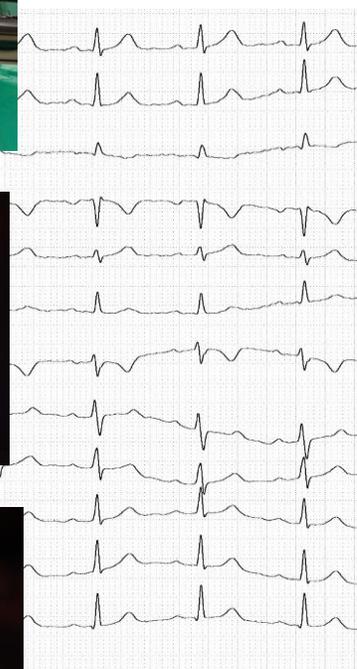
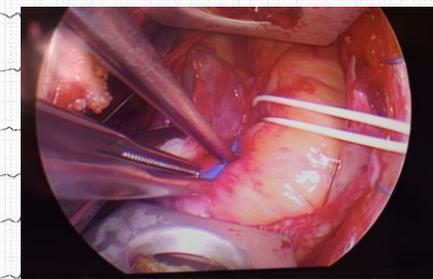
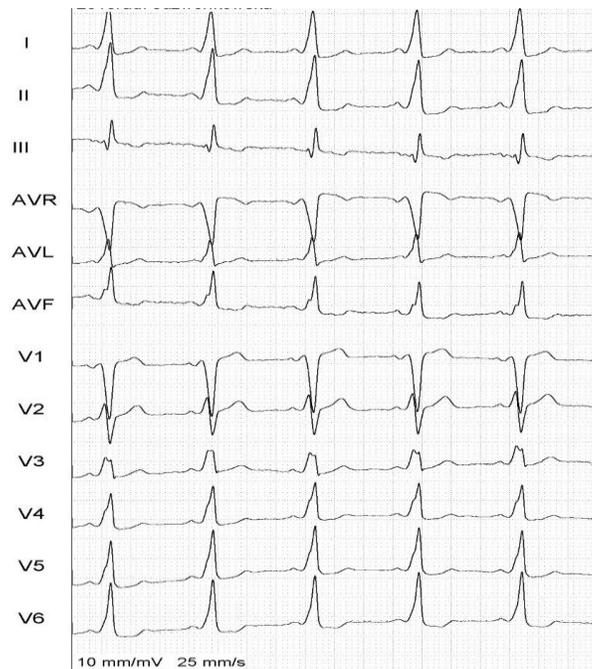




„Hybrid solution
in high-end complex WPW for
cases”

Sebastian Stec MD, PhD, FESC & Piotr Suwalski
Chair of Electroradiology, Faculty of Medicine,
Univ. of Rzeszow, Rzeszow, Poland

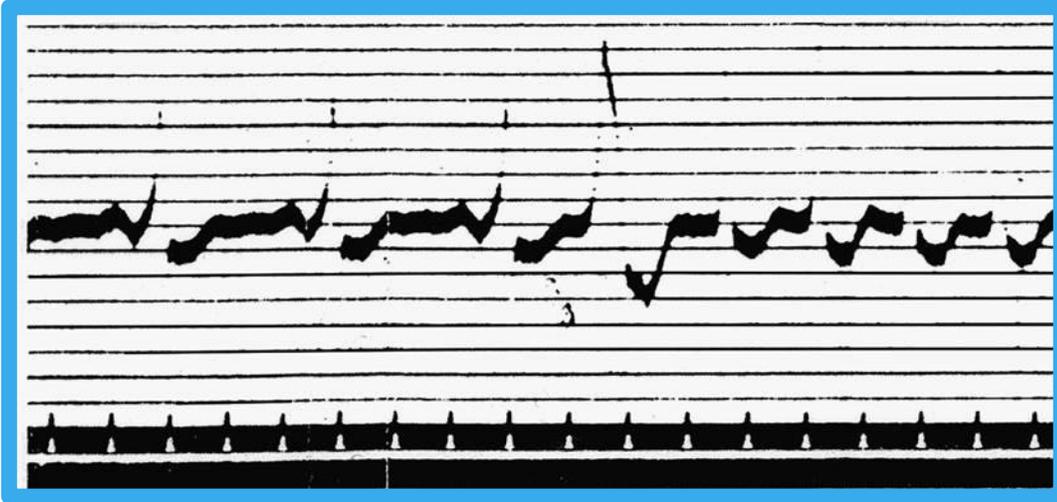


Potential conflicts of interest

Sebastian Stec:

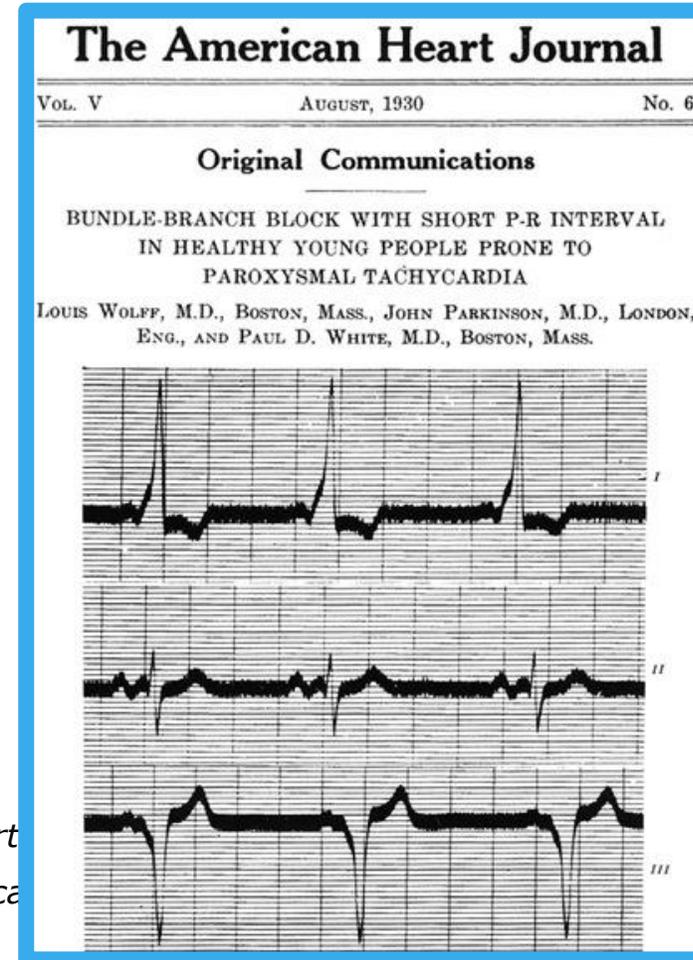
- ✦ I have the following potential conflicts of interest to report:
- ✦ Medinice stocks holder, patents: Cryoapplicator, Cathaio catheter, MiniMAX catheter, PACEPRESS

Pre-excitation and WPW syndrome



Cohn AE, and Fraser FR. Paroxysmal tachycardia and the effect of stimulation of the vagus nerve by pressure. Heart 1913-14;5:93-105

Wolff L, Parkinson J and White PD. Bundle branch block with short interval in healthy young people prone to paroxysmal tachycardia. Am Heart J 1930



Pre-excitation and WPW syndrome

All 4 features

in sinus rhythm:

- **short PQ interval**
- **prolong QRS**
- **delta wave**
- **ST-T wave abnorms**

Asymptomatic or

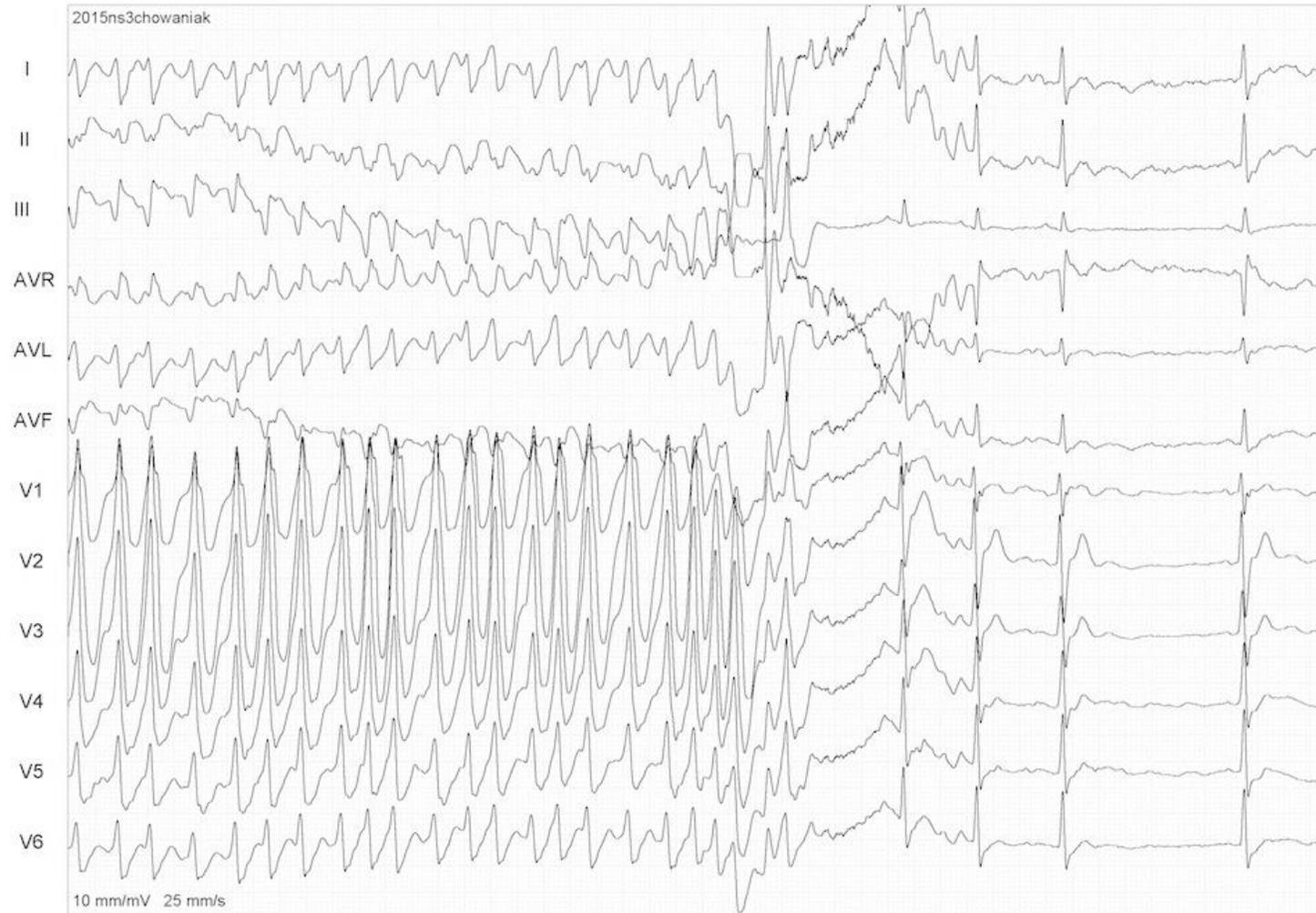
associated with paroxysmal tachycardias or palpitations (syndrome)



Pre-excitation and WPW syndrome

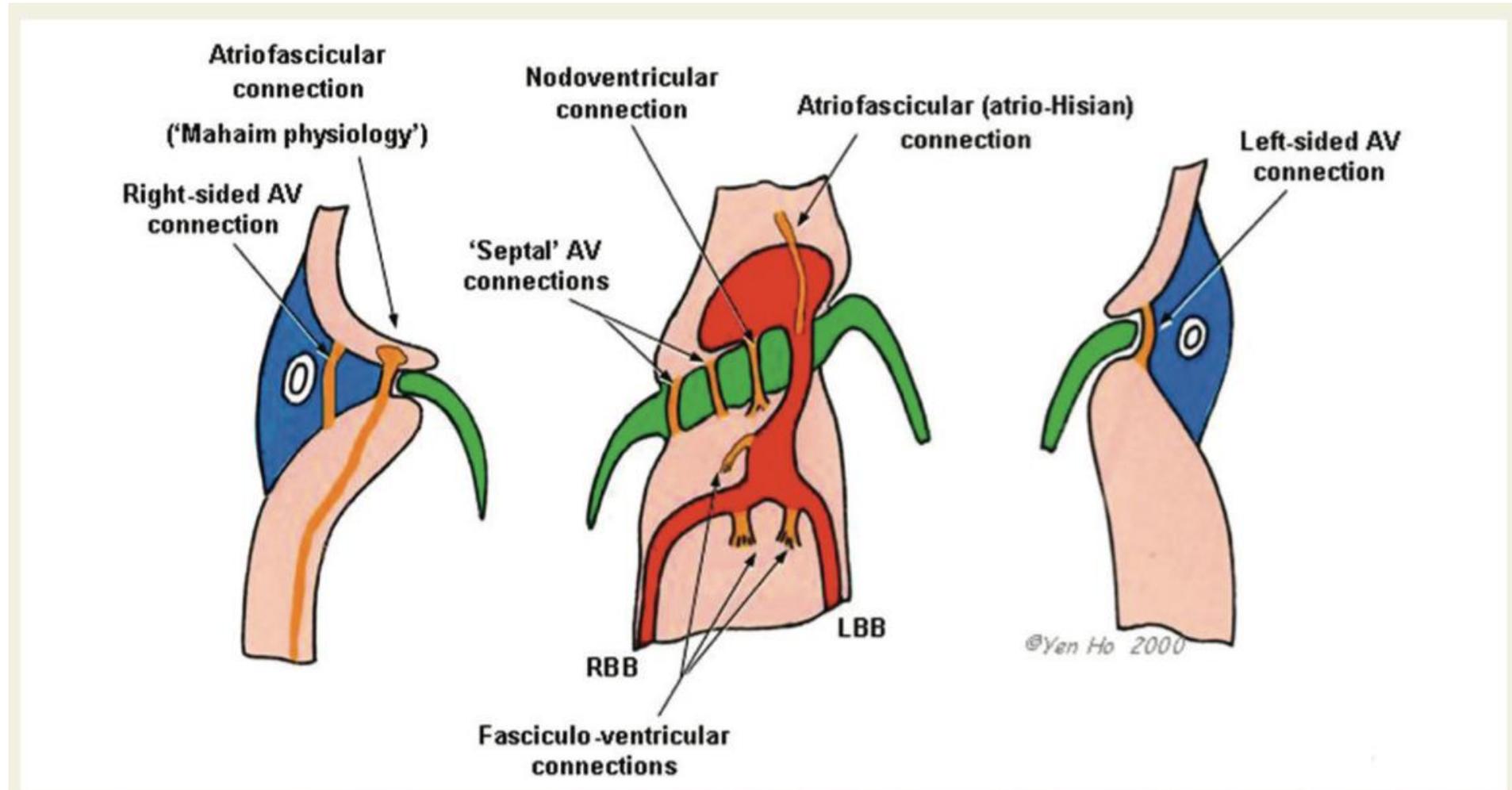
Risk of:

- syncope
- tachycardias
- DCM
- AF
- SCD



FBI - Fast Broad and Irregular - AF with pre-excitation - DC -> SR

Accessory pathways or connections



Catheter ablation for WPW syndrome

No structural heart disease and defects

-
- I B- 1. Catheter ablation of the accessory pathway is recommended in patients with AVRT and/or pre-
NR NR excited AF (55,165,187–193).
-

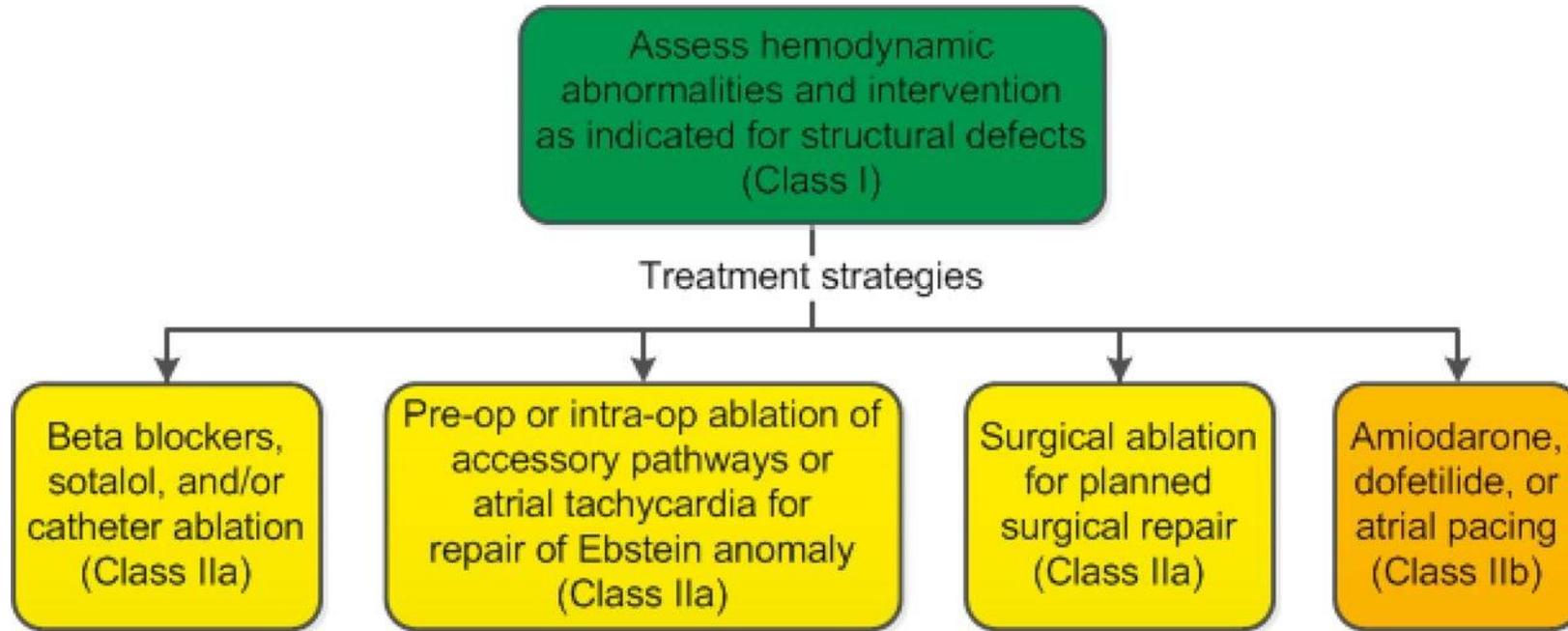
Gold tip catheters, sheaths, cryoablation, irrigated tips,
transeptal/epicardial/ coronary sinus approach, 3D- mapping > 99% success rate (redo)



**No indications/ trials / case series
on hybrid/surgical ablation in XXIst century**

Catheter and Surgery ablation for SVT/ WPW synd.

Adult congenital heart diseases and defects



For planned surgical repair only

Richard L. Page et al. JACC 2016;67:1575-1623

WPW syndrome for Hybrid ablation

Hybrid procedure

1. Past medical history

- prior several EPs and
- failed catheter ablations (n=4-6, 3 - 5 different centers)

2. Pre-procedural examination

- final failed catheter ablation with 3D-EAM and mapping
- prior coronary arteries/veins angiography
- EP-HEART-TEAM consultations

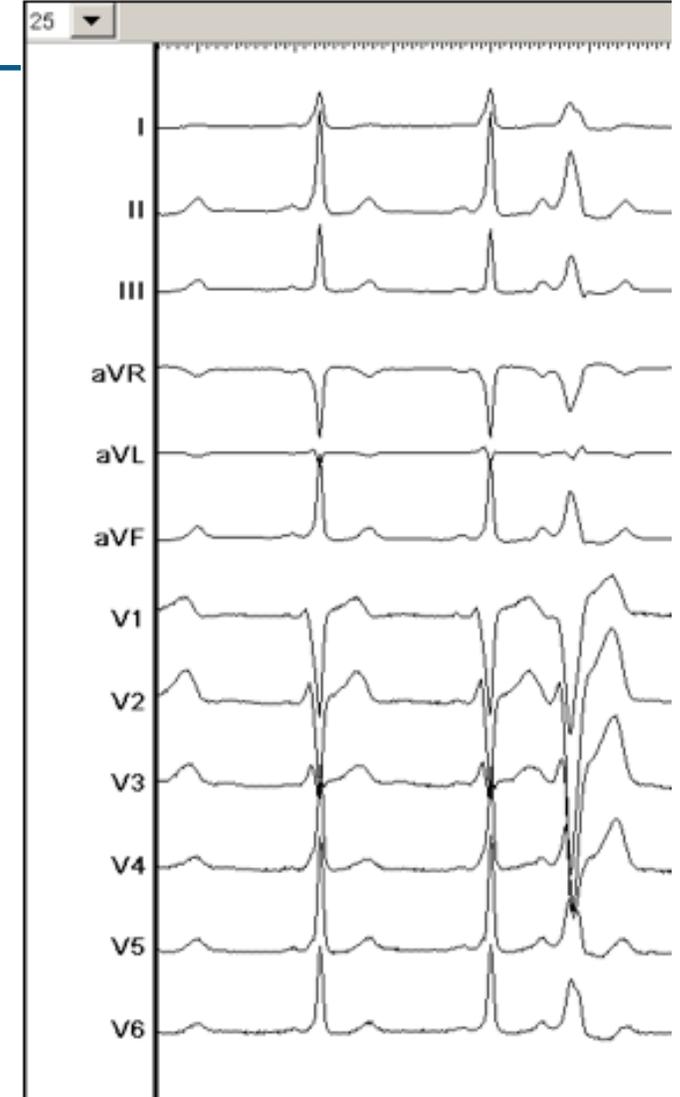
WPW syndrome for Hybrid ablation

Equipment and approach:

- **EP system**
- **3D-EAM**
- **1 decapolar endocardial catheter from jugular vein**
- **Cryoapplicator/cryoconsole**
- **Bipolar/Unipolar RF generator**
- **1 mapping epicardial catheter**
- **Full-thoracoscopic epicardial approach as intention-to -treat**
- **Zero-fluoroscopy approach for endocardial mapping**

Hybrid cryoablation with 3D mapping WPW syndrome, OAVRT 220 bpm, 4 failed ablation including epicardial approach

- 23-year-old sportsman
- Prior 3 failed RF endocardial,
- Prior 1 failed epicardial RF catheter ablation
- Permanent pre-excitation with ERP <230 msec
- every week palpitation after exercise
- documented narrow QRS tachycardia > 200 bpm
- failed several drugs
- occupation: fitness consultant



Hybrid approach - Different hopes/dreams of Cardiac surgeon vs Electrophysiologist

Cardiac surgeon hopes:

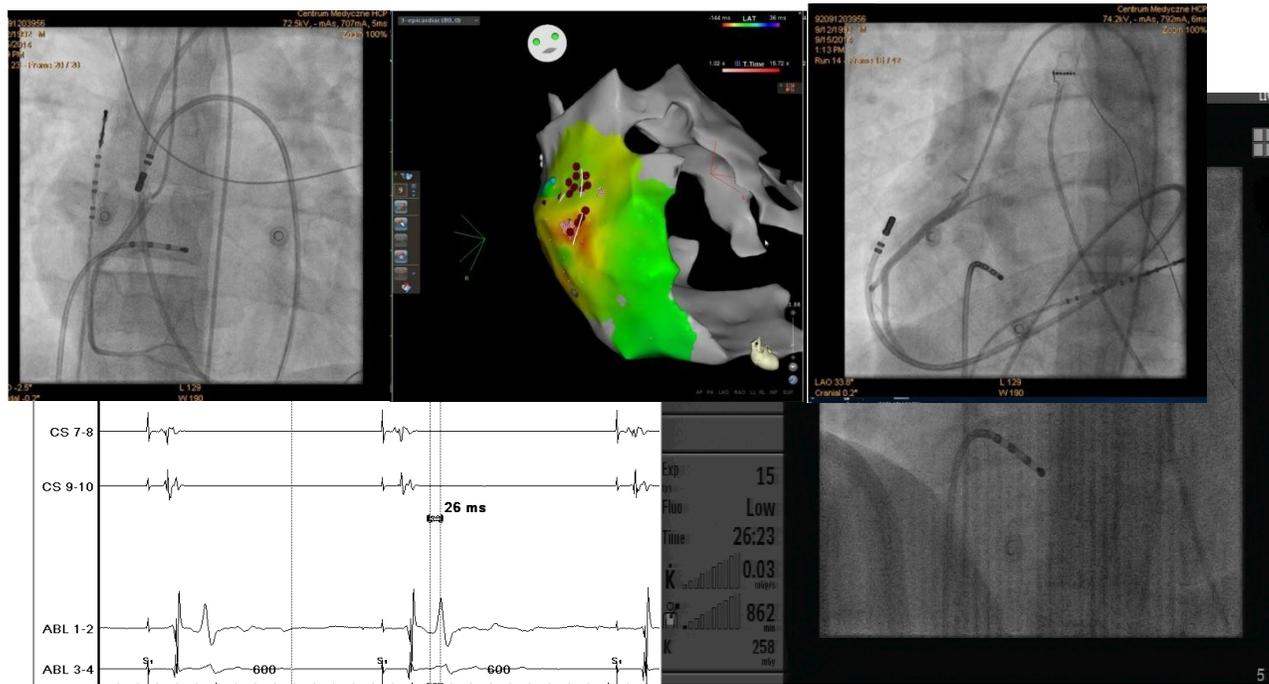
- fully- thoracoscopic
- off-pump
- no artery on the way
- no bleedings



Electrophysiologist dreams:

- persistent pre-excitation
- OAVRT inducible
- no more pathways
- no cardioplegia
- no AF/VF during procedure
- no mechanical block

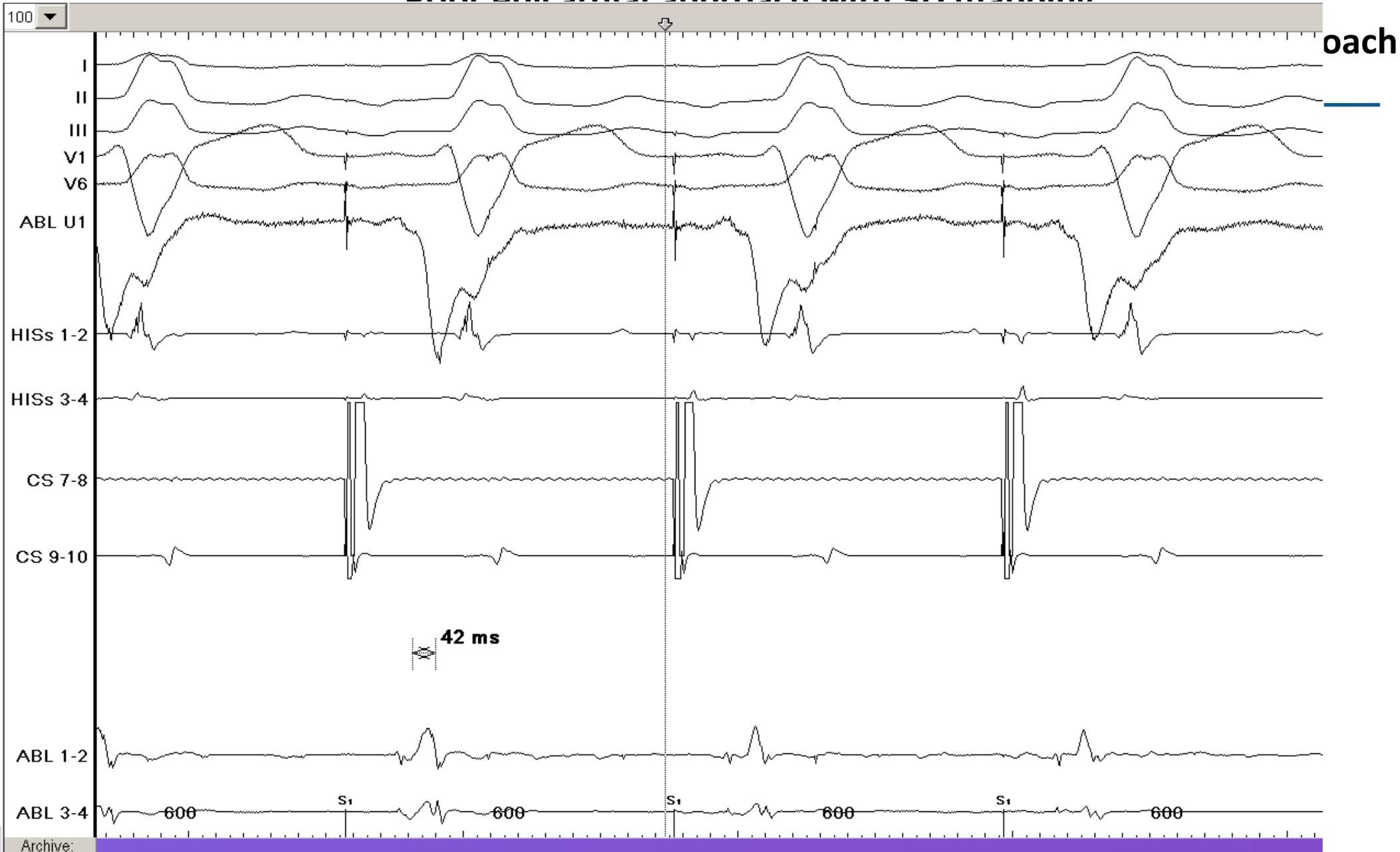
Prior epicardial approach with 3D mapping WPW syndrome, OAVRT 220 bpm, 4 failed ablation including epicardial approach



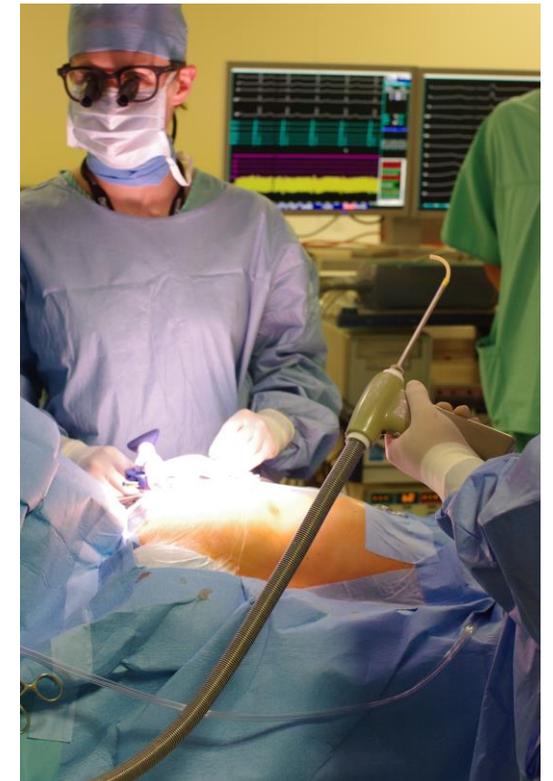
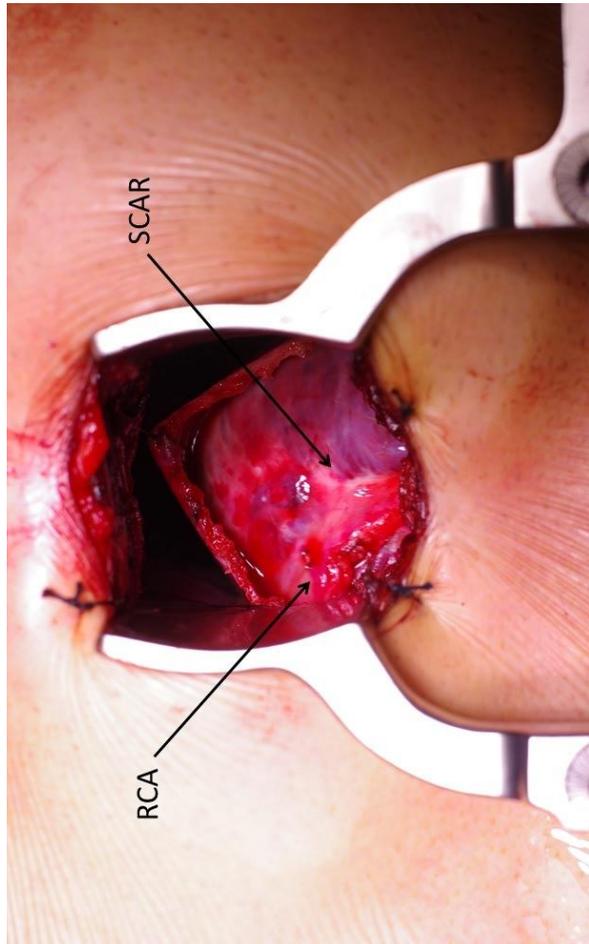
Best epicardial signals recorded from right free wall - courtesy of dr Artur Baszko

4 failed ablation including epicardial approach

Prior epicardial approach with 3D mapping

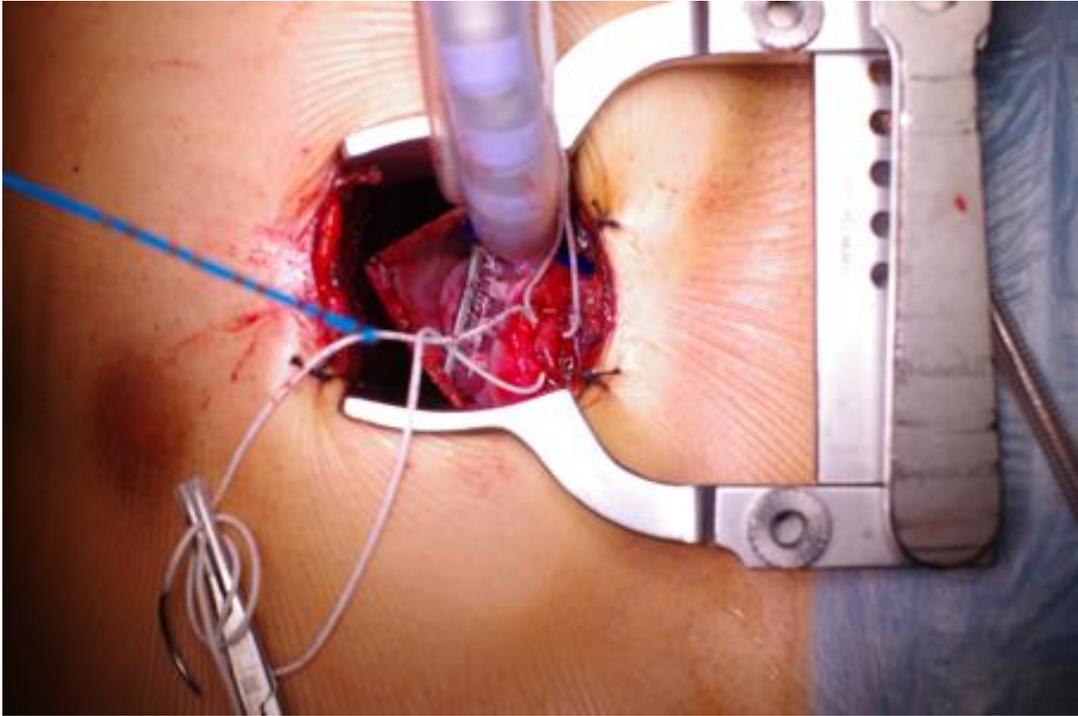


Hybrid cryoablation with 3D mapping WPW syndrome, OAVRT 220 bpm, 4 failed ablation including epicardial approach

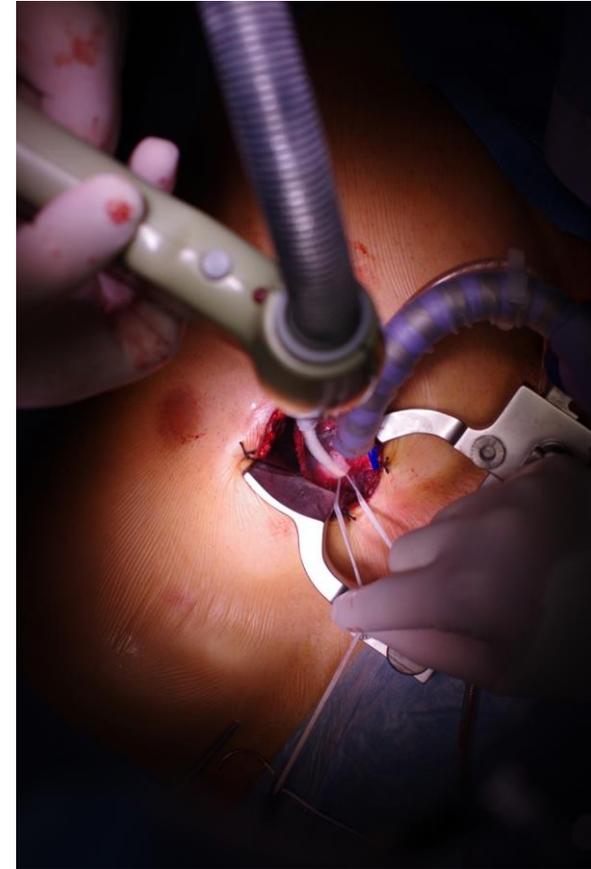


4 failed ablation including epicardial approach

**Hybrid cryoablation with 3D mapping
WPW syndrome, OAVRT 220 bpm, 4 failed ablation including epicardial
approach**



**RCA dissection
Mapping**



Deep cryoablation -180

Hybrid cryoablation with 3D mapping

WPW syndrome, OAVRT 220 bpm, 4 failed ablation including epicardial approach

Local activation time =
-42 msec prior to pre-excitation

First cryapplication - successful

Bonus cryoapplications -180°C

Total application time: 280 sec

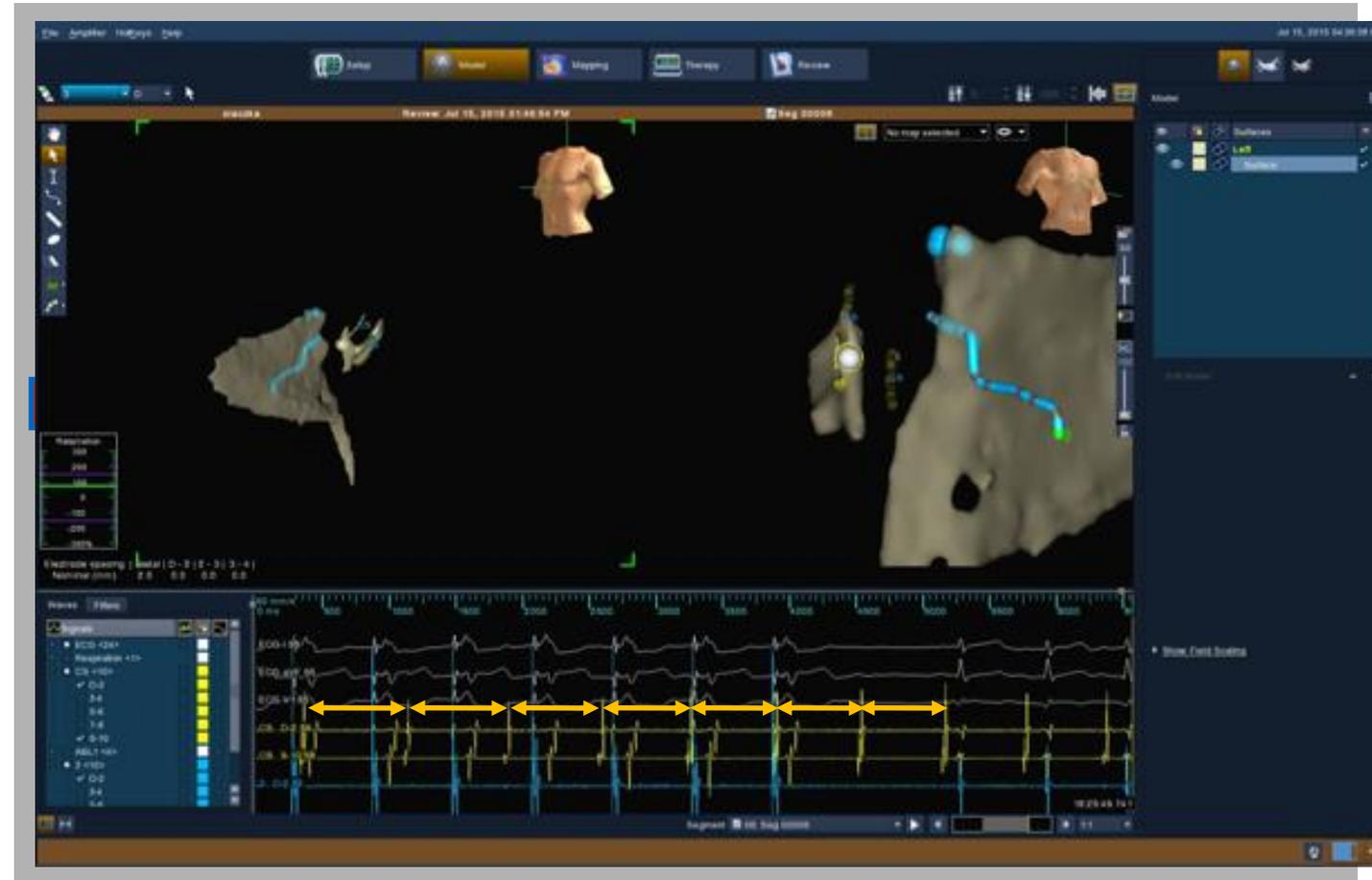
No retrograde conduction

No pre-excitation and SVT induction

Adenosine challenge - negative

Procedure time: 2 hours

Accessory pathway located under 1/2 segm of RCA - bidirectional accessory pathway block



**Hybrid cryoablation with 3D mapping
WPW syndrome, OAVRT 220 bpm during exercise,
4 failed ablation including epicardial approach**



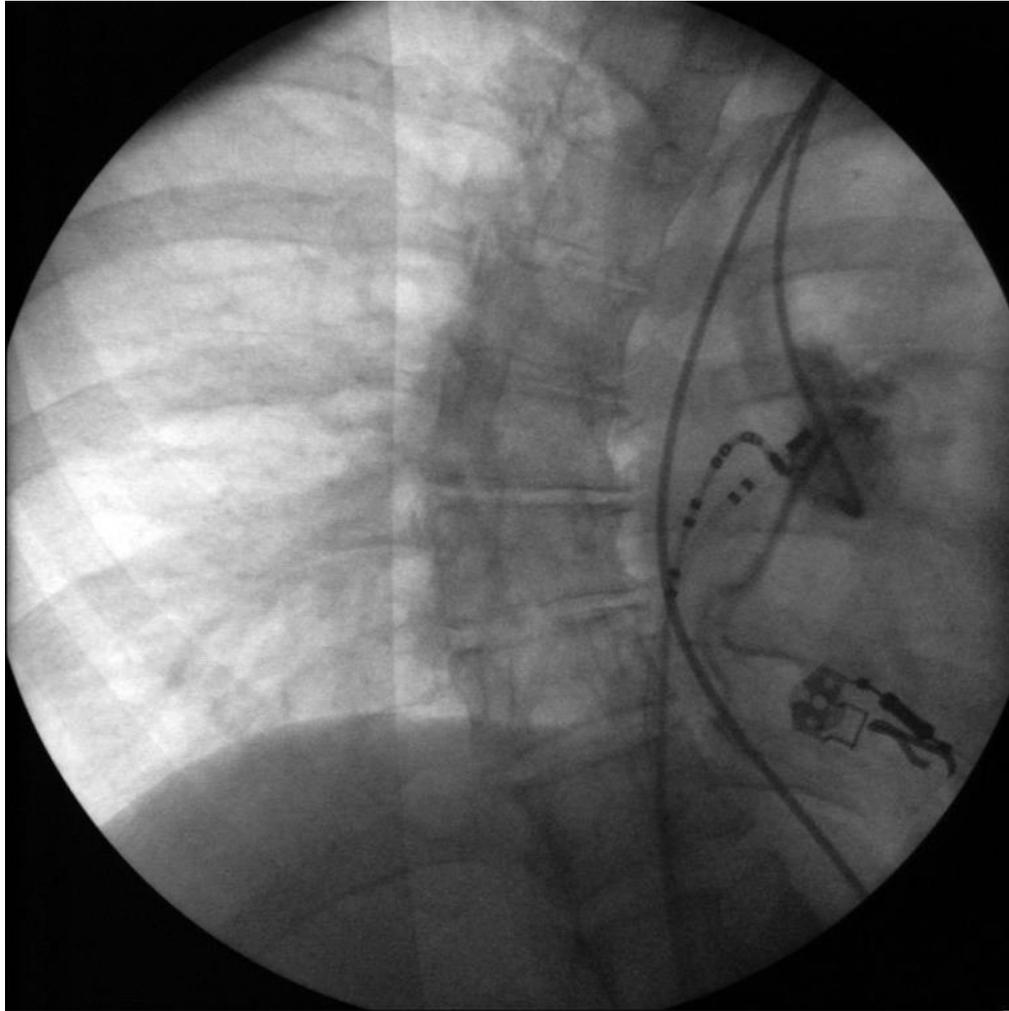
**2015 successful cryoablation of accessory pathway
located under 1/2 segm of RCA
Sportsman/ Fitness consultant**

**Follow-up after 12- months: request from the patient:
„If I am healthy please Doctor confirm in written that I have no contraindications to anything“**

Hybrid cryoablation with 3D mapping WPW syndrome, OAVRT 220 5 failed ablation including ablation from RAA – 22-11-20117

- 23-year-old women
- Prior 4 failed RF endocardial and endocardial cryoablation
- The last ablation effective for 30 minutes from RAA
- Permanent pre-excitation with ERP <240 msec
- documented narrow QRS tachycardia > 200 bpm
- failed several drugs, amiodarone effective as a last choice
- long treatment not accepted
- occupation: dentist assistant
- leisure activity: runner (training stopped due to WPW)

Hybrid cryoablation with 3D mapping WPW syndrome, OAVRT 220 5 failed ablation including ablation from RAA



Hybrid cryoablation with 3D mapping

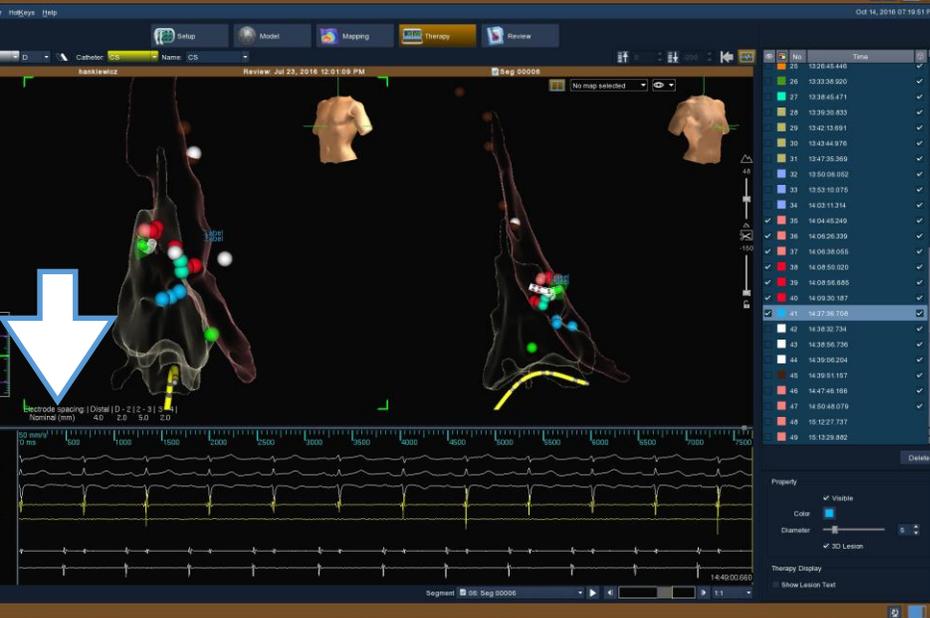
WPW syndrome, OAVRT 220

5 failed ablation including ablation from RAA

Zero-fluoroscopy till the first effective application and Angio

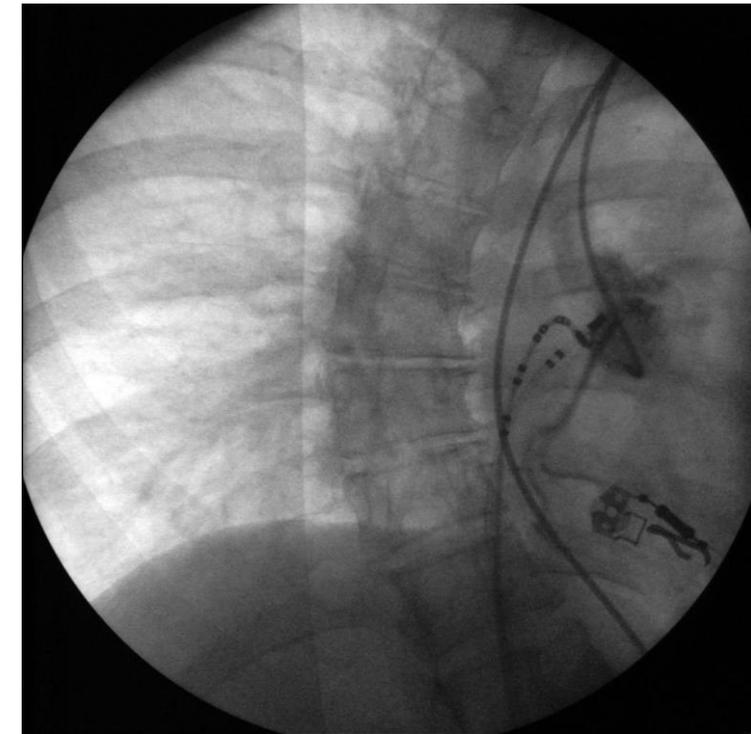
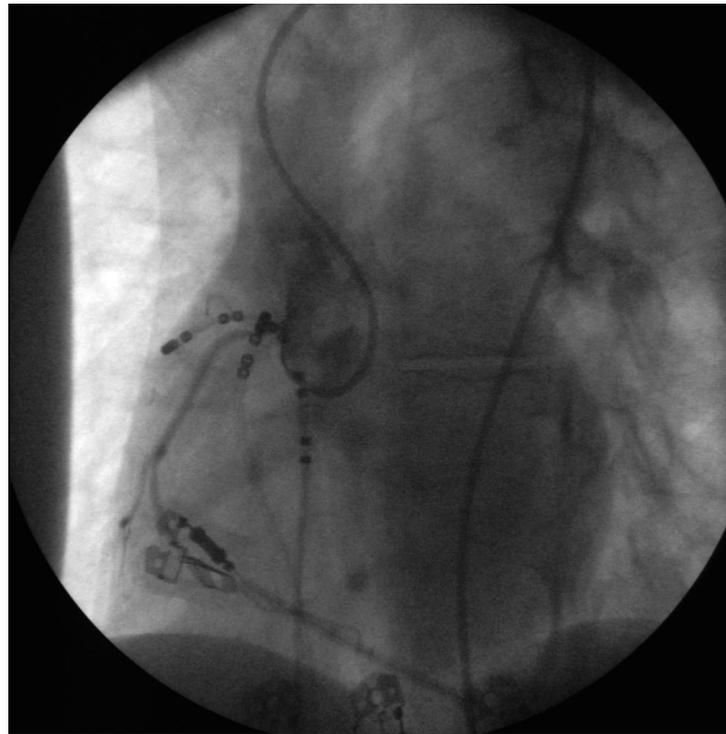
LAO

RAO



LAO

RAO



No pre-excitation after RF ablation in basal RAA

Reccurences - bonus application + pre-excitation after 30 minutes

Hybrid cryoablation with 3D mapping WPW syndrome, OAVRT 220 5 failed ablation including ablation from RAA

- Procedure: at least 2 months after amiodarone removal
- EP-HEART-TEAM consultation
- Start with RAA evaluation (RAA-RVOT connection???)
- If not: 1 segment RCA dissection
- Mapping, RCA elevation, cryoablation in AV groove
- Checking anterograde and retrograde conduction
- **Adenosine challenge**

Hybrid approach - Different hopes/dreams of Cardiac surgeon vs Electrophysiologist

Cardiac surgeon hopes:

- fully- thoracoscopic
- off-pump
- no artery on the way
- no bleedings



Electrophysiologist dreams:

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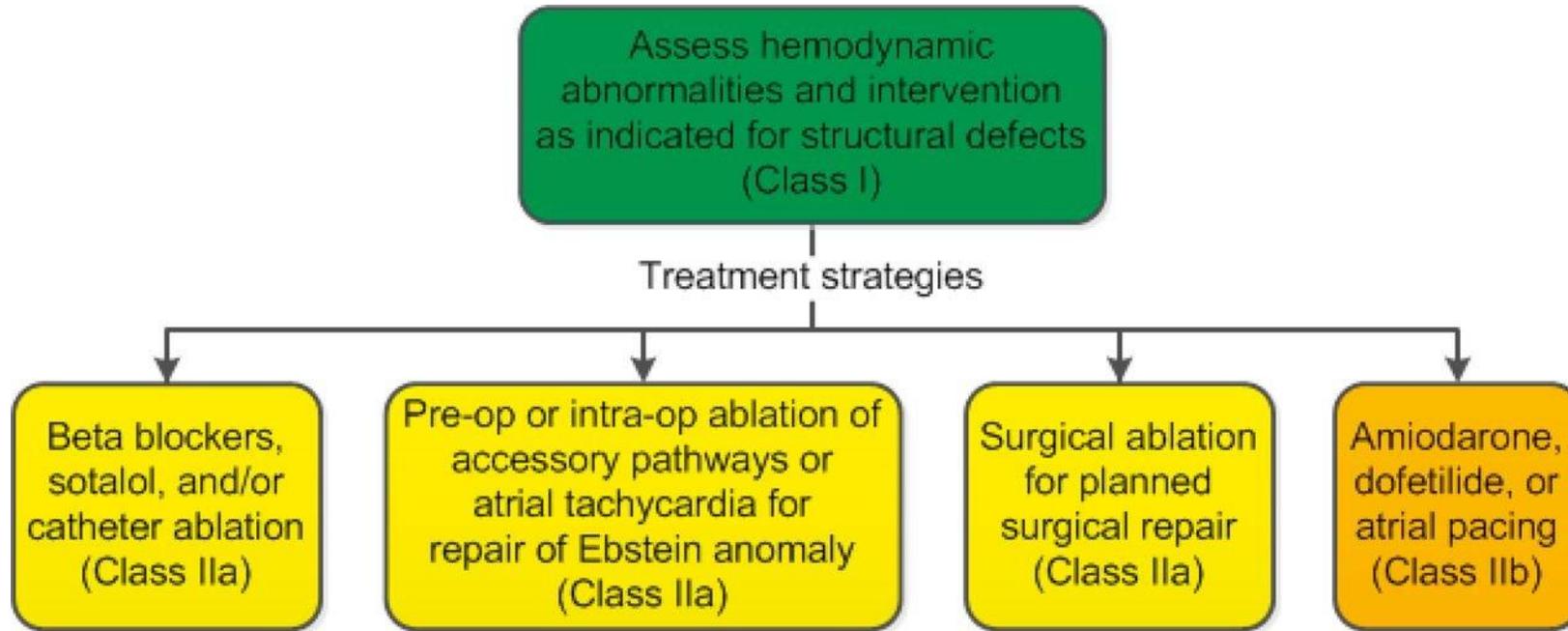
XX century story - Surgery ablation of WPW syndrome

Largest series < 310 pts, > 3000 cases worldwide (<1995)

- endocardial
 - epicardial
 - fulguration
 - cryoablation
 - Ethanol injection
 - laser
 - etc
- efficacy - 75-99%
 - mortality - 0-12%
 - re-do procedures - 1-15%
 - complications - 0-25%

Catheter and Surgery ablation for SVT/ WPW synd.

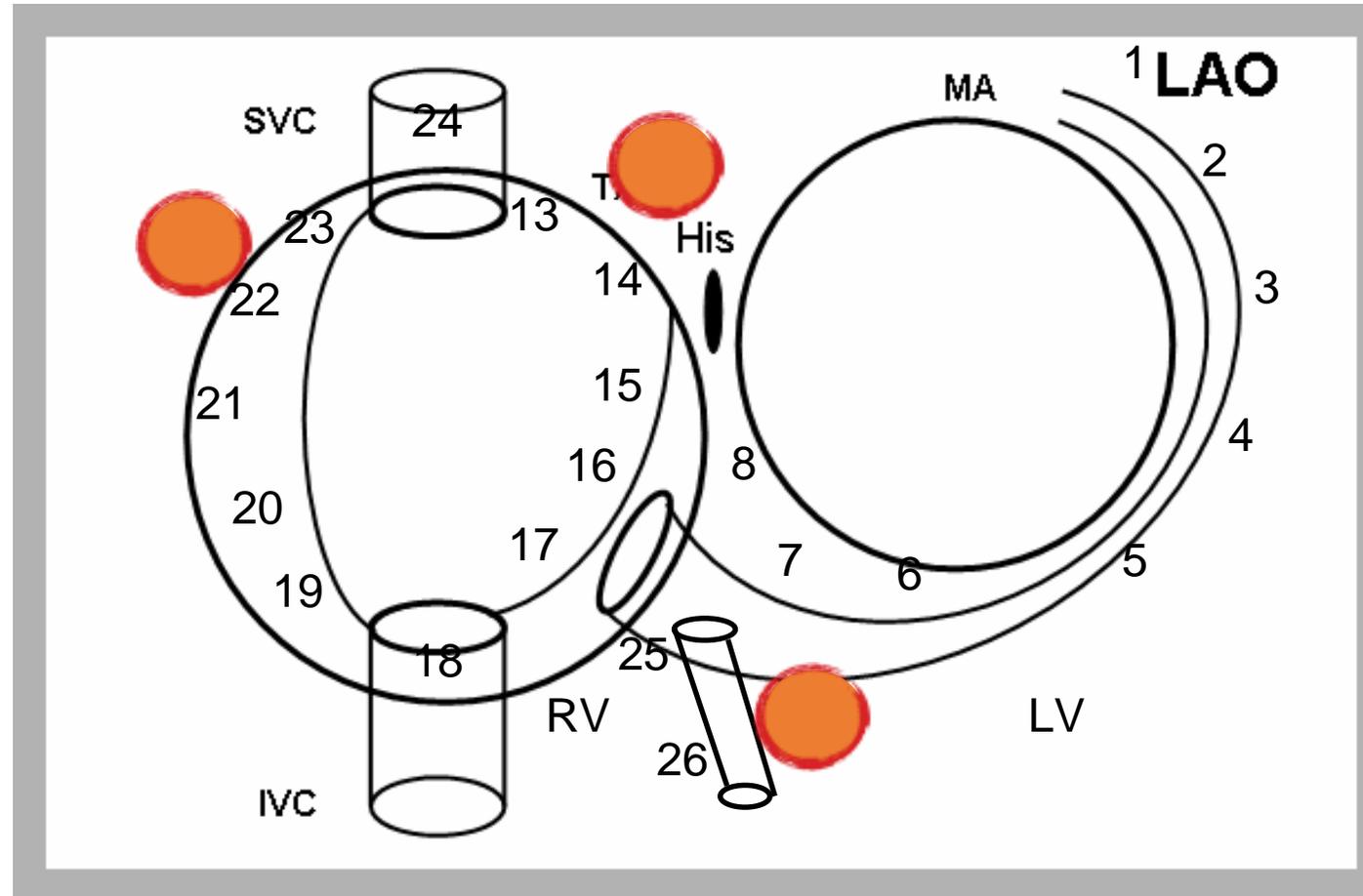
Adult congenital heart diseases and defects



For planned surgical repair only

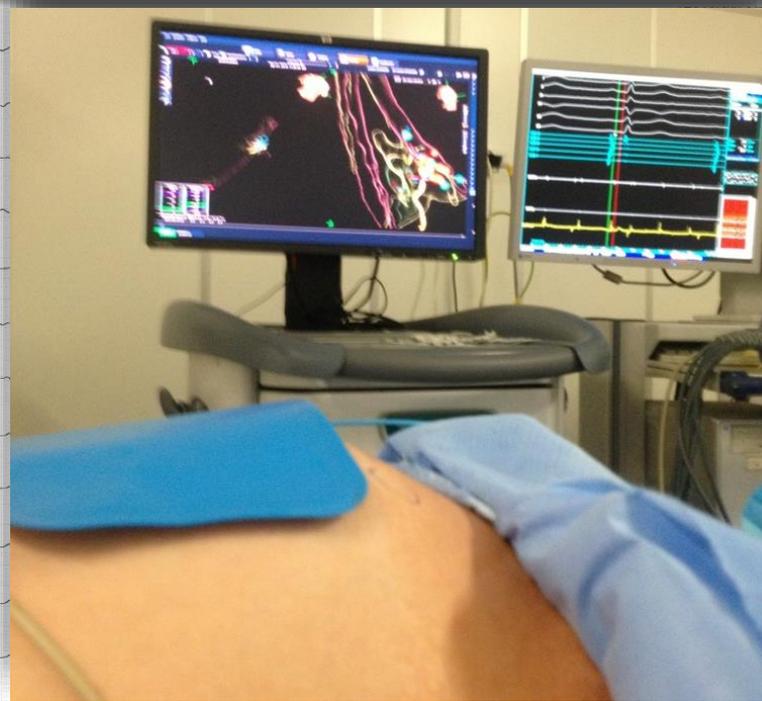
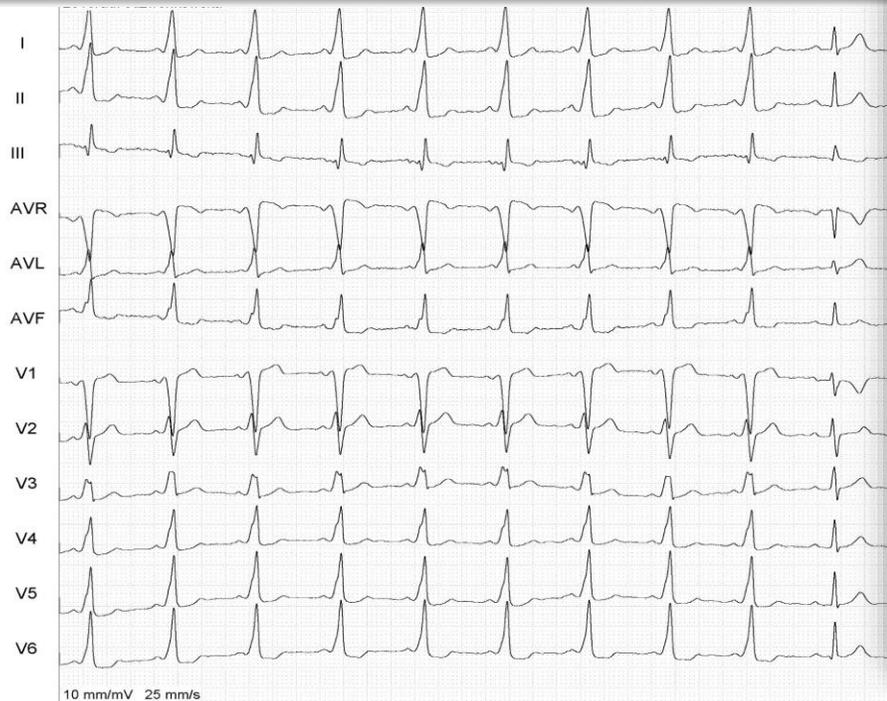
Richard L. Page et al. JACC 2016;67:1575-1623

Accessory pathways or connections



Zero-fluoroscopy ablation in pregnancy in WPW syndrome - Accessory pathway ablated from non-coronary aortic cusp

22-year old women, paraHisian WPW syndrome, failed previous right-sided ablation in another institution, April 2016 25 th week of pregnancy, recurrences of palpitation and syncope (x3).

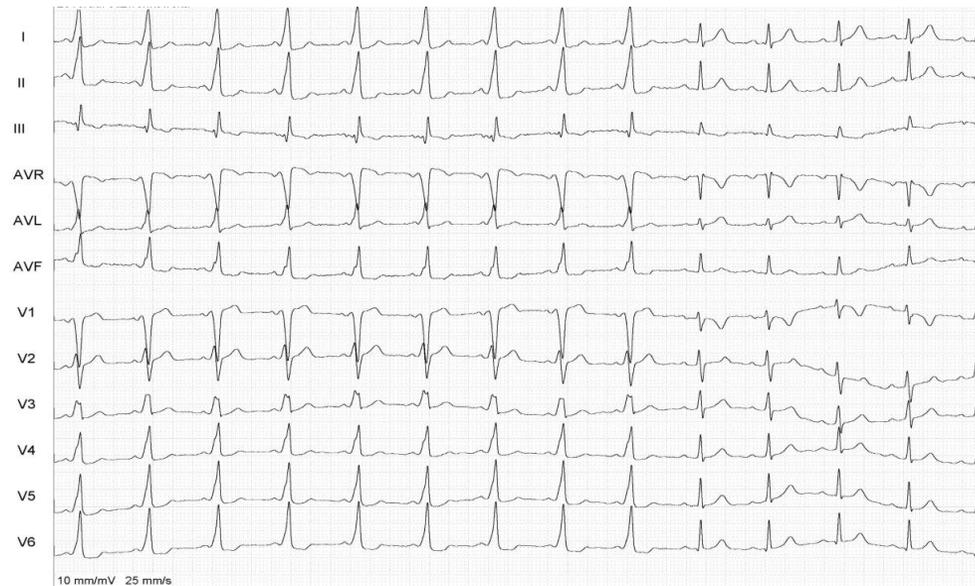


pictures with acceptance and permission of patient

Karbarz D, ..., S Stec, Pol Heart J 2017: in press

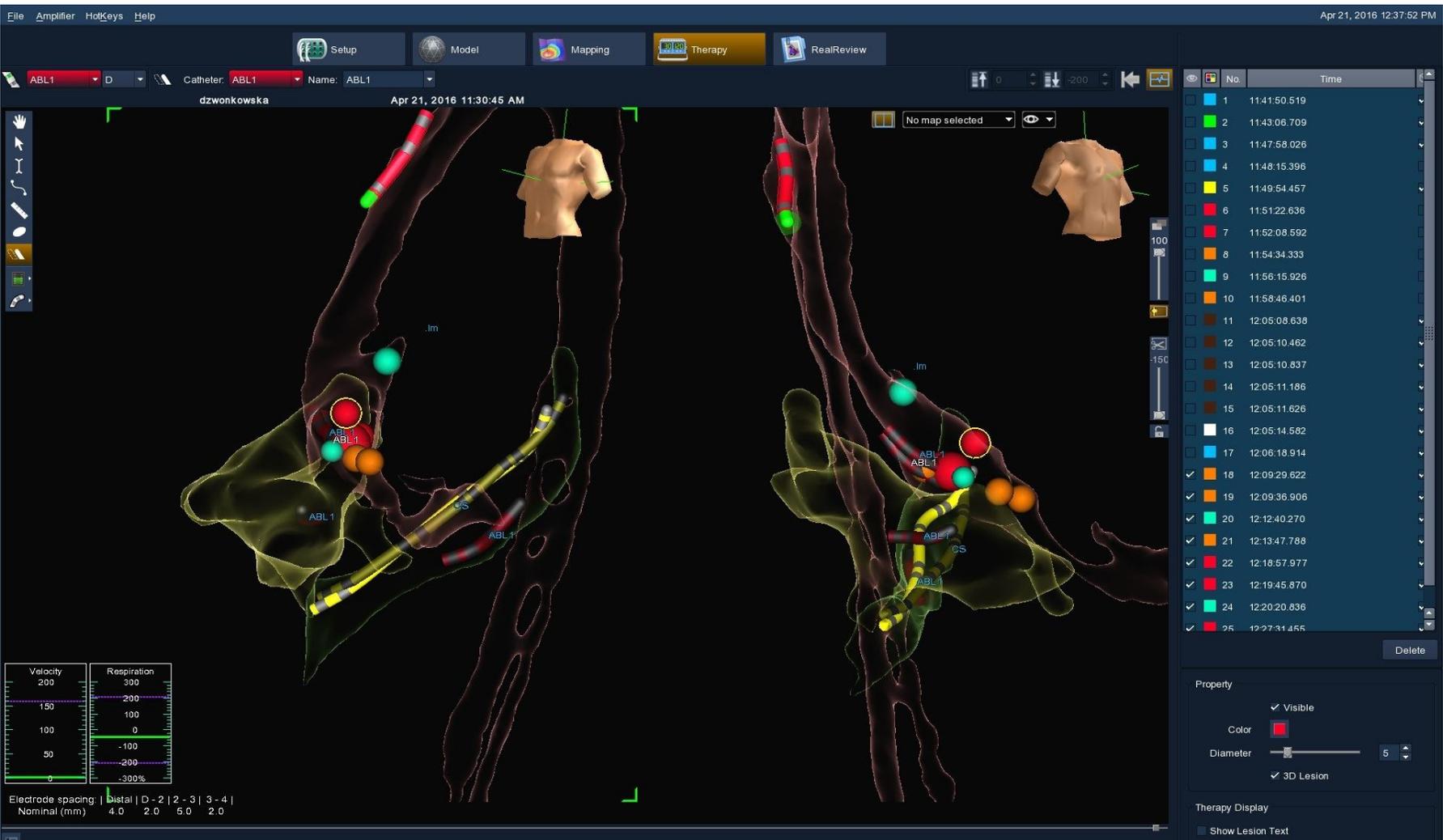
Zero-fluoroscopy ablation in pregnancy in WPW syndrome - Accessory pathway ablated from non-coronary aortic cusp

- left-sided mapping pictures with acceptance and permission of patient
- n=6 application in NCC (240 sec) 0,5 cm above His potential recordings
- no junctional rhythms, no complication, no-fluoro
- procedure time: 71 min



0 sec fluoro, successful application from non- coronary cusp, Ensite Velocity
No recurrences, caesarian section in 34 week of pregnancy (non cardiac reason),
APGAR 10, no recurrences and no pre-excitation within 16 months

Zero-fluoroscopy ablation in pregnancy in WPW syndrome - Accessory pathway ablated from non-coronary aortic cusp



Karbarz D, ..., S Stec, Pol Heart J 2017: in press