WPW and Brugada syndrome: what do they have in common?

Prof. Fiorenzo Gaita
WPW and Brugada
What do they have in common?

1. Electrocardiographic diagnosis, in anatomically normal heart

Wolff L, Osher HL, 1953
Described the 1° ECG with Brugada pattern

A 39-year-old man with no clinical evidence of heart disease.
WPW and Brugada
What do they have in common?

1. Electrocardiographic diagnosis, in anatomically normal heart

2. Once the diagnosis has been made, these patients have a low mortality rate, but the first event may be sudden cardiac death

3. EPS can be helpful in stratifying the risk of sudden death

4. Both of them have a substrate target for catheter ablation
Risk of death in 363 WPW patients 1982-1992

Associated cardiopathies in 12 patients (3.3%)

3 patients died, 1 of SD, 0.03 per 100 person-year

# Natural history of 1642 pts with WPW

<table>
<thead>
<tr>
<th>Authors</th>
<th>NEJM '68</th>
<th>Circulation '90</th>
<th>Am J Cardiol 1989</th>
<th>Circulation '93</th>
<th>Am Heart J '00</th>
<th>JACC '09</th>
<th>Heart '00</th>
<th>Circulation '95 (abstr)</th>
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<tbody>
<tr>
<td>Berkman et al</td>
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<td>Leitch et al</td>
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## COMPLICATIONS OF TC ABLATION OF WPW

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<thead>
<tr>
<th></th>
<th>Pts</th>
<th>Complications</th>
<th>Tamponade</th>
<th>AV block</th>
<th>Stroke</th>
<th>Death</th>
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<td>Total</td>
<td>9125</td>
<td>218 (2.4%)</td>
<td>32 (0.32%)</td>
<td>30 (0.30%)</td>
<td>24 (0.26%)</td>
<td>0.08%</td>
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<td>with SCD</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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**SCD: 9/1642 pts 0.5 %**

**Mean SCD per year 0.03 %**

*SCD was the first event 60%*
Brugada Piedmont Prospective Registry

2001-2016

826 pts → 12 diagnosed after Sudden Death

total 814 pts

Participants

- Torino
- Alessandria
- Asti
- Cuneo
- Novara
- Orbassano
- Pinerolo
- Rivoli
- Vercelli
Deaths in the Brugada Piedmont Registry:
814 pz f-up from 2001-2016

6 deaths

3 NOT Brugada related:
1 myocardial infarction
1 cancer
1 old age

3 sudden deaths

Sudden Deaths 3/814
0.07% events-year

WPW
0.03 %
How we treated ALL the patients with Brugada ECG pattern

Avoid drugs that may increase the ST segment elevation [www.brugadadrugs.org](http://www.brugadadrugs.org)

Promptly treat fever
How we treated Brugada patients

1. aSD
   - ICD
   - if still arrhythmic events: HQ/Ablation

2. unexplained SYNCOPE
   - EPS +
   - ICD
   - Follow-up/loop recorder +/- HQ
   - EPS -
   - HQ
   - EPS +
   - EPS -
   - F-up

3. neurally mediated SYNCOPE / ASYMPTOMATIC
   - Spontaneous type 1 ECG
   - Drug-induced type 1
   - 12 lead Holter: Spontaneous type 1
   - F-up

yes

NO

F-up
Brugada Piedmont Prospective Registry

826 pts → 12 diagnosed after Sudden Death

total 814 pts

2001-2016

Symptoms at presentation

Asymptomatic 608

aSD 11

1%

Syncope 195

608 (75%)

118 (15%)

77 (9%)
Brugada Piedmont Registry 2001-2016

pts with history of SD 23(2.9%)

- 12 (52%) diagnosed after SD
- 11 aborted SD

- 10 ICD
- 1 child → HQ and loop recorder

follow-up 74 ± 45 months

NO DEATHS
Arrhythmic events in pts with aSD

60%
12% per year

f-up 74 months

Gaita, Giustetto Piedmont Brugada Registry
pts with Syncope

f-up 74 ± 45 m

Syncope: 195 (24%)

77 unexplained syncope
118 neurally mediated syncope

53 (69%) ICD
20 (17%) HQ + Loop

16 (21%) HQ + Loop

But... again, NO DEATHS

Giustetto et al Int. J. of Cardiology 2017;241:188-193
118 neurally-mediated vs 77 unexplained syncope

Neurally mediated

Unexplained

2 (1.6%) (0.3% person-year)

6 (9.0%) (1.8% person-year)

Giustetto et al Int. J. of Cardiology 2017;241:188-193
Role of EPS in pts with UNEXPLAINED SYNCOPE

27% 5.2% per year

0 events

Freedom from arhythmic events

p = 0.007

pos EPS

neg EPS

pos EPS

neg EPS

Giustetto et al Int. J. of Cardiology 2017;241:188-193
in Asymptomatic pts
f-up 74 ± 45 m

Asymptomatic pts: 608

This means that we have stratified and treated properly the symptomatic patients, but we still have to improve risk stratification and treatment of the asymptomatic patients

3 DEATHS
+ 3 events ICD
Can ablation improve these results?

Prevention of Ventricular Fibrillation Episodes in Brugada Syndrome by Catheter Ablation Over the Anterior Right Ventricular Outflow Tract Epicardium

Koonlawee Nademanee, MD; Gumpanart Veerakul, MD; Pakorn Chandanamattha, MD; Lertlak Chaothawee, MD; Aekarach Ariyachaipanich, MD; Kriengkrai Jirasirirojanakorn, MD; Khanchit Likittanasombat, MD; Kiertijai Bhuripanyo, MD; Tachapon Ngarmukos, MD

Circulation 2011, 123: 1270-79

Brugada Syndrome Phenotype Elimination by Epicardial Substrate Ablation

Josep Brugada, MD*; Carlo Pappone, MD, PhD*; Antonio Berruezo, MD, PhD; Gabriele Vicedomini, MD; Francesco Manguso, MD, PhD; Giuseppe Ciconte, MD; Luigi Giannelli, MD; Vincenzo Santinelli, MD

Brugada, circ arrh el 2015
9 Brugada ICD patients

2-6 shock previous month

RVOT mapping, endo and epicardial

Low and fractionated potentials

Nademane Circulation 2011
RF epicardial ablation

Complications: 2 pericarditis, resolved spontaneously in 1 week

2 years followup

1 VF recurrence

Progressive ECG normalization

Fragmented potential abolition

Before Ablation 1 Mo. Post Ablation 3 Mo. Post Ablation

V1
V2
V3

V1
V2
V3

V1
V2
V3

Nademanee Circulation 2011
RVOT areas of low and fractionated potentials

Area dimension increased after flecainide

17.6 cm² → 28.5 cm²
Brugada pattern
50-year-old patient with history of aborted sudden death

ECG h. 8.00

ECG h. 14.00

50 mm/sec

V1 II

V2 II

V1 III

V2 III

50 mm/sec

V1 II

V2 II

V1 III

V2 III
Ajmaline infusion

240 ms
After radiofrequency ablation
Basal ECG

Post Ablation

1 month FU

50 mm/sec

V1 II

V2 II

V1 III

V2 III

50 mm/sec

V1 II

V2 II

V1 III

V2 III

25 mm/sec

V1 II

V2 II

V1 III

V2 III
Catheter ablation in Brugada patients

Ablation should be considered in all patients with a single appropriate ICD shock.
Patients with Brugada syndrome, as in WPW syndrome, have low risk of death if correctly treated.

EPS can be helpful to stratify risk in both syndromes.

Ablation is curative in WPW patients, while in Brugada syndrome doesn’t replace ICD yet.

We need randomized studies before considering ablation as an alternative to ICD implantation, or to enlarge the indication to asymptomatic patients.
Thank you for your attention