenza

Baranchuk A. CMAJ. 2011

Sodium channel blockers



Brugada Syndrome
Report of the Second Consensus Conference

Antzelevitch C. Circulation 2005

Drug	Dosage and Administration
Ajmaline	1 mg/kg over 5 min, IV
Flecainide	2 mg/kg over 10 min, IV (400 mg, PO)
Procainamide	10 mg/kg over 10 min, IV
Pilsicainide	1 mg/kg over 10 min, IV

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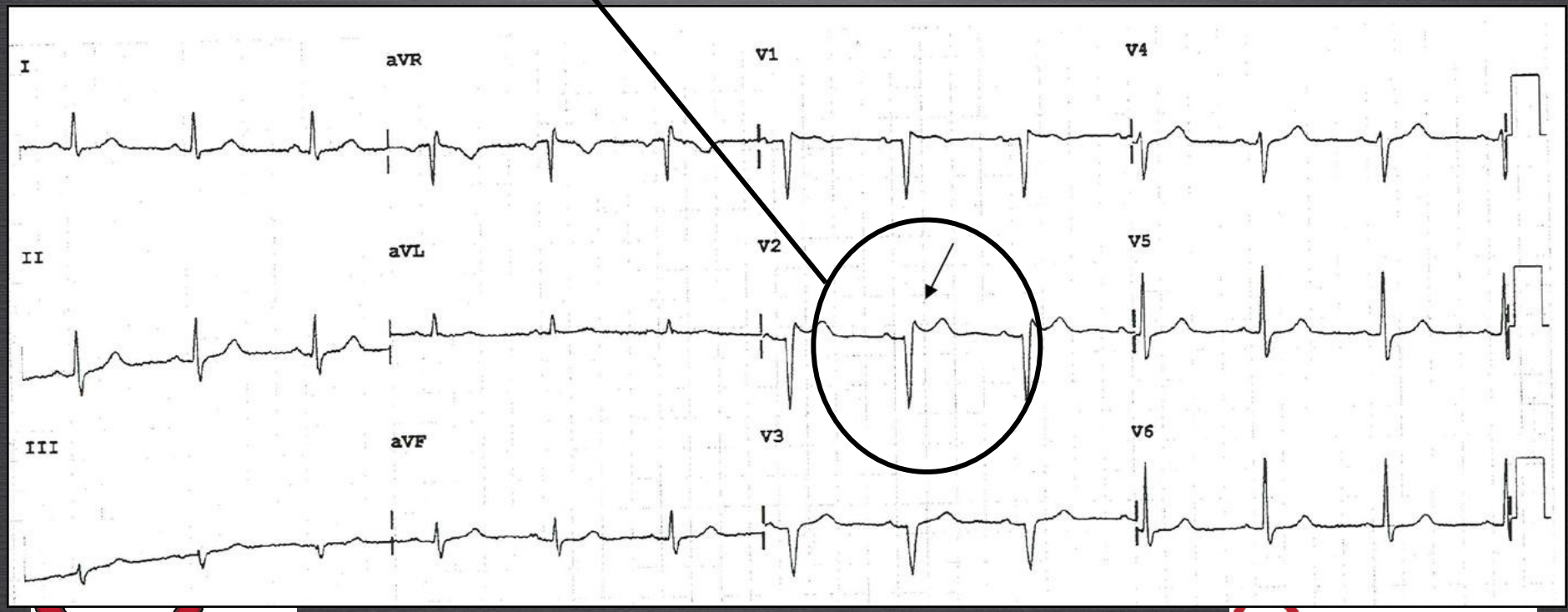
Case #2

- 37 year old man, referred by Fam doc
- 2 episodes of syncope
- Uncle died at the age of 42 during sleep

Type-2 “Saddle-back” Brugada ECG pattern

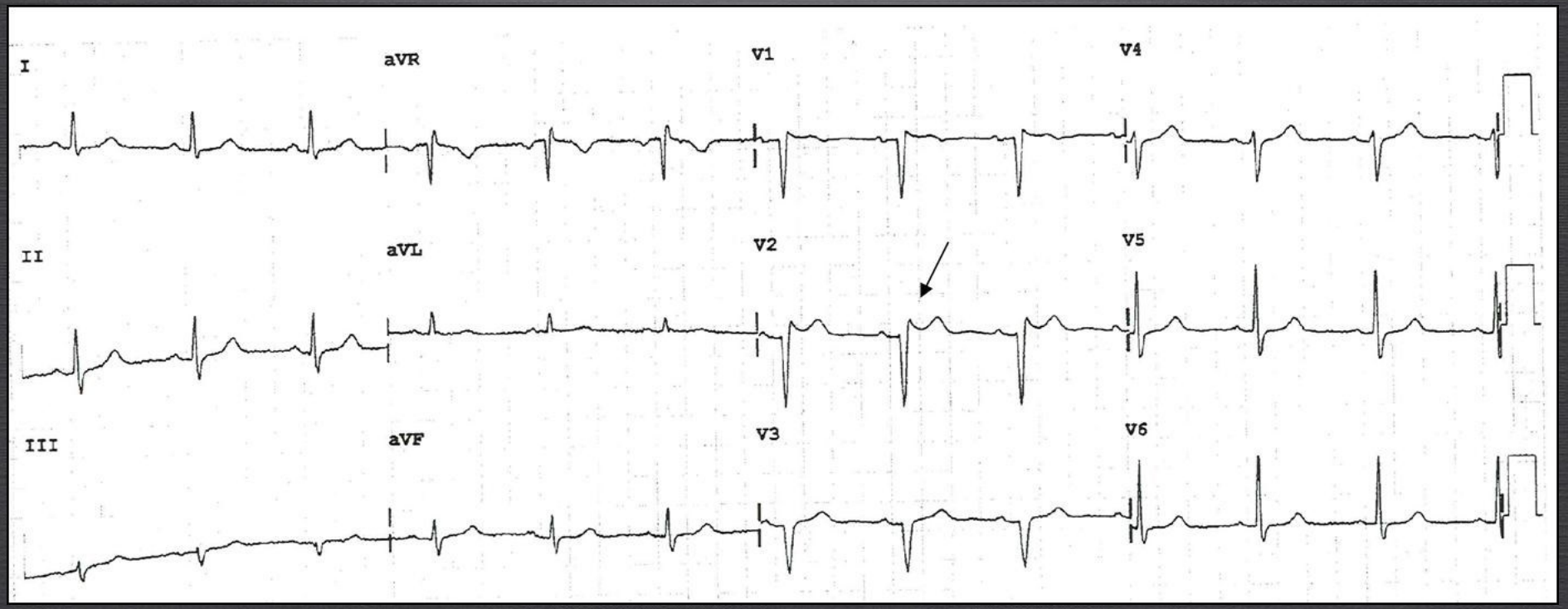


How can we summarize the ECG findings of a Type-2 Brugada ECG pattern?

Type-2 Brugada ECG pattern

ECG Features:

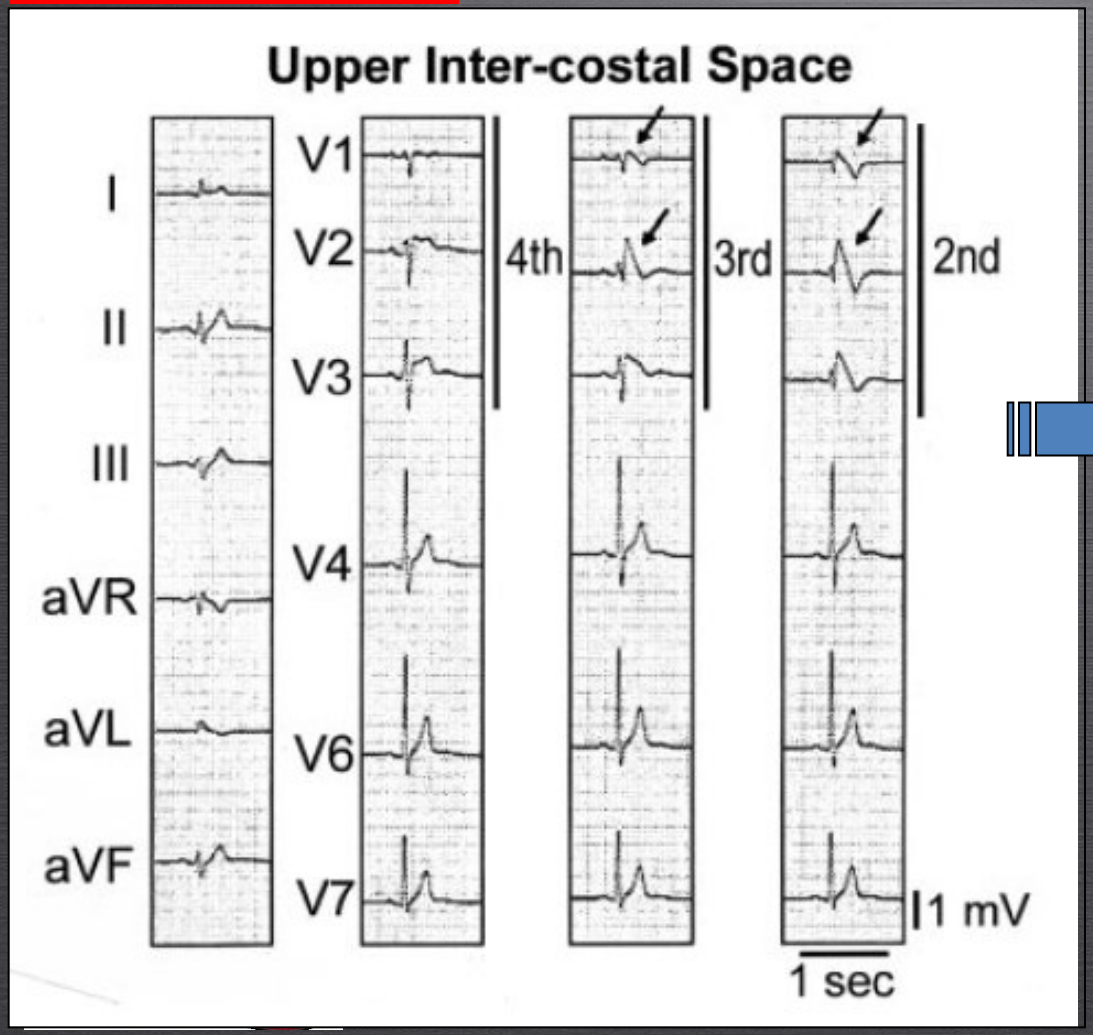
1. R' pattern with a high take-off of at least 0.2 mV with convex ST elevation (>.5 mV)
2. Positive T-wave in lead V2
3. Minimum ST ascend
4. ß-angle > 58° (Chevallier)
5. Base of the triangle > 4mm (Serra)
6. Sodium channel blocker test: transforms the type-2 into a type-1



TIP

Type-2 Brugada ECG pattern: Value of high precordial leads

Antzelevitch C. Circulation 2005



The higher the right precordial leads, the higher the chances of facing the RVOT

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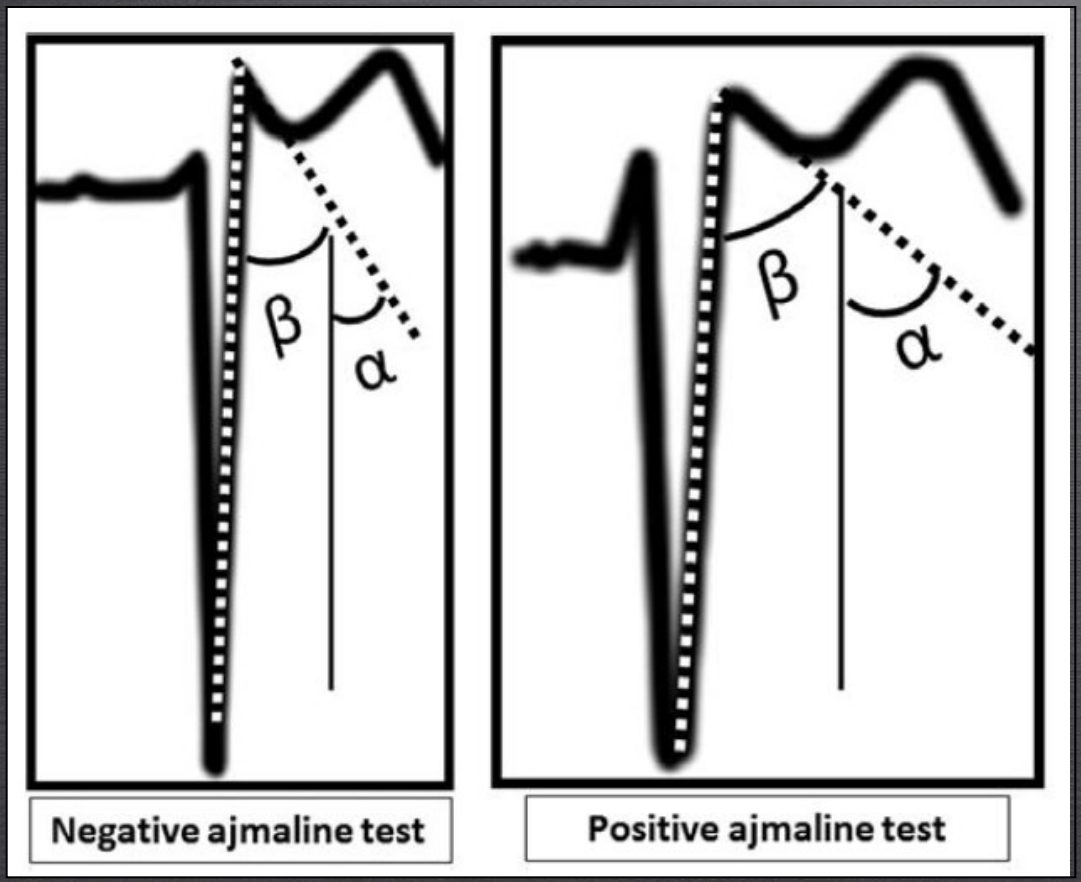
Type-2 Brugada ECG pattern
New Criteria: ß-angle

New Electrocardiographic Criteria for Discriminating Between Brugada Types 2 and 3 Patterns and Incomplete Right Bundle Branch Block

Chevallier S. JACC 2011



ß-angle > 58° indicates BrS pattern

- Sens: 79%
- Spec: 83%
- PPV: 73%
- NPV: 87%

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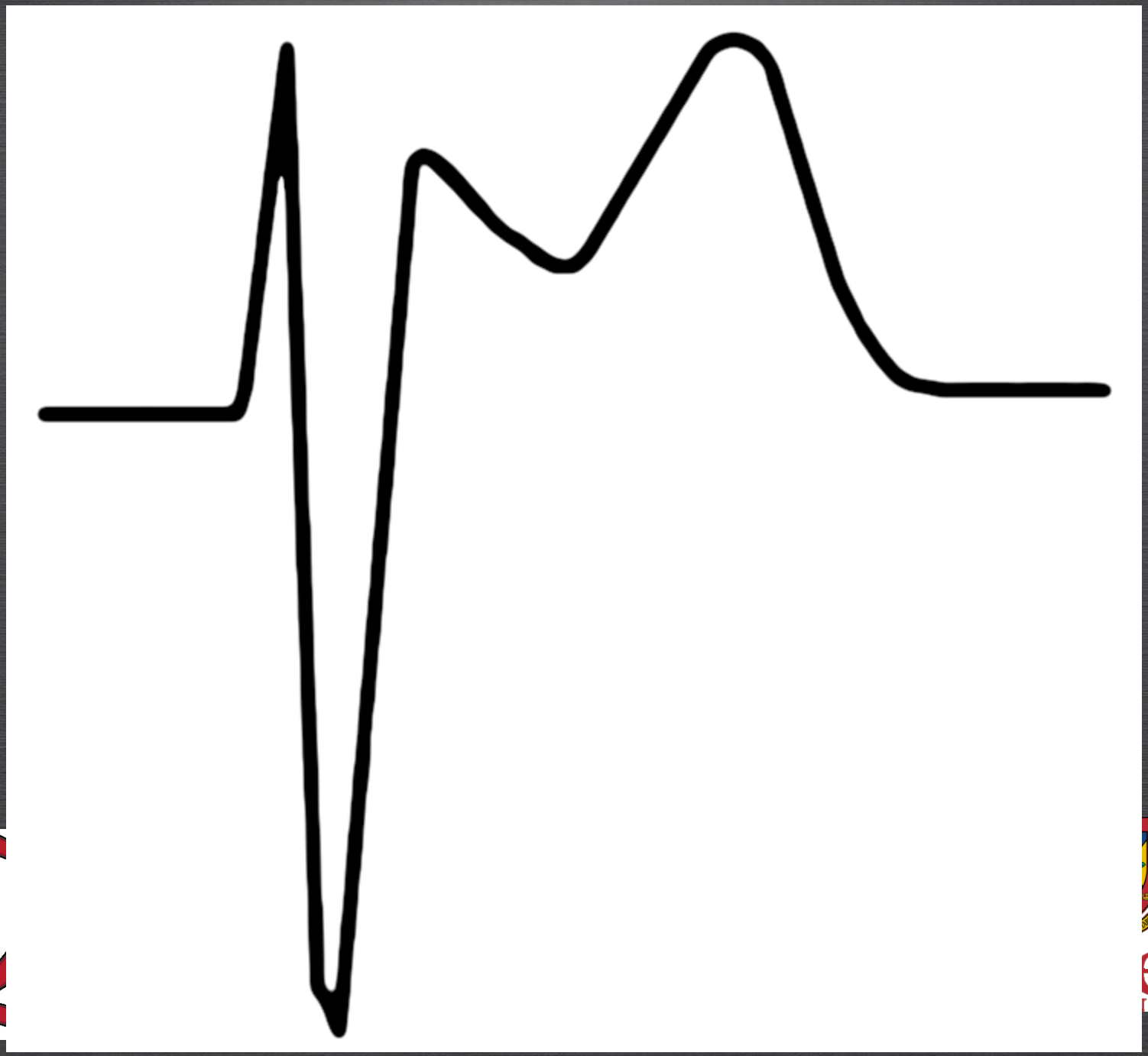
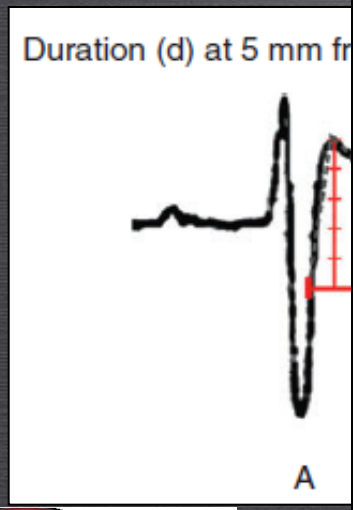
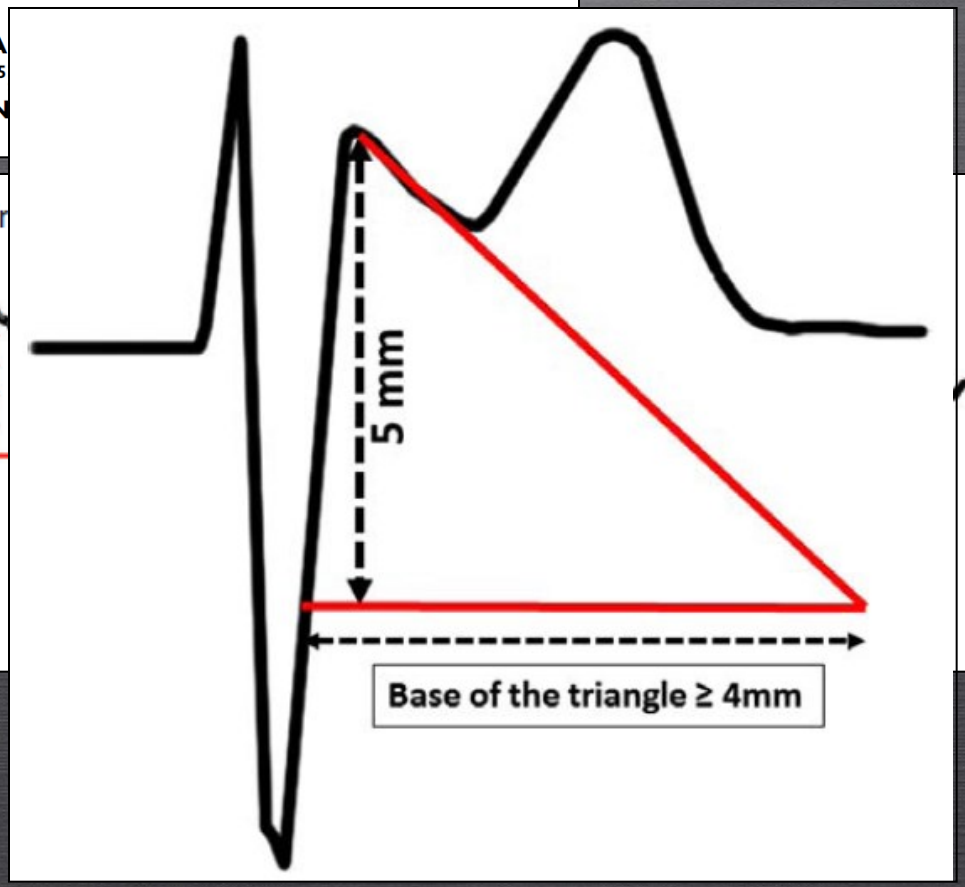


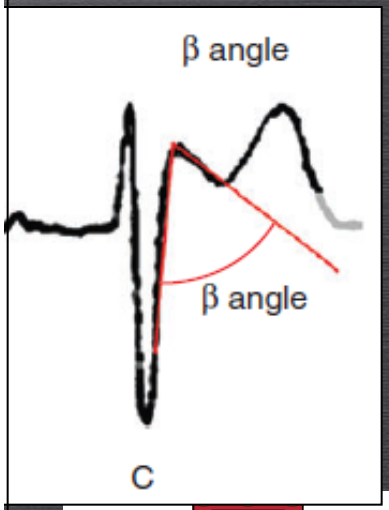
Type-2 Brugada ECG pattern
New Criteria: Base of the triangle

New electrocardiographic criteria to differentiate the Type-2 Brugada pattern from electrocardiogram of healthy athletes with *r'*-wave in leads V1/V2

Guillem Serra[1], Adrián Baranchuk[2], A
Diego Goldwasser[1], Lucio Capulzini[4,5]
Maria-Eugenia Heras[6], Javier Garcia-N
and Pedro Brugada[4]







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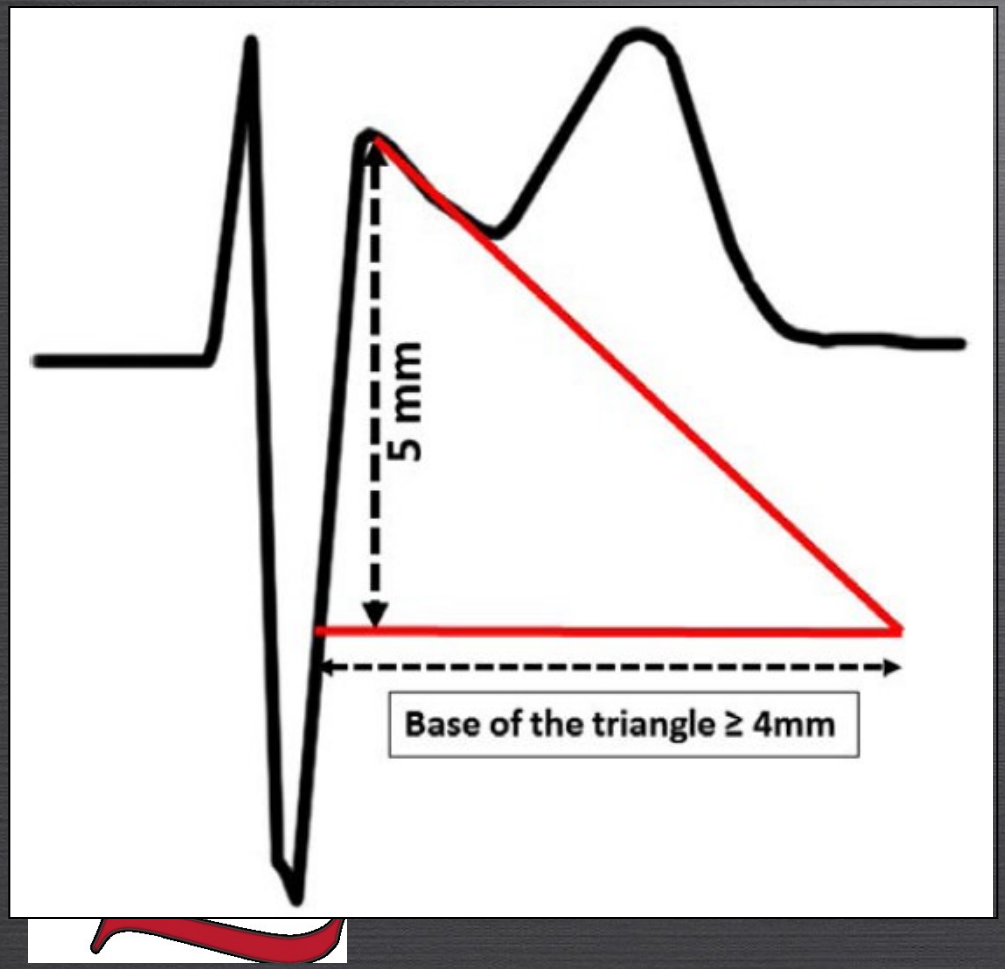
Type-2 Brugada ECG pattern
New Criteria: Base of the triangle

New Electrocardiographic Features in Brugada Syndrome

Antonio B. de Luna[a], Javier García-Niebla*[b] and Adrian Baranchuk[c]

Curr Cardiol Rev 2014



Base of the triangle > 4mm indicates BrS pattern

- Sens: 85%
- Spec: 95.6%
- PPV: 94.4%
- NPV: 87.9%

Base of the triangle is easier to measure with higher Sens & Spec

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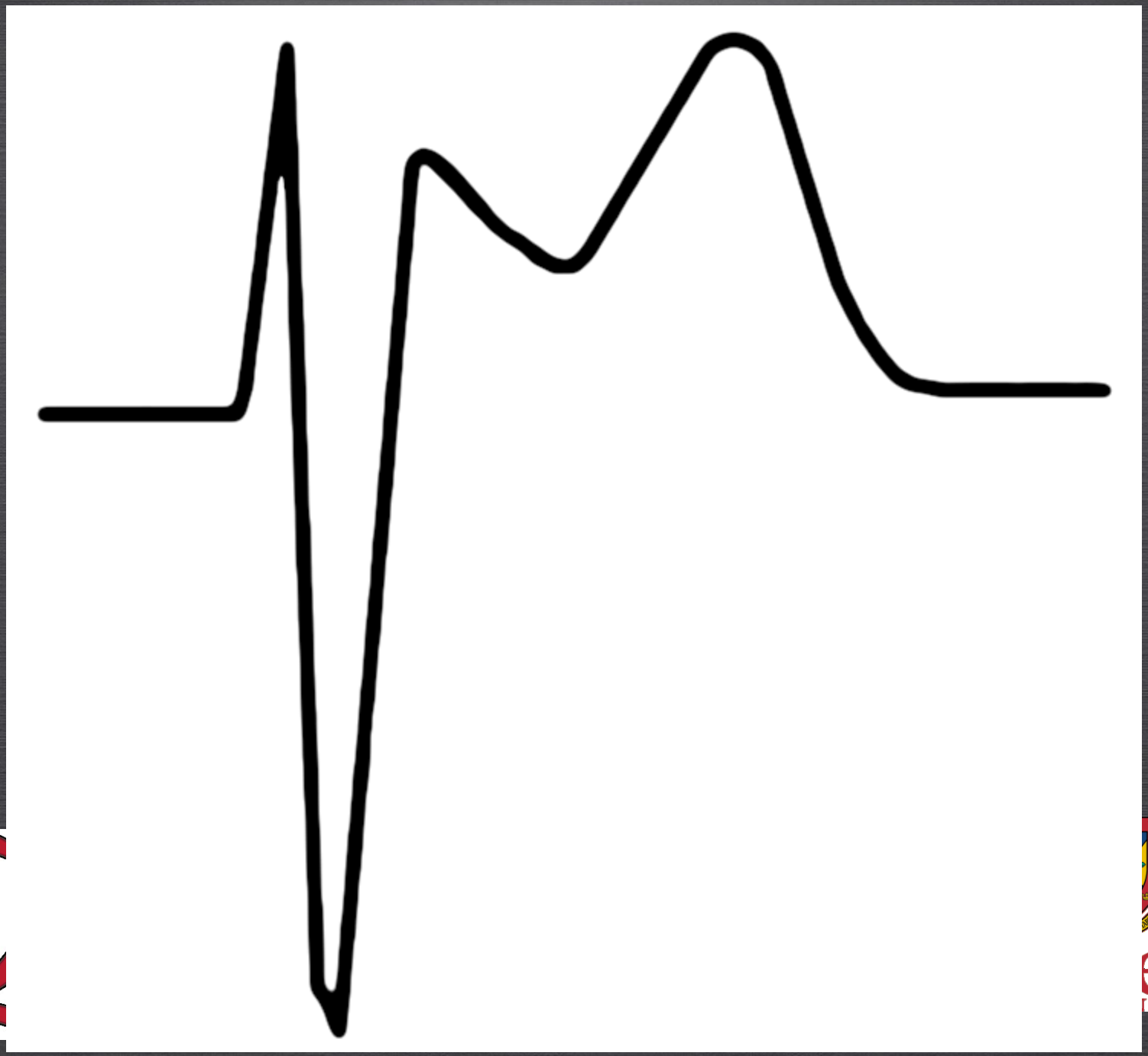
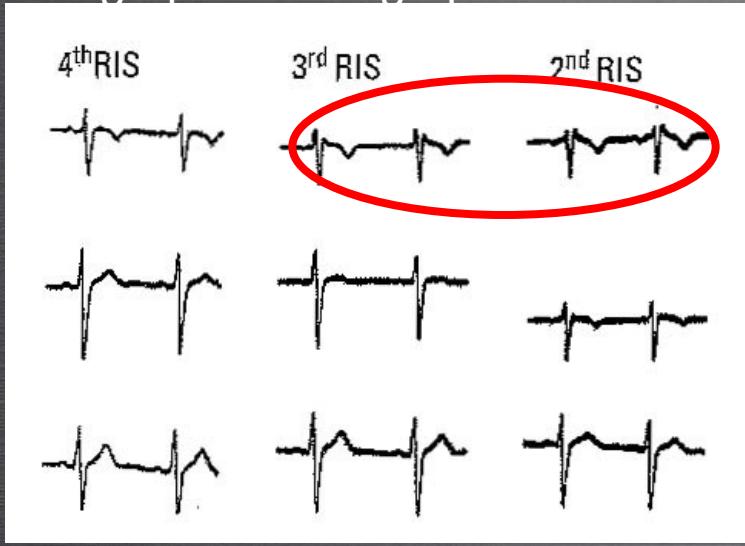
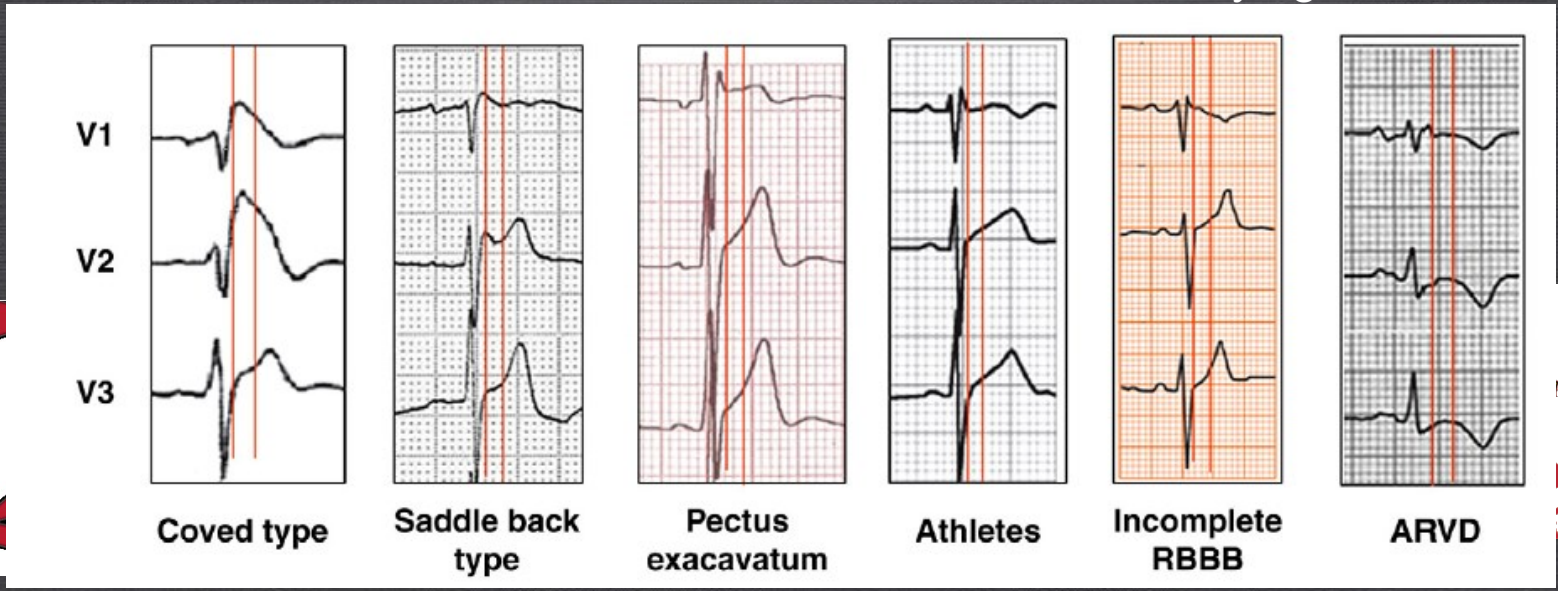


Type-2 Differential Diagnosis

Benign pattern: high precordial leads



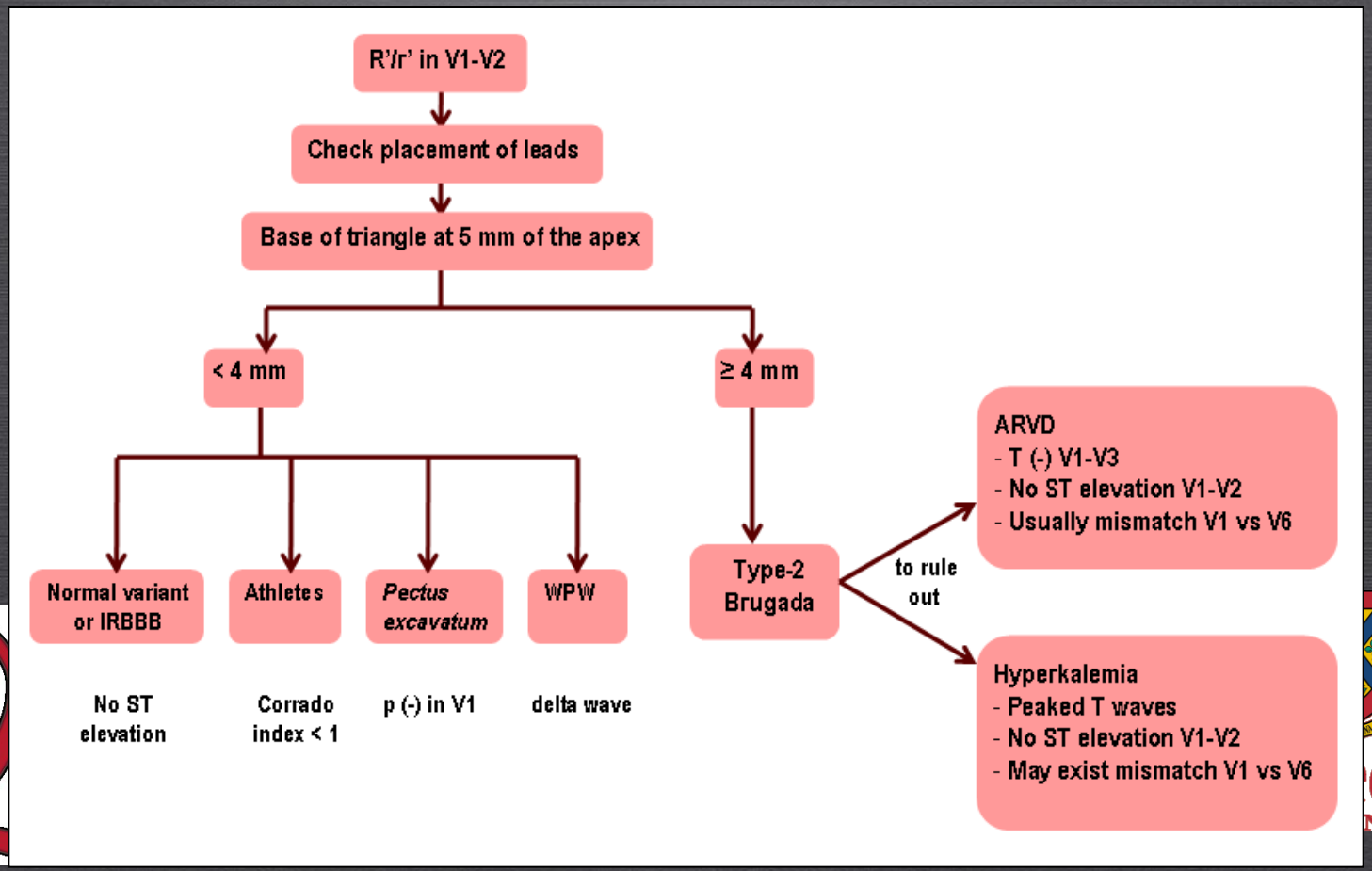
Underlying conditions



Type-2 Differential Diagnosis: Proposed algorithm

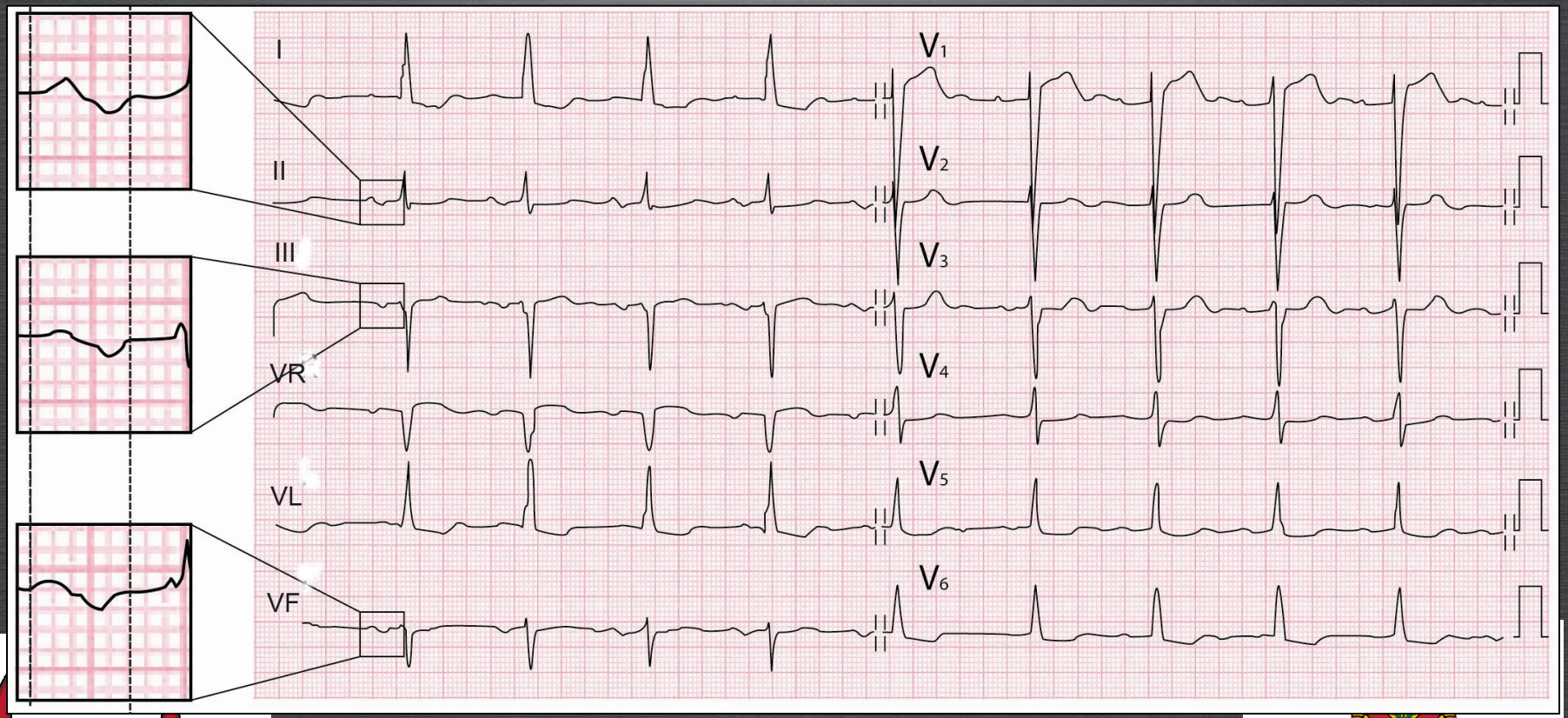
TIP

Baranchuk et al, ANE 2015



Case #3

- 77 year old woman, HTN, DM
- Frequent episodes of rapid palpitations
- Holter: pending results



Advanced Interatrial Block (aIAB)
- P-wave > 120 ms
- Biphasic P-wave morphology in the inferior leads

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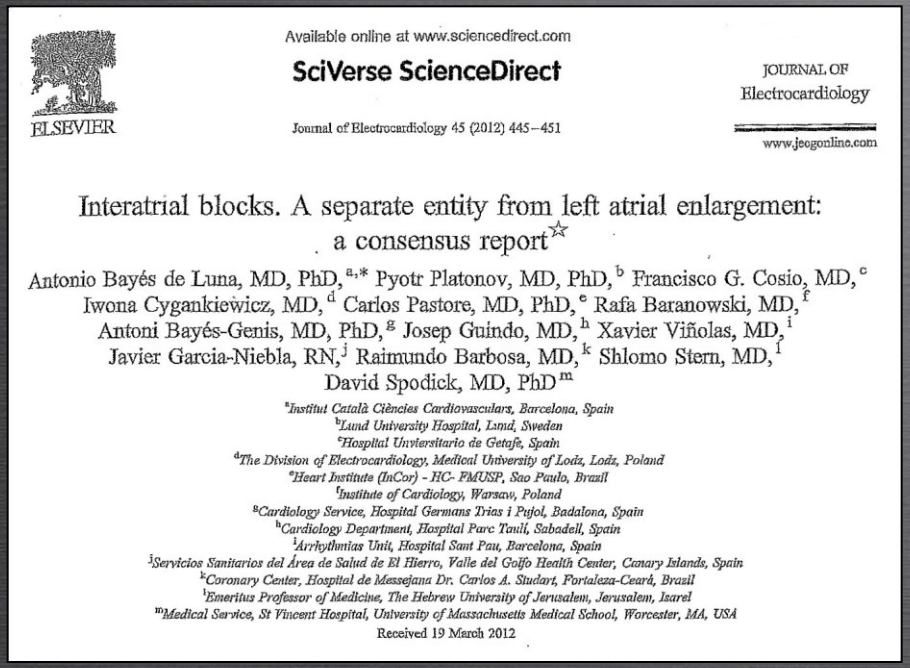
IAB: Consensus 2012



Available online at www.sciencedirect.com
SciVerse ScienceDirect
Journal of Electrocardiology 45 (2012) 445–451
JOURNAL OF Electrocardiology
www.jecgonline.com

Interatrial blocks. A separate entity from left atrial enlargement: a consensus report☆

Antonio Bayés de Luna, MD, PhD,[a,*] Pyotr Platonov, MD, PhD,[b] Francisco G. Cosio, MD,[c] Iwona Cygankiewicz, MD,[d] Carlos Pastore, MD, PhD,[e] Rafa Baranowski, MD,[f] Antoni Bayés-Genis, MD, PhD,[g] Josep Guindo, MD,[h] Xavier Viñolas, MD,[i] Javier Garcia-Niebla, RN,[j] Raimundo Barbosa, MD,[k] Shlomo Stern, MD,[l] David Spodick, MD, PhD[m]

[a]Institut Català Ciències Cardiovasculars, Barcelona, Spain
[b]Lund University Hospital, Lund, Sweden
[c]Hospital Universitario de Getafe, Spain
[d]The Division of Electrocardiology, Medical University of Lodz, Lodz, Poland
[e]Heart Institute (InCor) - HC- FMUSP, Sao Paulo, Brazil
[f]Institute of Cardiology, Warsaw, Poland
[g]Cardiology Service, Hospital Germans Trias i Pujol, Badalona, Spain
[h]Cardiology Department, Hospital Parc Taulí, Sabadell, Spain
[i]Arrhythmias Unit, Hospital Sant Pau, Barcelona, Spain
[j]Servicios Sanitarios del Área de Salud de El Hierro, Valle del Golfo Health Center, Canary Islands, Spain
[k]Coronary Center, Hospital de Messejana Dr. Carlos A. Studart, Fortaleza-Ceará, Brasil
[l]Emeritus Professor of Medicine, The Hebrew University of Jerusalem, Jerusalem, Israel
[m]Medical Service, St Vincent Hospital, University of Massachusetts Medical School, Worcester, MA, USA

Received 19 March 2012

In 2012, Bayes de Luna and a group of experts published the first consensus on IAB

Classification

1. Partial IAB: P-wave >120 ms
2. Advanced IAB: P-wave >120 ms + Morphology +/- in inferior leads

Also

1st degree

2nd degree

3er degree

Very frequent association with SV Arrhythmias, particularly AF

<u>IAB was found a predictor of AF in</u>:

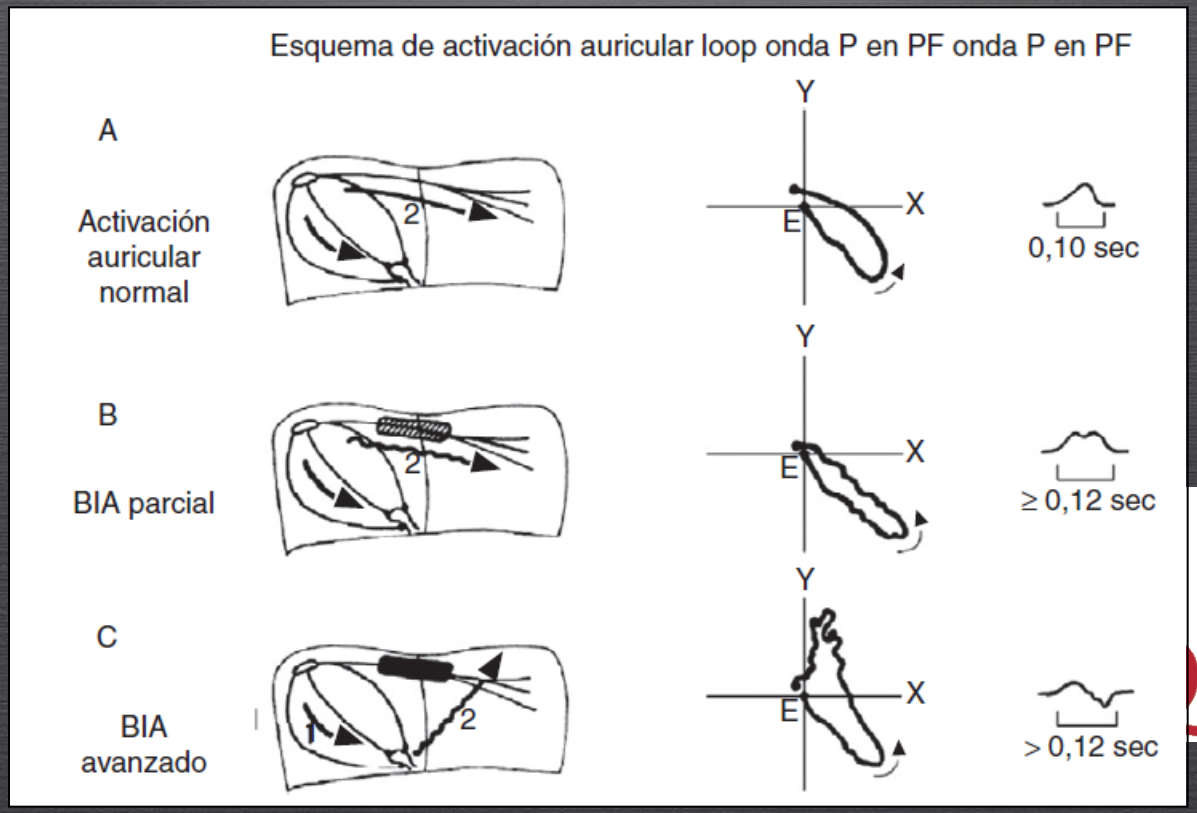
- Post-cardioversion
- Post PVI
- Post flutter ablation
- Chagas' disease
- Elderly
- General population

Bayés' syndrome: the association of Advanced IAB + supraventricular arrhythmias

Bloqueo interauricular como sustrato anatómico-eléctrico de arritmias supraventriculares: síndrome de Bayés

Diego Conde[a,*] y Adrián Baranchuk[b]

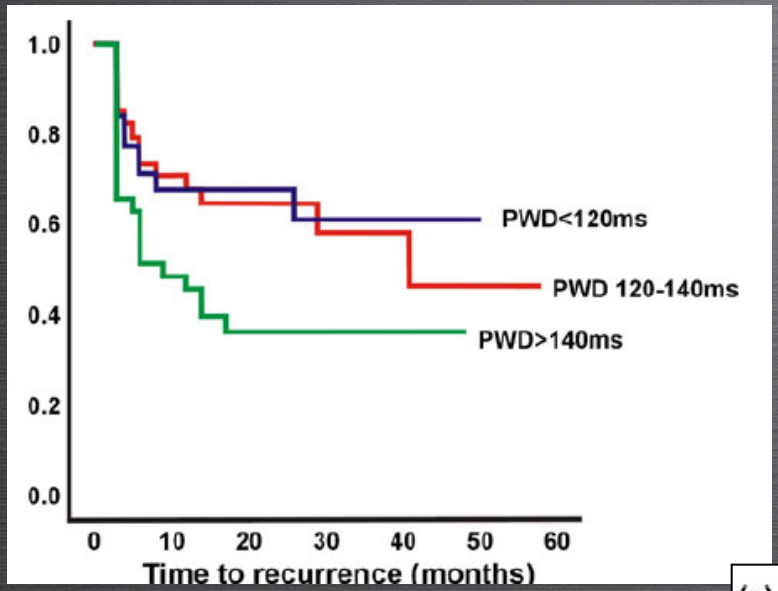
Arch Mex Cardiol 2014



Prolonged P-wave duration is associated with atrial fibrillation recurrence after successful pulmonary vein isolation for paroxysmal atrial fibrillation

Jane Caldwell · Sahil Koppikar · Walid Barake · Damian Redfearn · Kevin Michael · Christopher Simpson · Wilma Hopman · Adrian Baranchuk

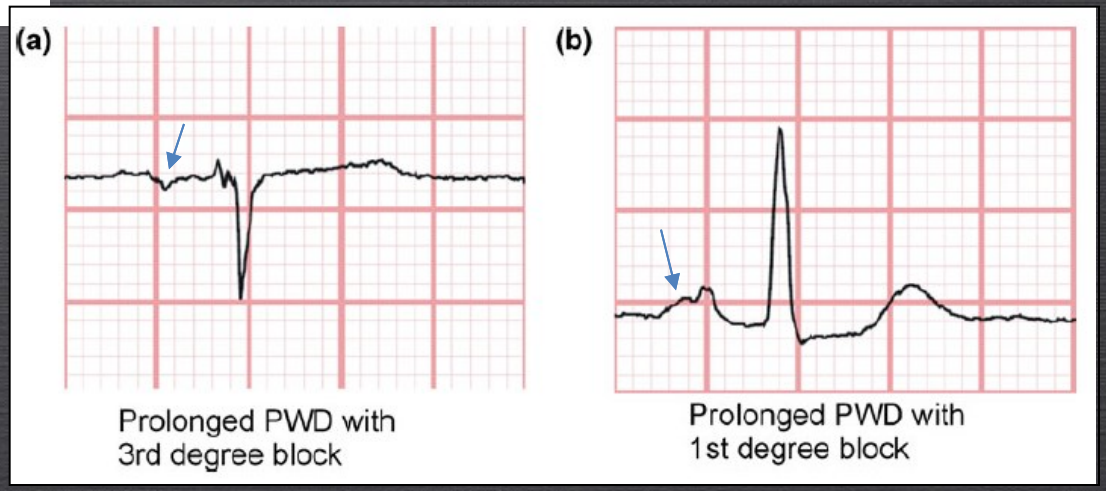
JICE 2013



	max PWD ≥140 ms n=15	max PWD <140 ms n=21
Initial SR	8	16
No of pulmonary veins reconnected	2.7±1.1*	3.4±1.1
Substrate ablation	7*	3
Re-recurrence	7	6

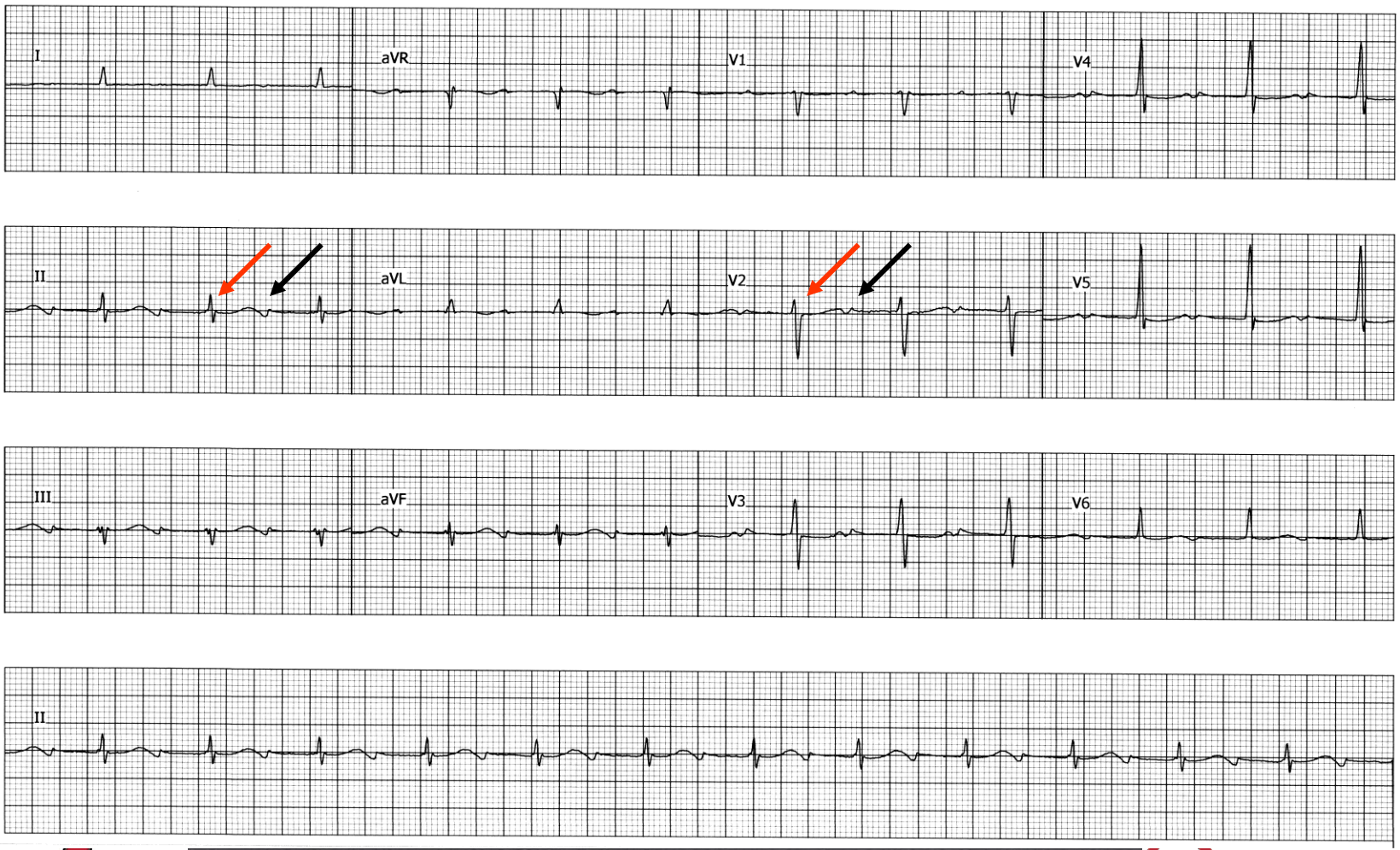
(n=170)

Advanced IAB predicts AF recurrence after PVI



Case #4

- P-wave in the middle of RR
- - retrograde P-waves
- Pseudo ‘R-waves in V1



2:1 AVNRT

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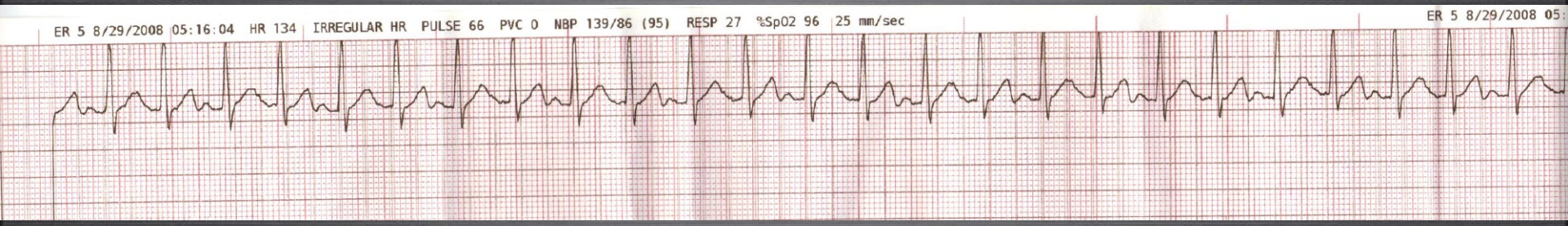
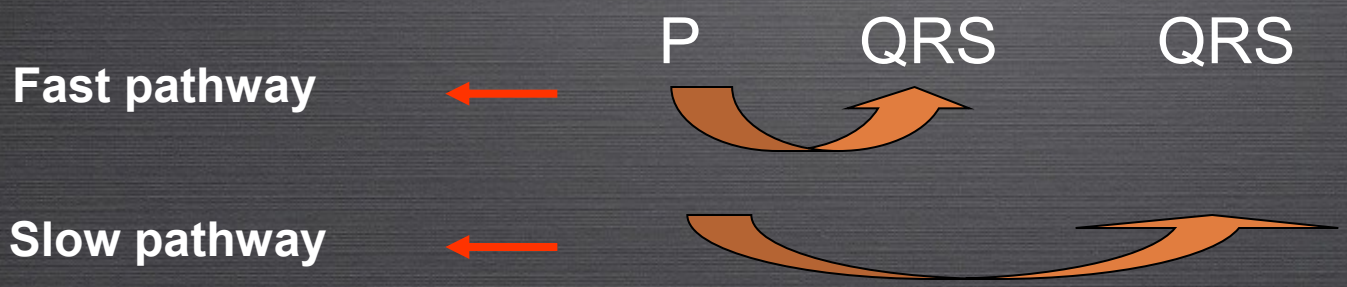
Case #5

- Narrow complex
- Slightly irregular
- 1 P-wave, 2 QRS





"2 x 1" Tachycardia

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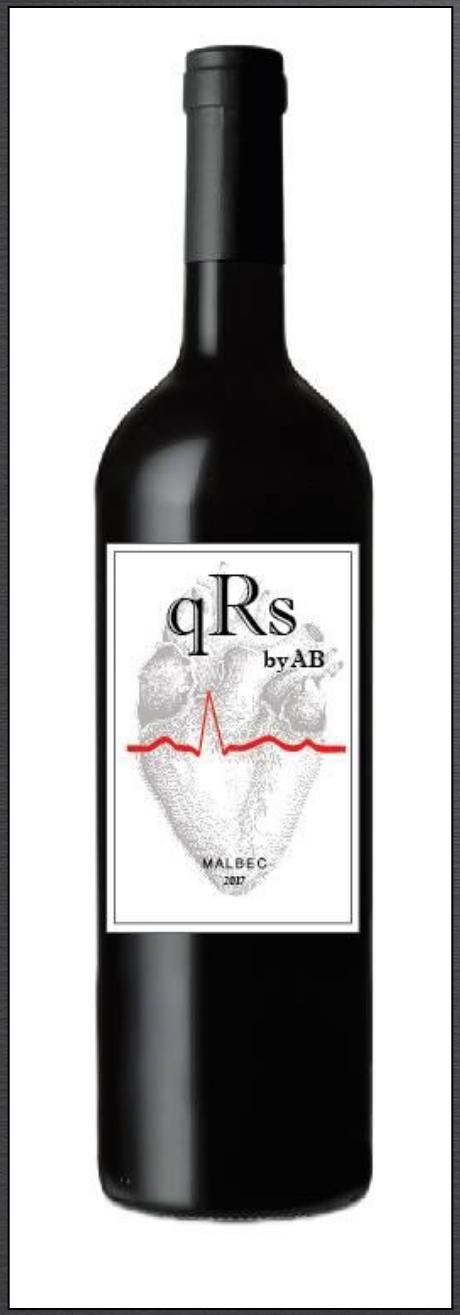

Thanks for your attention!!!

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