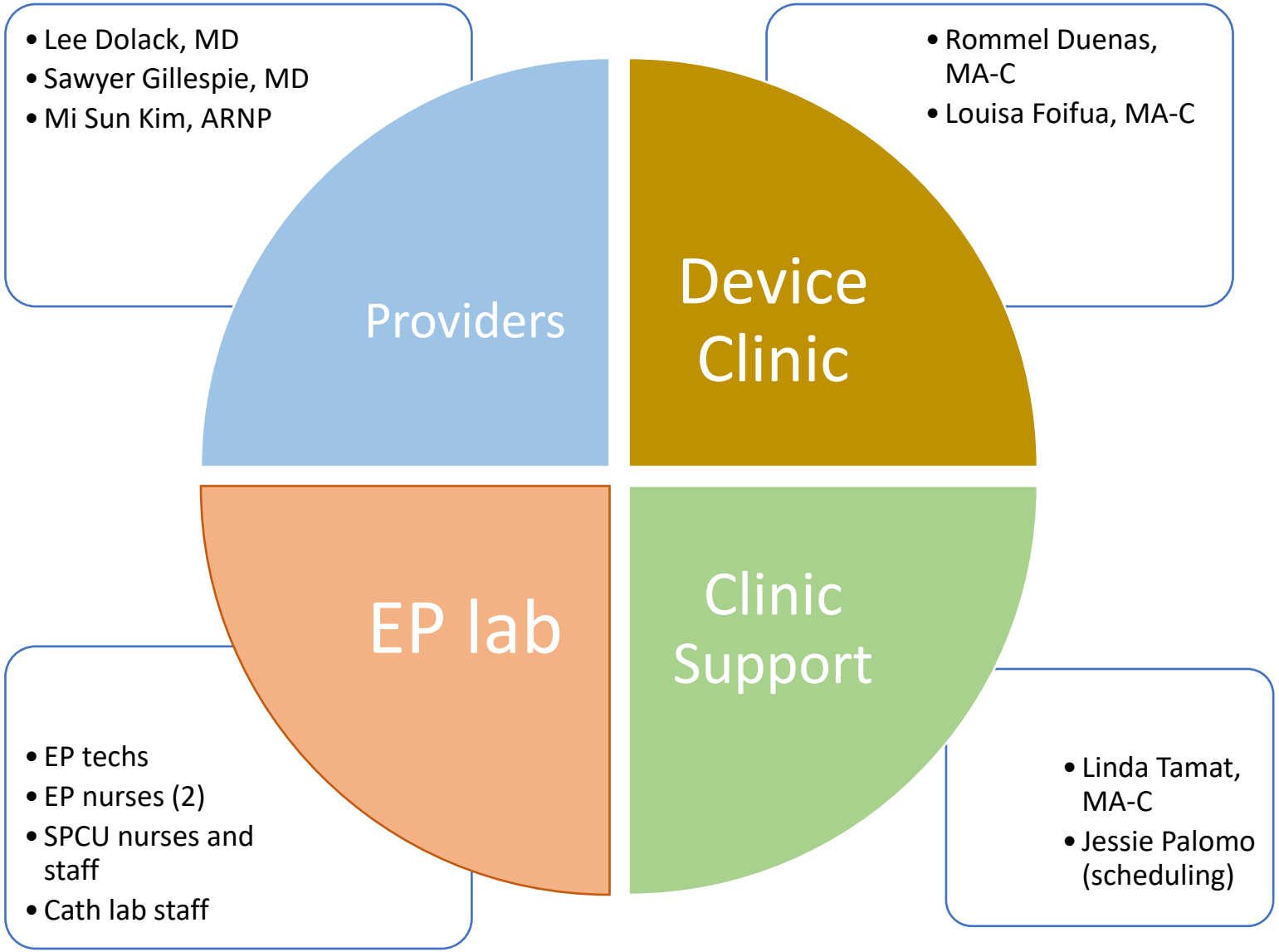
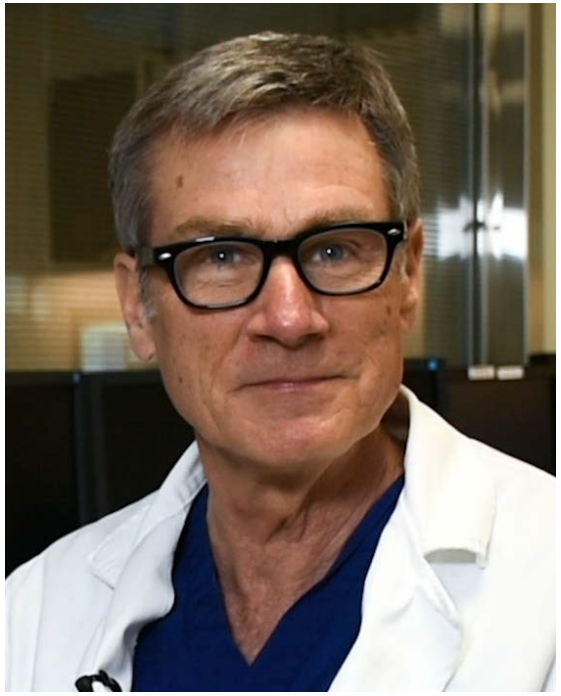
Cardiac Electrophysiology Service

5/25/22

Sawyer Gillespie, MD


• Lee Dolack, MD
• Sawyer Gillespie, MD
• Mi Sun Kim, ARNP
Providers
• Rommel Duenas, MA-C
• Louisa Foifua, MA-C
Device Clinic
EP lab
• EP techs
• EP nurses (2)
• SPCU nurses and staff
• Cath lab staff
Clinic Support
• Linda Tamat, MA-C
• Jessie Palomo (scheduling)

Electrophysiology Service Providers

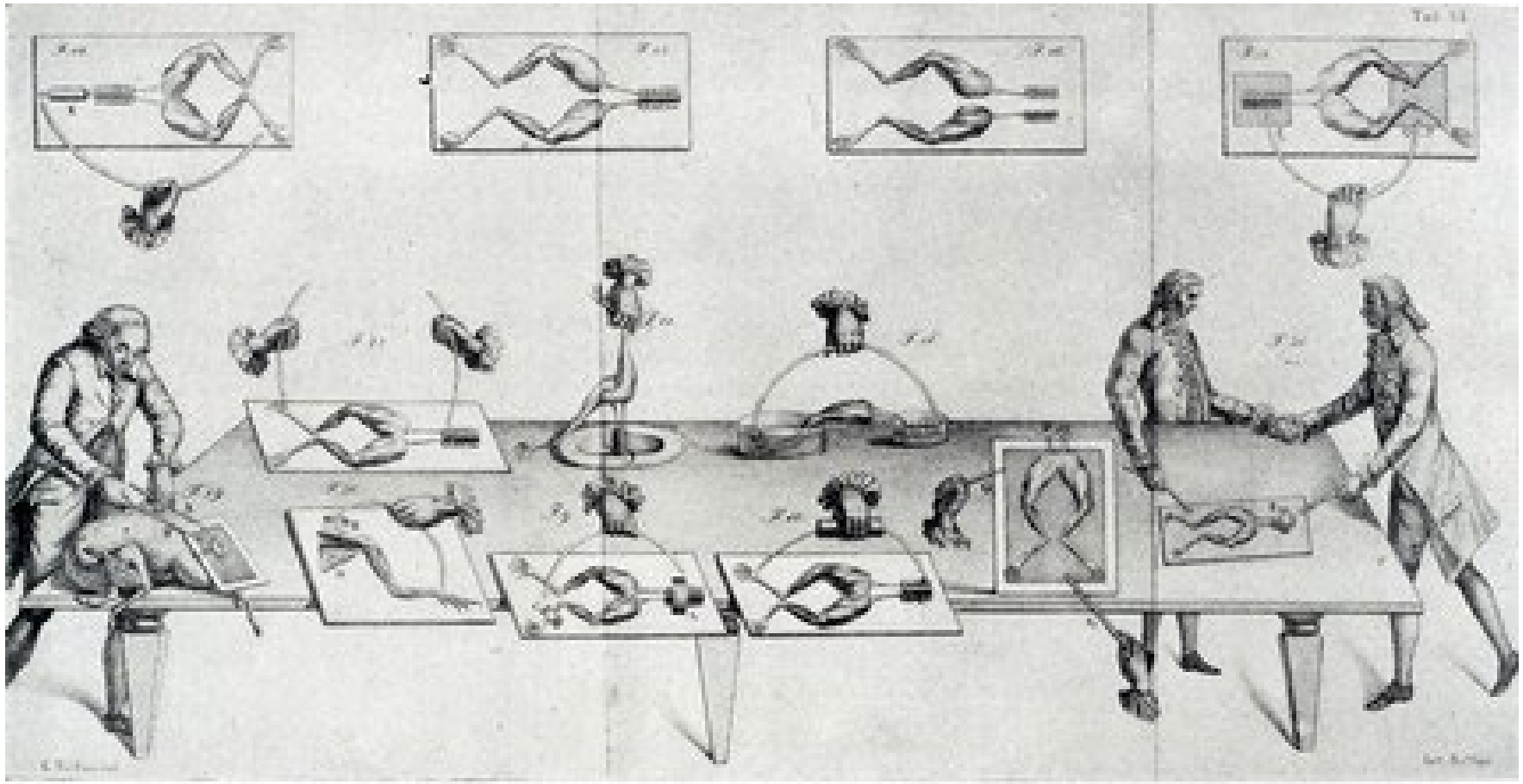


Lee Dolack, MD

Mi Sun Kim, ARNP

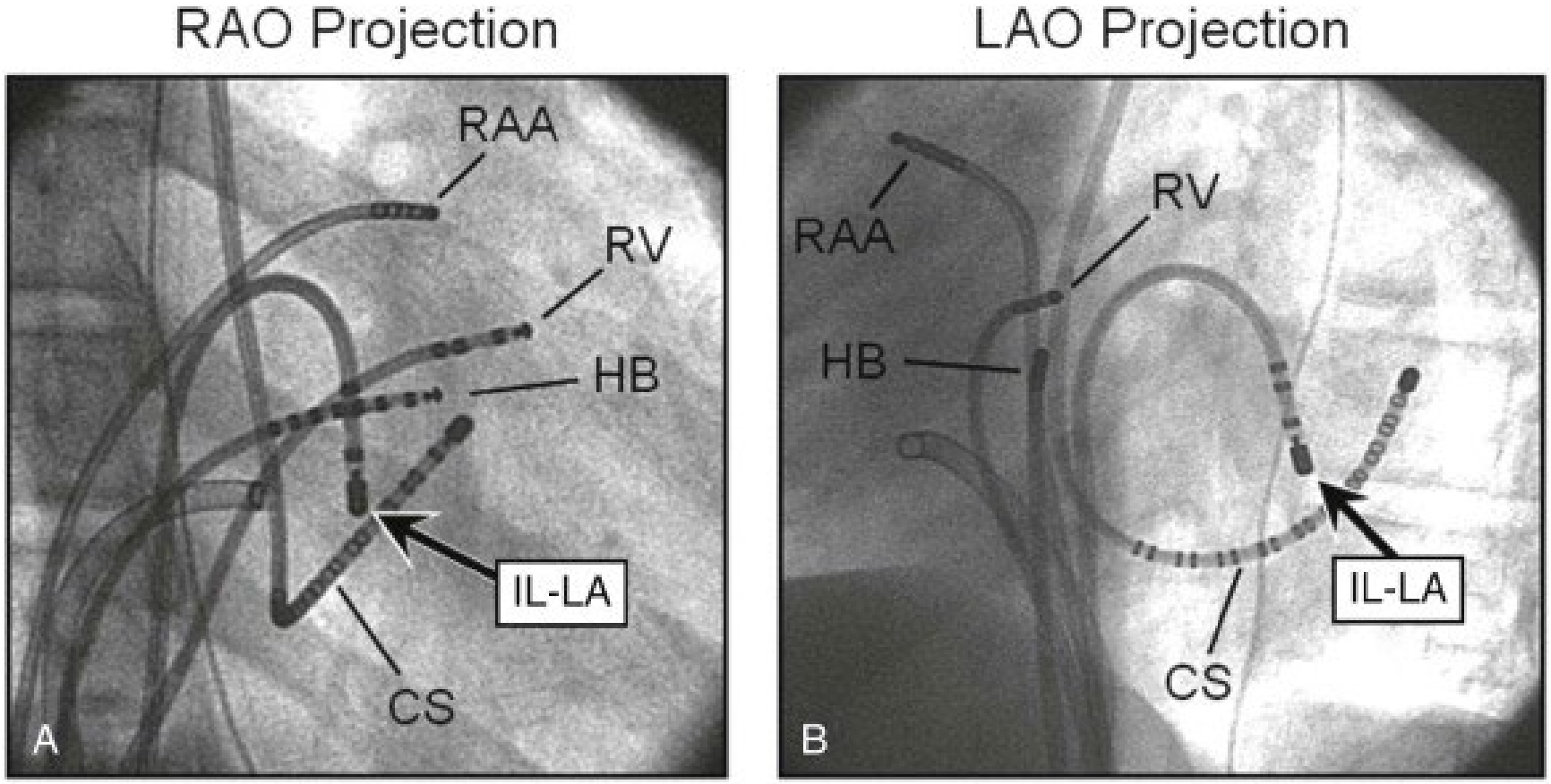
Sawyer Gillespie, MD

What is electrophysiology?



Expériences de Galvani sur les grenouilles. (Extrait des Œuvres de Galvani.)
(*Collection de M. E. Sartiaux.*)

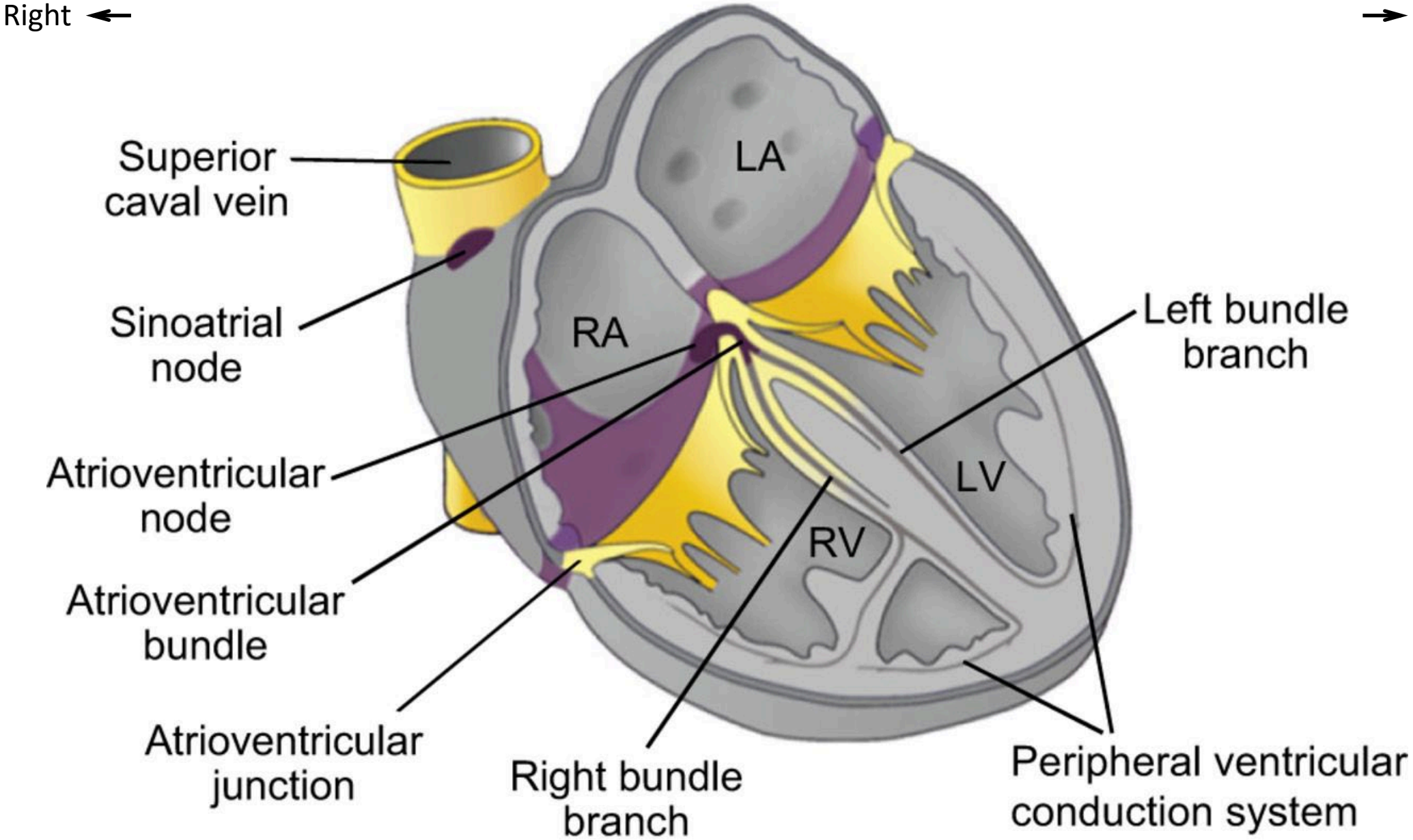
Look what we can do…



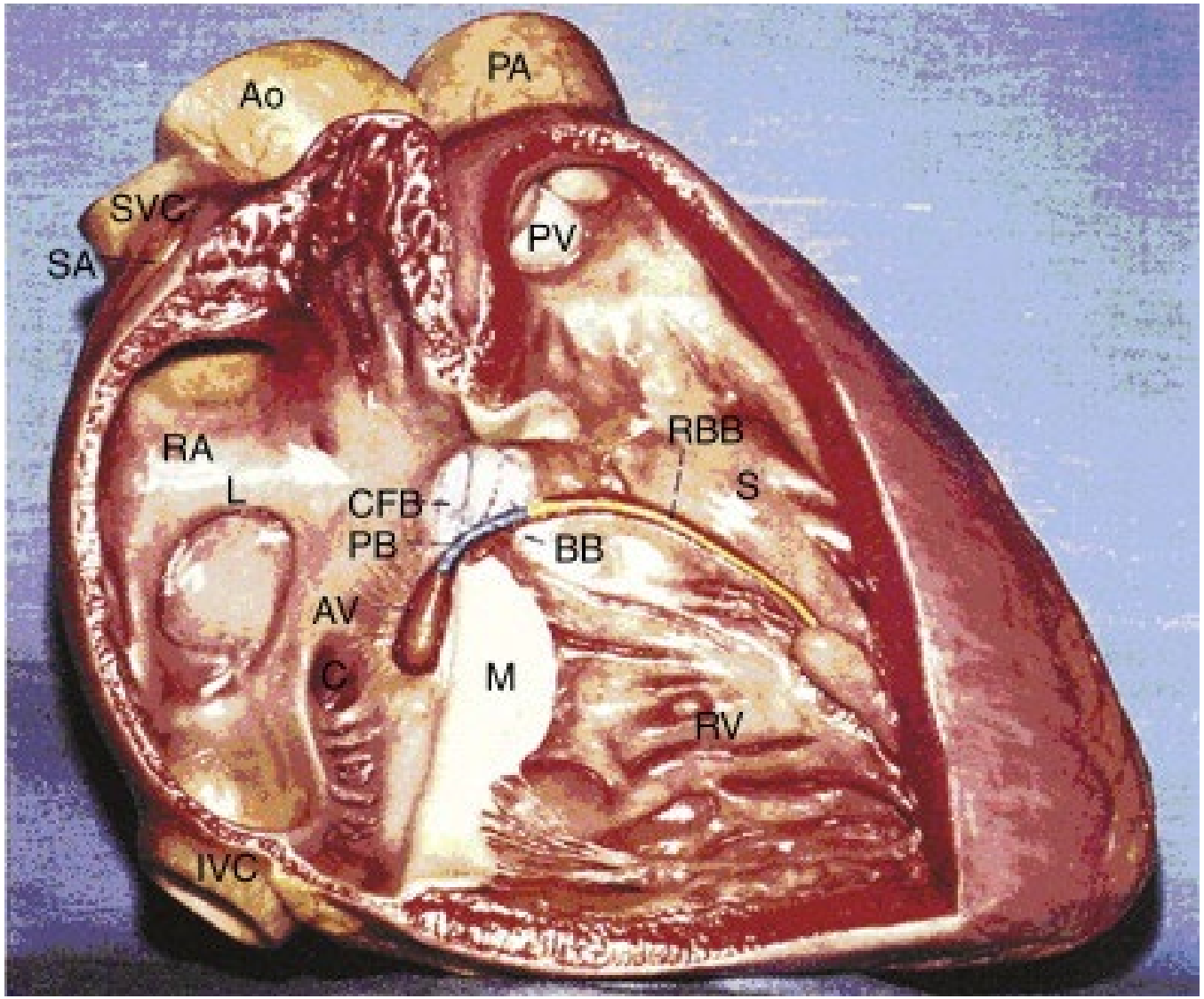
What do we really do?

"I deal with abnormally fast or slow heart rhythms"

**and a little bit with stroke*



van Weerd, J. H., & Christoffels, V. M. (2016). The formation and function of the cardiac conduction system. *Development*, *143*(2), 197–210.


Ao
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SVC
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RBB
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CFB
PB
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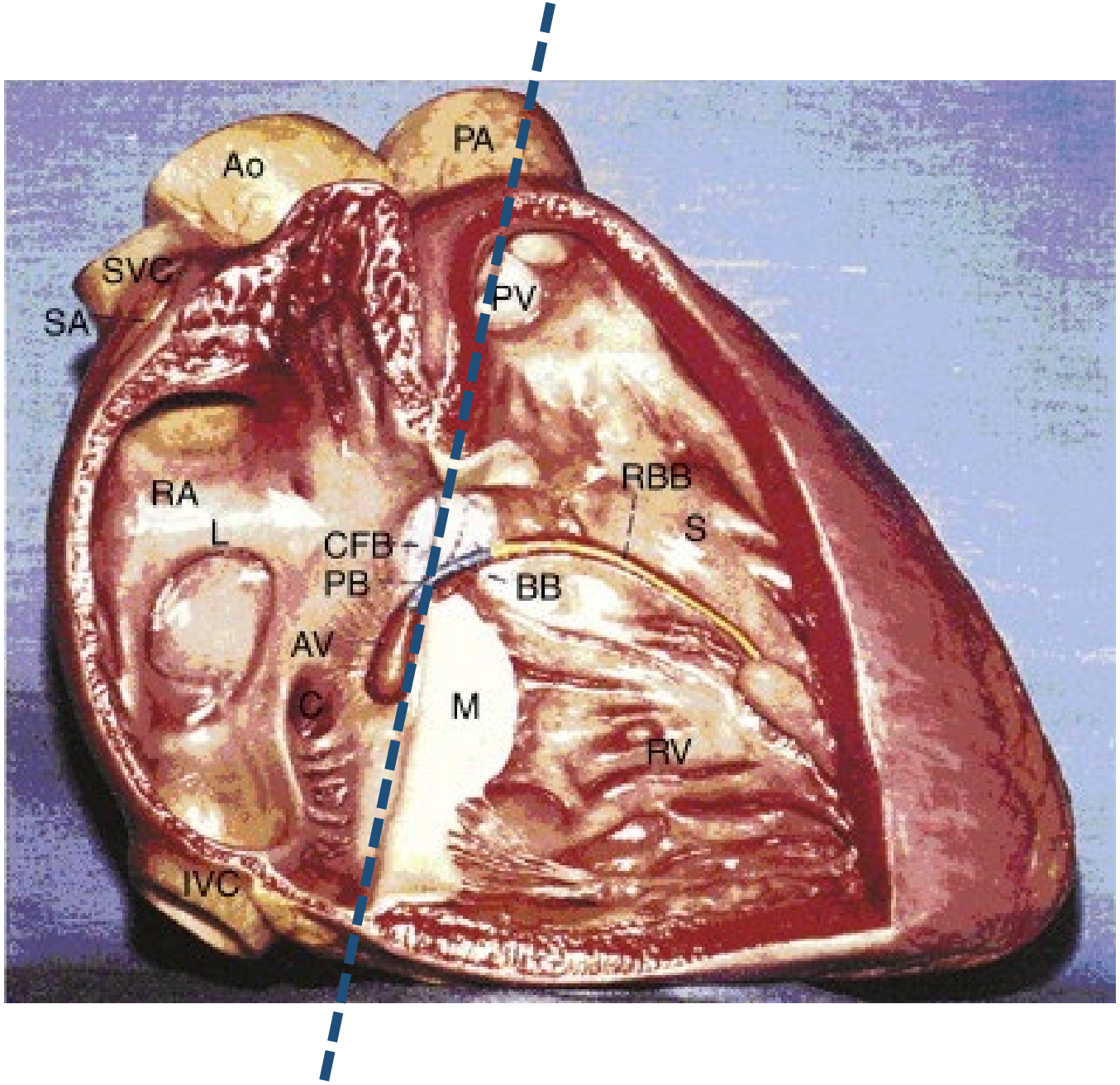
AV
C
M
RV
IVC


Ao
PA
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RBB
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CFB
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AV
C
M
RV
IVC

Bradycardia

Supraventricular

Sinus Bradycardia

Intrinsic

Sinus node dysfunction

Injury

Extrinsic

Metabolic

Drugs

Autonomic

AV Block

Mobitz I

Infra-nodal

AV Block

Intrinsic

His bundle

Bundle branches

Fascicles

Extrinsic

Metabolic

Drugs

Bradycardia

Supraventricular

Sinus Bradycardia

Intrinsic

Sinus node dysfunction

Injury

Extrinsic

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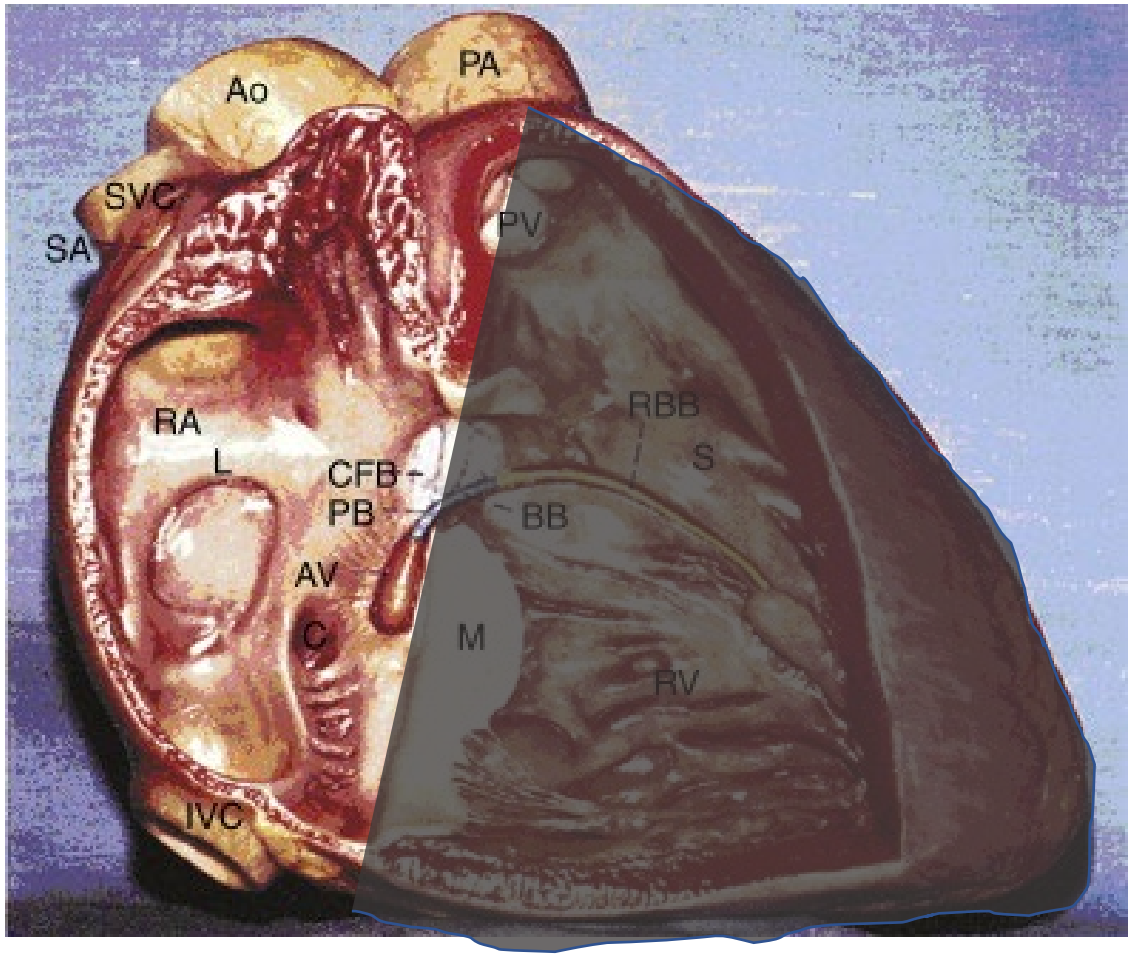
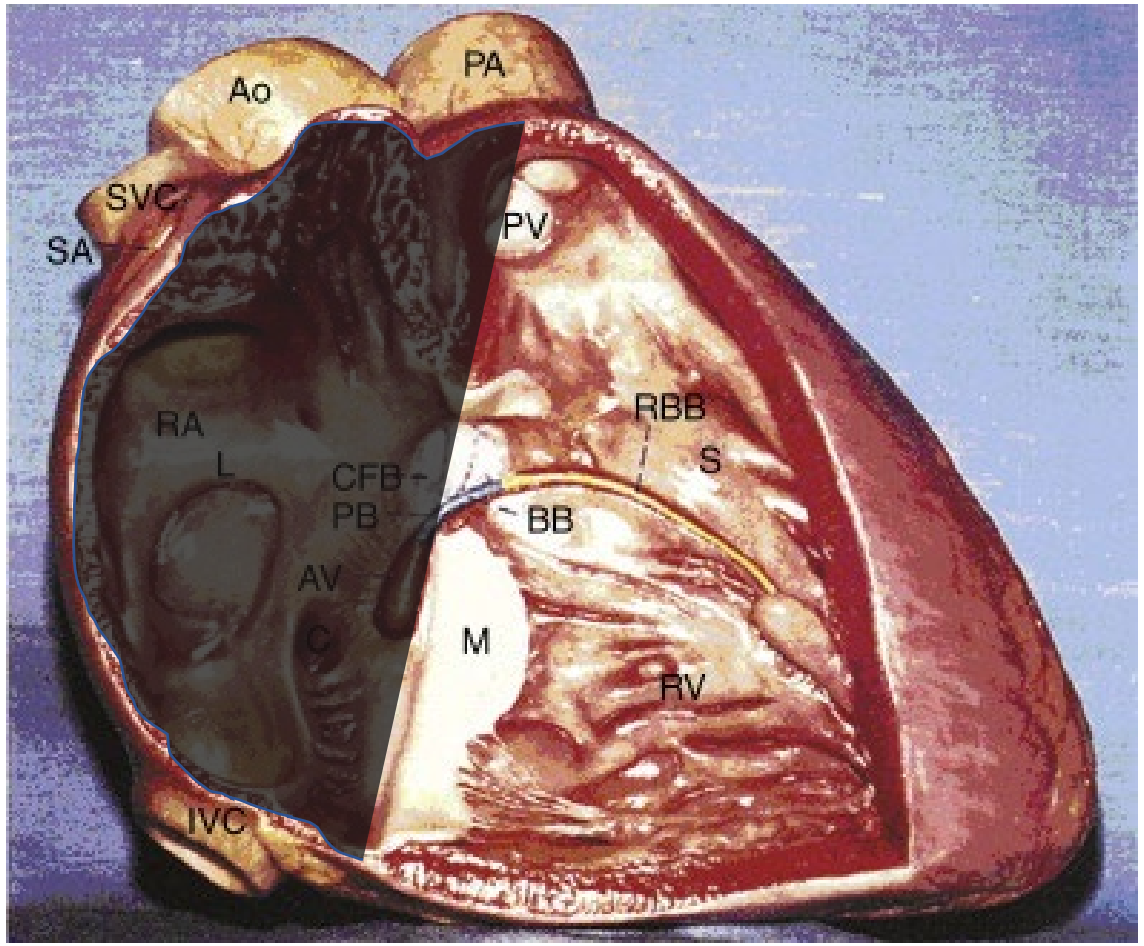
Autonomic

AV Block

Mobitz I



Bradycardia



Infra-nodal

AV Block (Mobitz II, CHB)

Intrinsic

His bundle

Bundle branches

Fascicles

Extrinsic

Metabolic

Drugs

Tachycardia

Supraventricular

Sinus Tachycardia

Atrial Tachycardia

AV node Re-entry

AV Re-entry

Focal Atrial Tachycardia

Atrial Flutter

Atrial Fibrillation

PACs

Ventricular

Monomorphic

Idiopathic Ventricular Tachycardia

Structural Heart Disease

PVCs

Outflow Tract

His-Purkinje

Ventricular Fibrillation

Polymorphic

Tachycardia

Supraventricular

Sinus Tachycardia

Atrial Tachycardia

AV node Re-entry

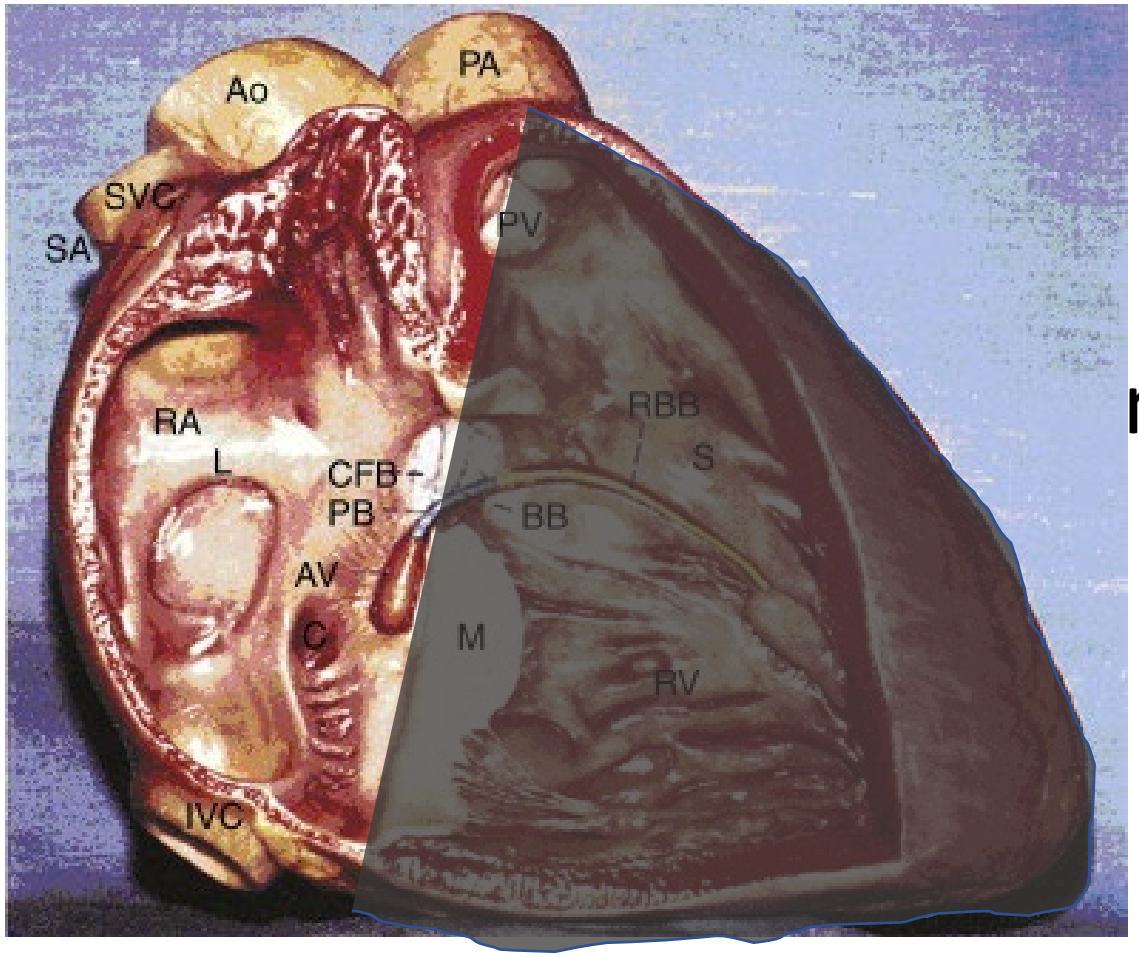
AV Re-entry

Focal Atrial Tachycardia

Atrial Flutter

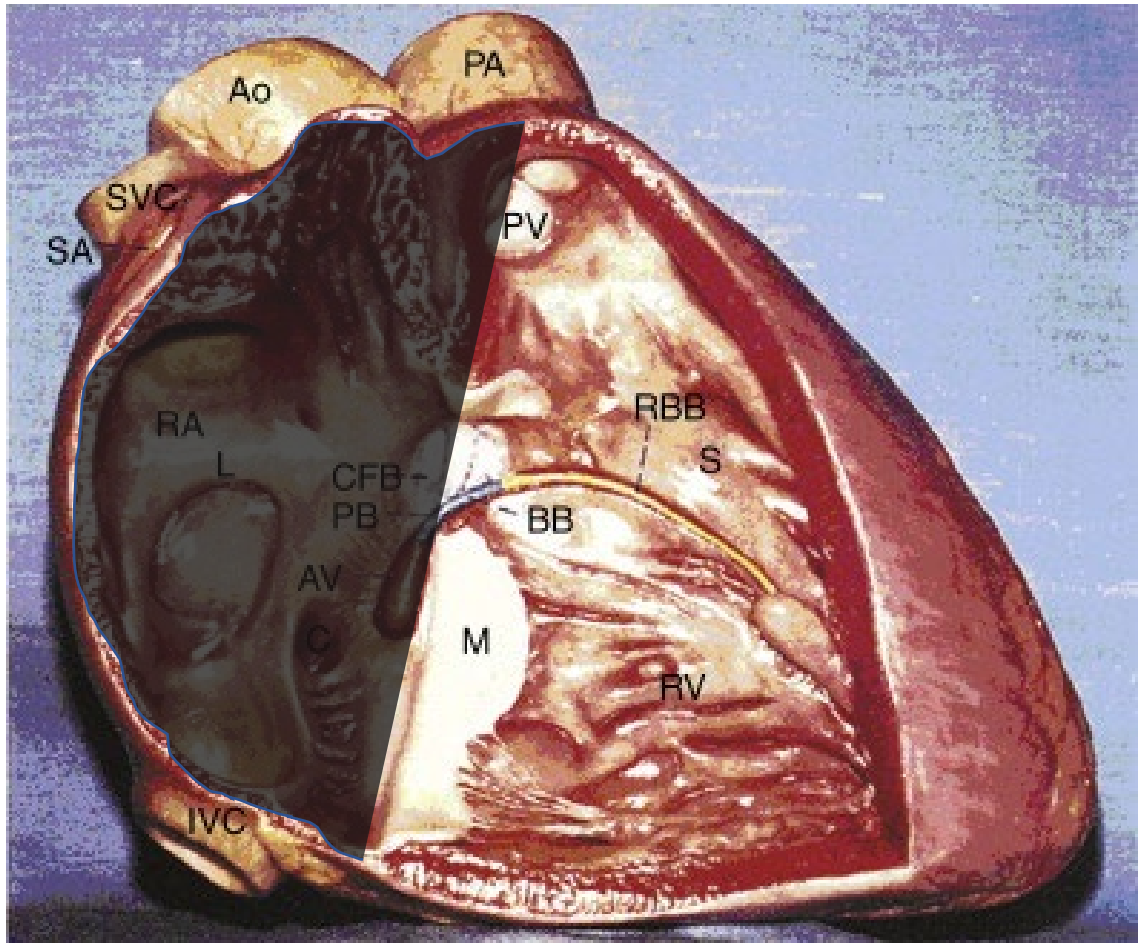
Atrial Fibrillation

PACs



n

Tachycardia



Ventricular

Monomorphic

Idiopathic Ventricular Tachycardia

Structural Heart Disease

PVCs

Outflow Tract

His-Purkinje

Ventricular Fibrillation

Polymorphic

Diagnostics

"CAM Patch"

"Zio Patch"

- 12 lead ECG
- Signal averaged ECG (rare)
- Treadmill testing
- Ambulatory monitoring
  - 24-48h Holter
  - 7-14d ambulatory monitor
  - Event monitoring (loop recorder)
  - Implantable loop recorder (3 yr)
- Electrophysiology study
- Device interrogation (pacemaker/defibrillator)
- Imaging
  - Echo (TTE, TEE)
  - MRI

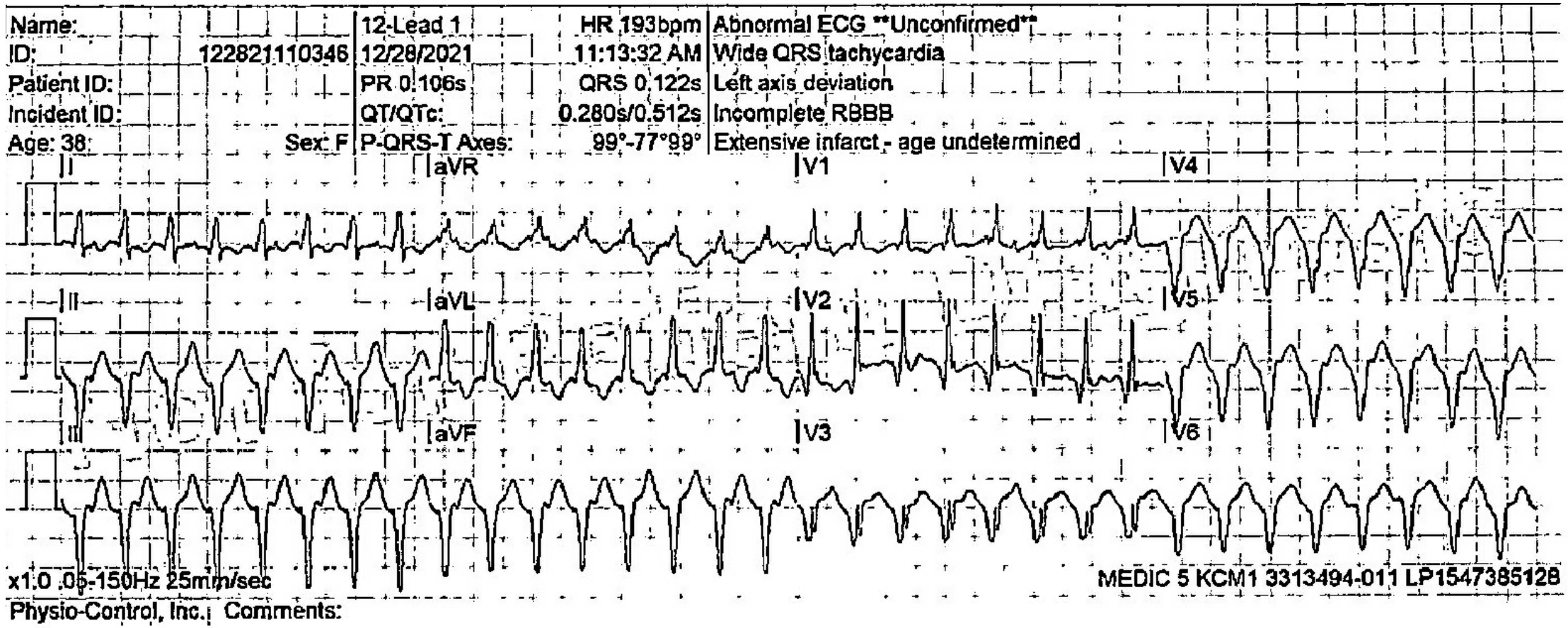
Treatment

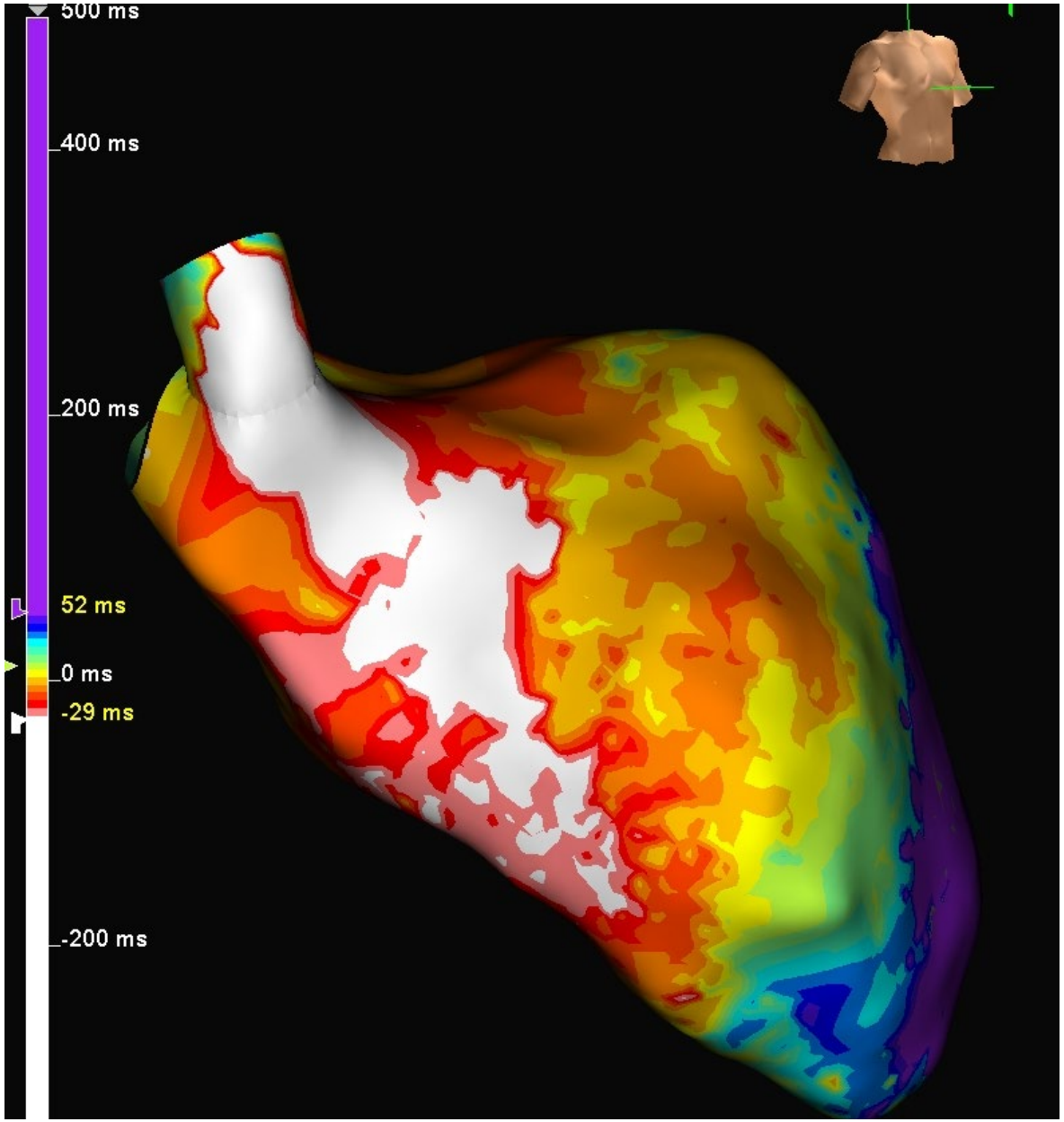
- MEDICAL THERAPY
  - Antiarrhythmic drugs (including beta blockers/CCB)
  - Anticoagulation
  - Counselling/precautions
    - Medical therapy
    - Genetic therapy
- EP STUDY/ABLATION
  - Atrial fibrillation
    - Radiofrequency
    - Cryoballoon
  - Supraventricular tachycardia
    - Radiofrequency
    - Cryocatheter
  - Ventricular tachycardia
    - PVC

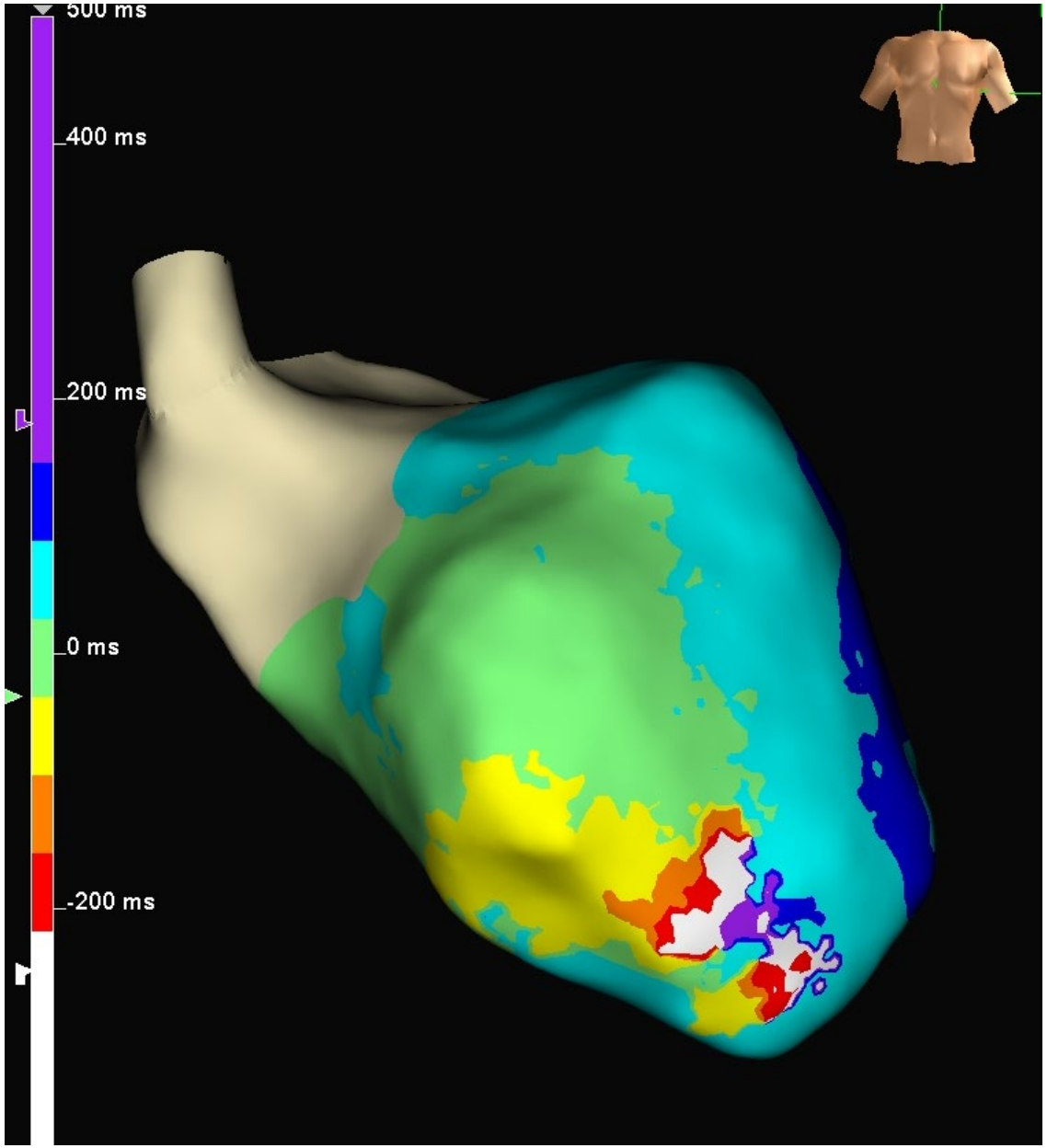
Interventions

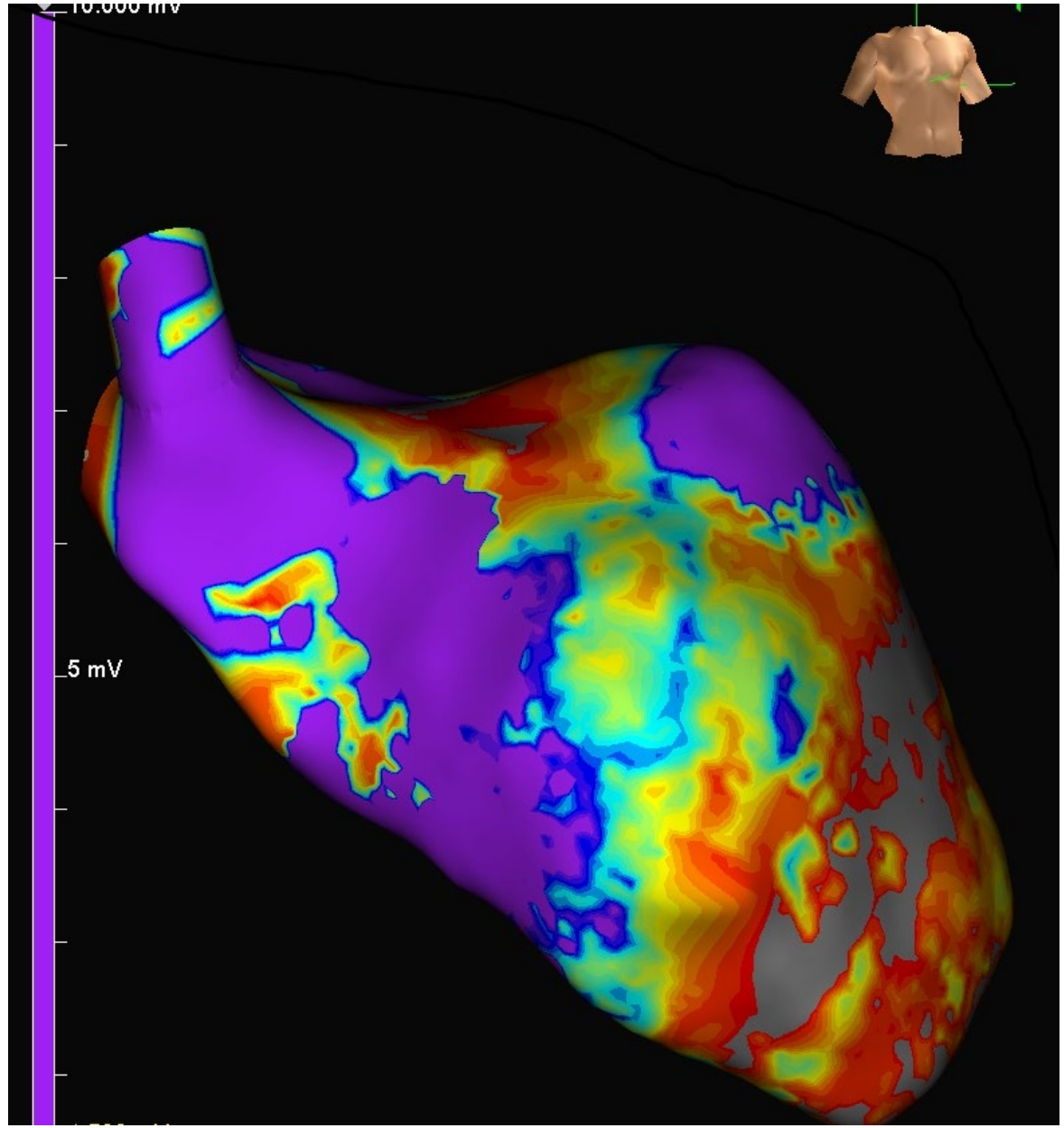
- DEVICE THERAPY
  - Pacemaker
    - Transvenous
    - “Leadless”
    - Physiologic pacing
      - Cardiac resynchronization (CRT)
      - His-bundle pacing
  - Defibrillator
    - Implantable
      - Transvenous
      - Subcutaneous
    - Wearable
- EP STUDY/ABLATION
  - Atrial fibrillation
    - Radiofrequency
    - Cryoballoon
  - Supraventricular tachycardia
    - Radiofrequency
    - Cryocatheter
  - Ventricular tachycardia
    - PVC

39yo F with racing heartbeat, dyspnea

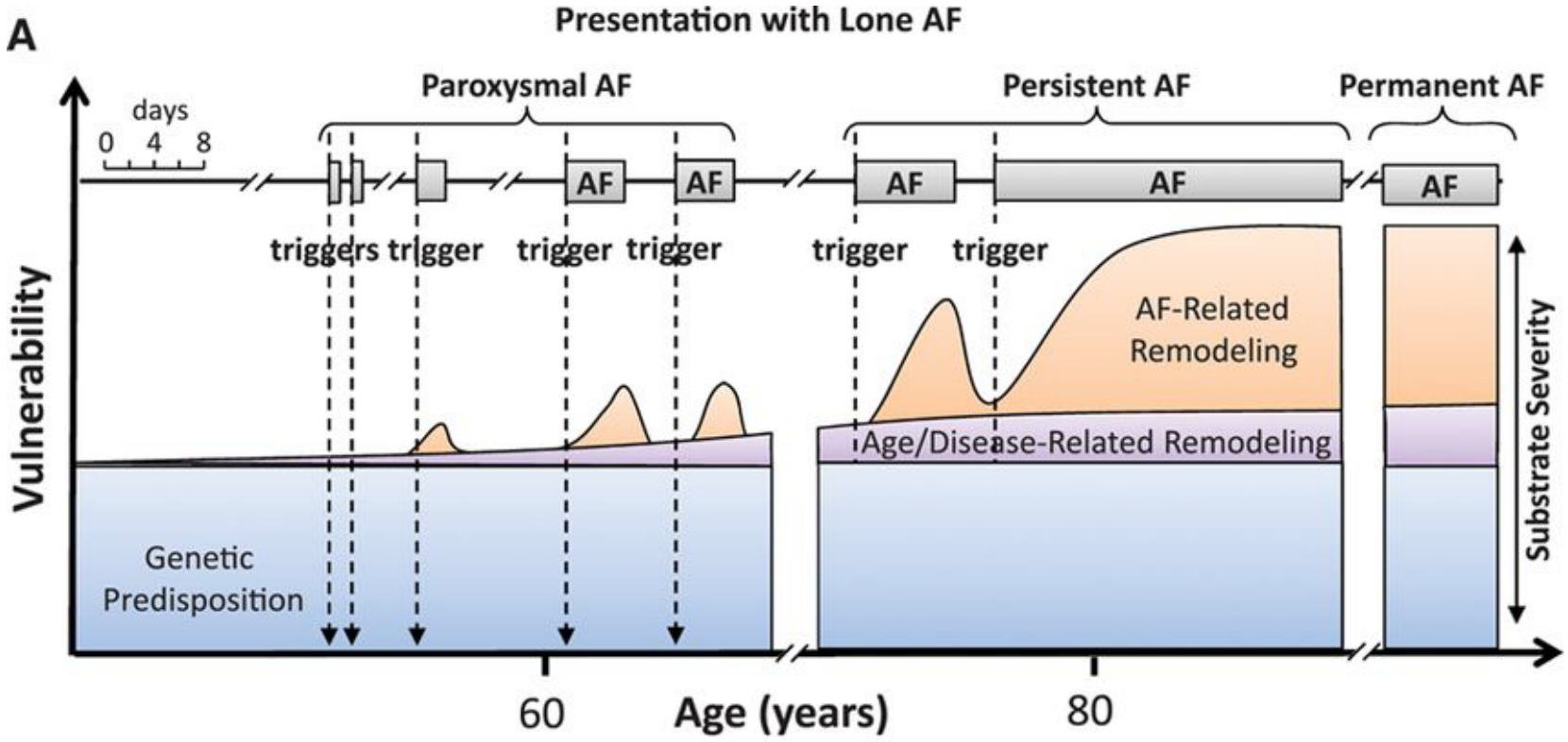



500 ms
400 ms
200 ms
52 ms
0 ms
-29 ms
-200 ms

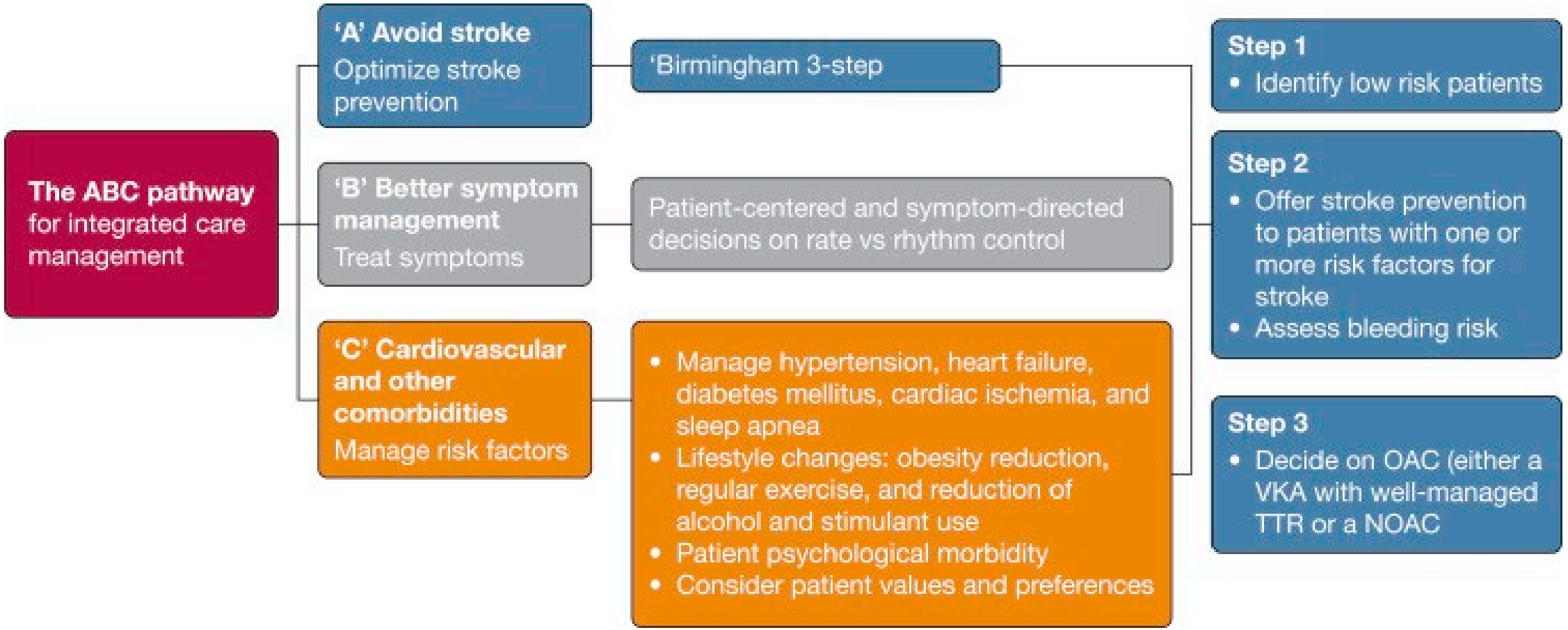

500 ms
400 ms
200 ms
0 ms
-200 ms


5 mV

Atrial Fibrillation



Heijman J, Voigt N, Nattel S, Dobrev D. Cellular and Molecular Electrophysiology of Atrial Fibrillation Initiation, Maintenance, and Progression. Circ Res. Lippincott Williams & Wilkins; 2014 Apr 25 [cited 2016 Aug 24];114(9):1483–99.



Lip, G. Y. H., Banerjee, A., Boriani, G., Chiang, C. en, Fargo, R., Freedman, B., … Moores, L. (2018). Antithrombotic Therapy for Atrial Fibrillation: CHEST Guideline and Expert Panel Report. CHEST, 154(5), 1121–1201.

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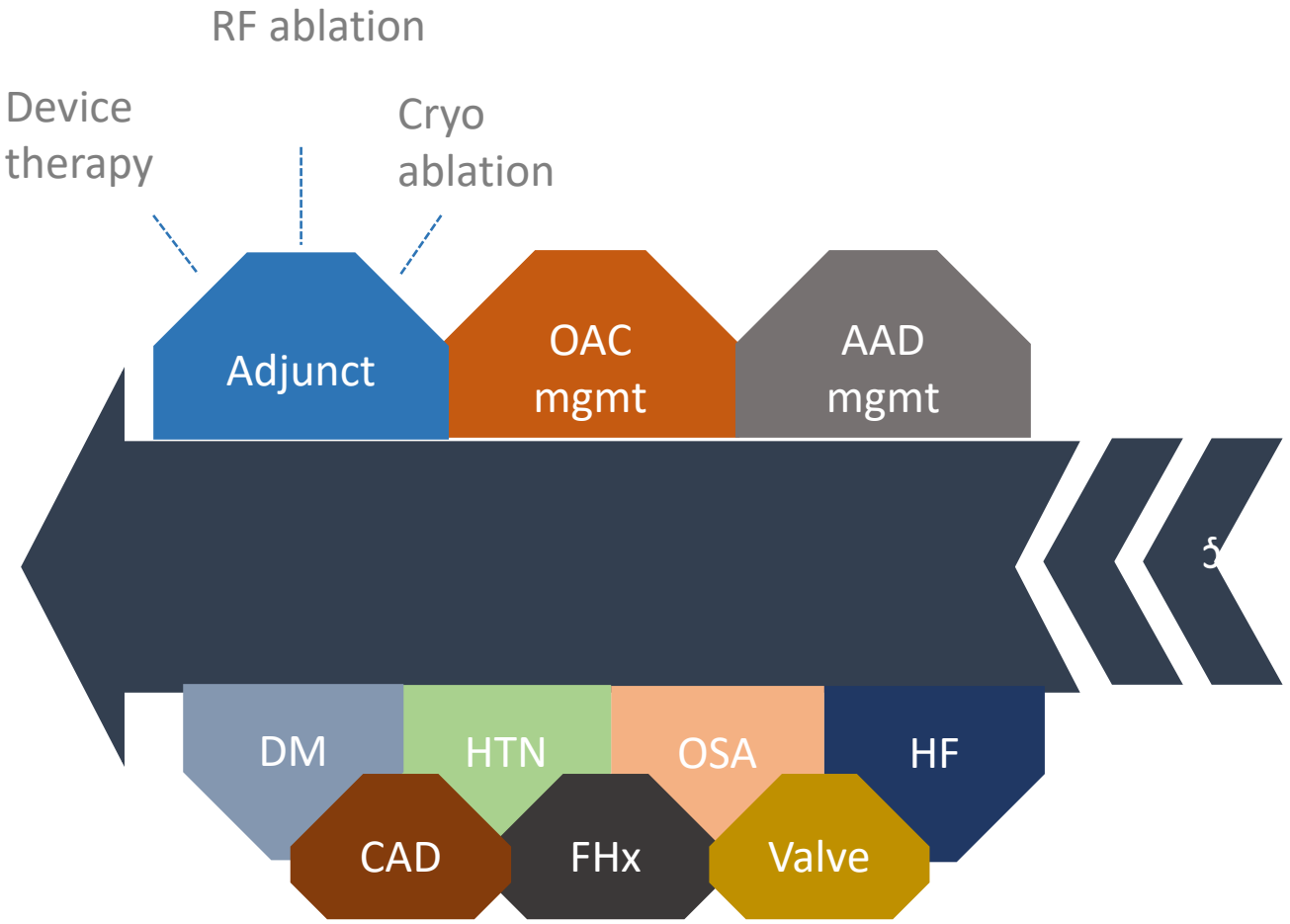
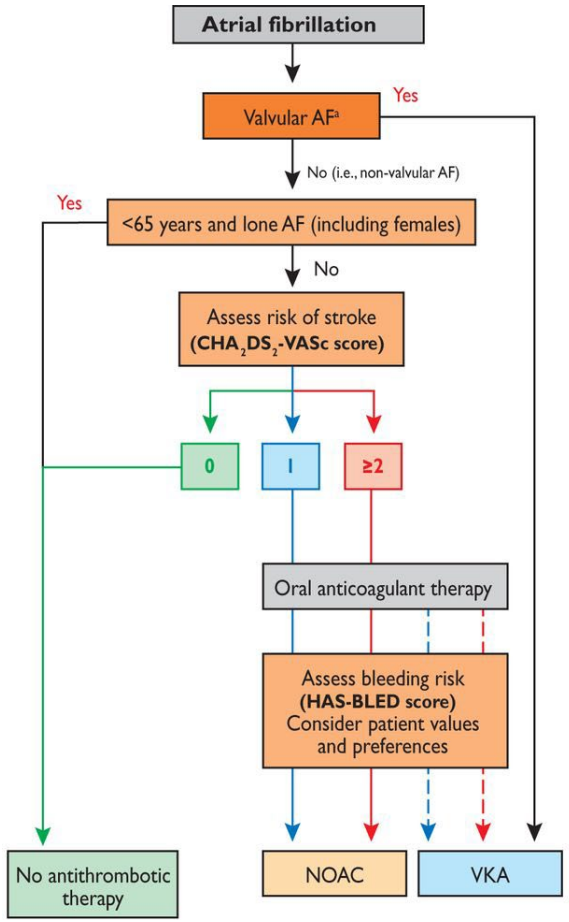
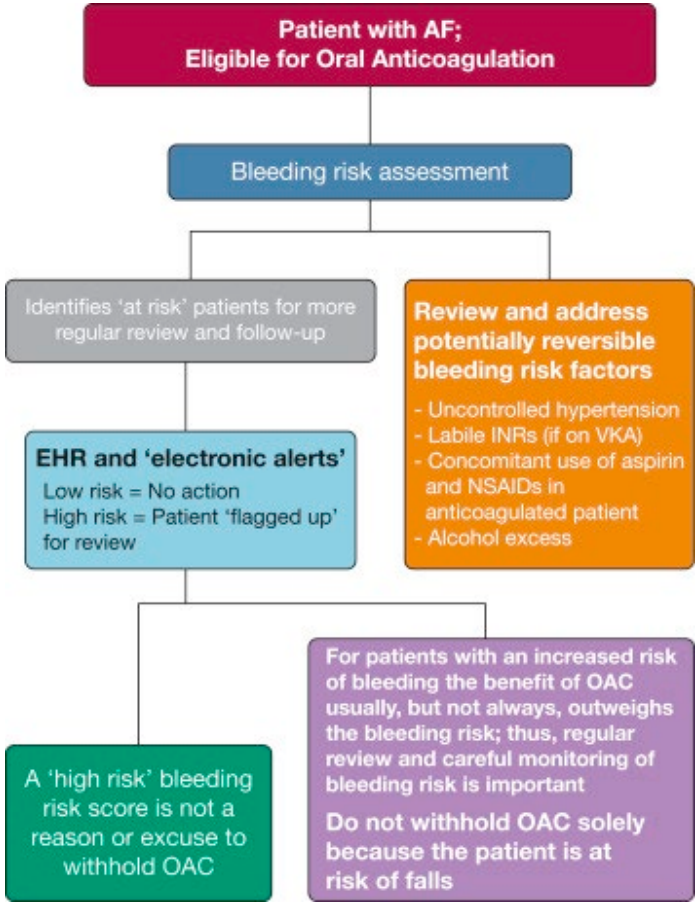
Models for an AF program



Atrial Fibrillation - Anticoagulation





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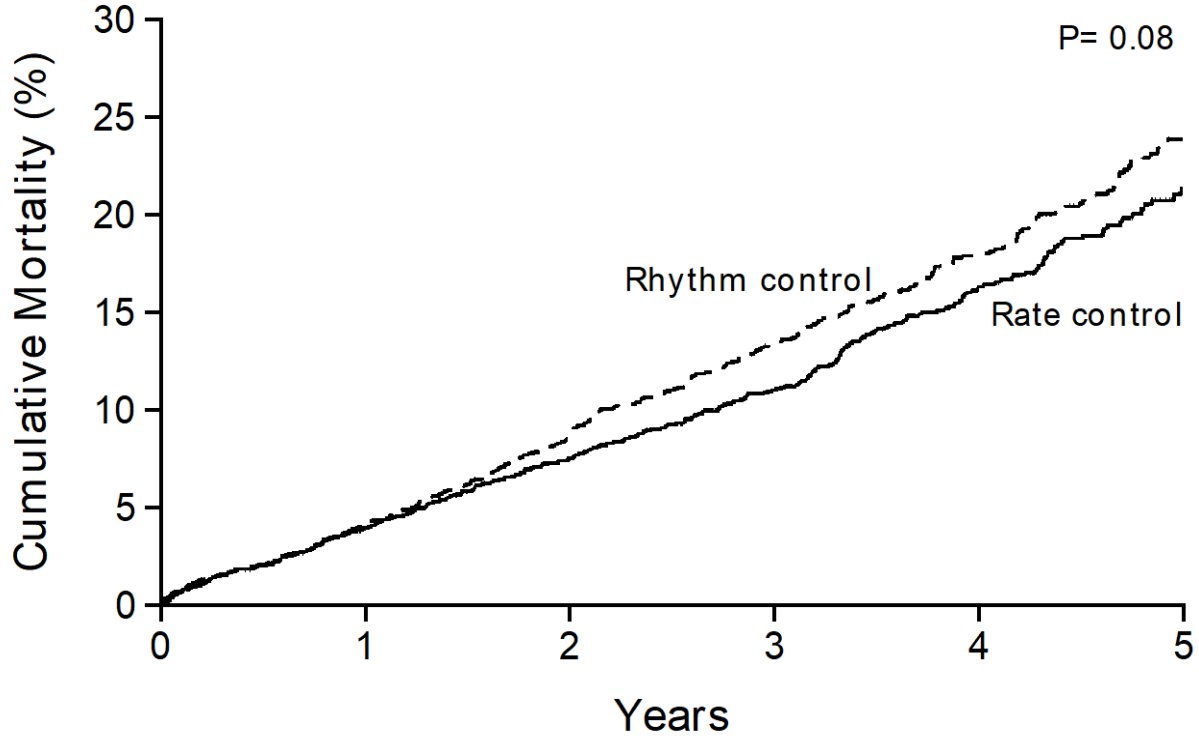
AFFIRM: Rate vs. Rhythm control (pub 2002)



NO. OF DEATHS		number (percent)				
Rhythm control	0	80 (4)	175 (9)	257 (13)	314 (18)	352 (24)
Rate control	0	78 (4)	148 (7)	210 (11)	275 (16)	306 (21)

The Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) Investigators. A Comparison of Rate Control and Rhythm Control in Patients with Atrial Fibrillation. N Engl J Med; 2002 Dec 5;347(23):1825–33.

Original Article

Early Rhythm-Control Therapy in Patients with Atrial Fibrillation

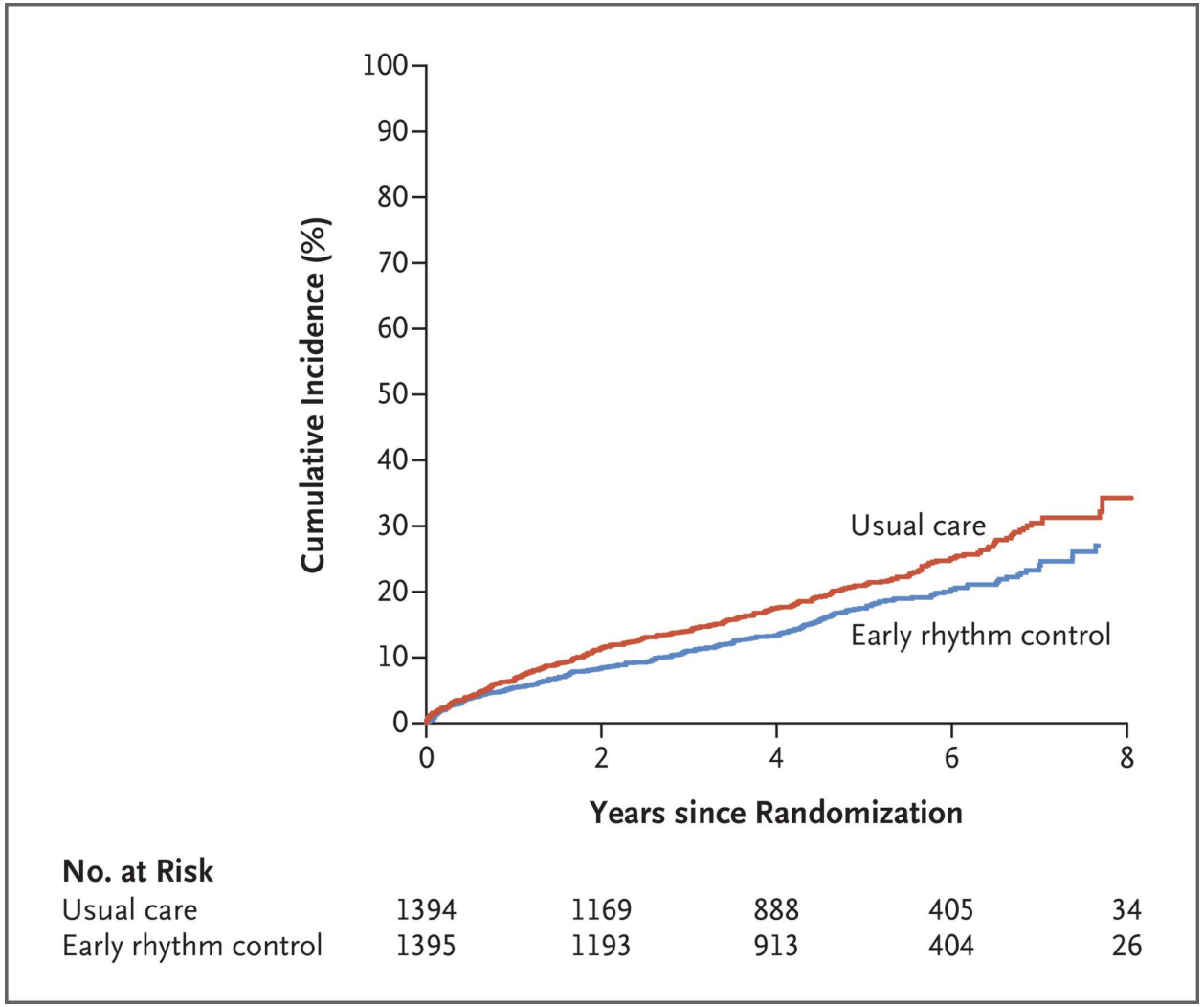
Paulus Kirchhof, M.D., A. John Camm, M.D., Andreas Goette, M.D., Axel Brandes, M.D., Lars Eckardt, M.D., Arif Elvan, M.D., Thomas Fetsch, M.D., Isabelle C. van Gelder, M.D., Doreen Haase, Ph.D., Laurent M. Haegeli, M.D., Frank Hamann, M.D., Hein Heidbüchel, M.D., Ph.D., Gerhard Hindricks, M.D., Josef Kautzner, M.D., Karl-Heinz Kuck, M.D., Lluis Mont, M.D., G. Andre Ng, M.B., Ch.B., Ph.D., Jerzy Rekosz, M.D., Norbert Schoen, M.D., Ulrich Schotten, M.D., Ph.D., Anna Suling, Ph.D., Jens Taggeselle, M.D., Sakis Themistoclakis, M.D., Eik Vettorazzi, M.Sc., Panos Vardas, M.D., Ph.D., Karl Wegscheider, Ph.D., Stephan Willems, M.D., Harry J.G.M. Crijns, M.D., Ph.D., Günter Breithardt, M.D., for the EAST-AFNET 4 Trial Investigators

N Engl J Med
Volume 383(14):1305-1316
October 1, 2020

The NEW ENGLAND JOURNAL of MEDICINE

Aalen–Johansen Cumulative-Incidence Curves for the First Primary Outcome.

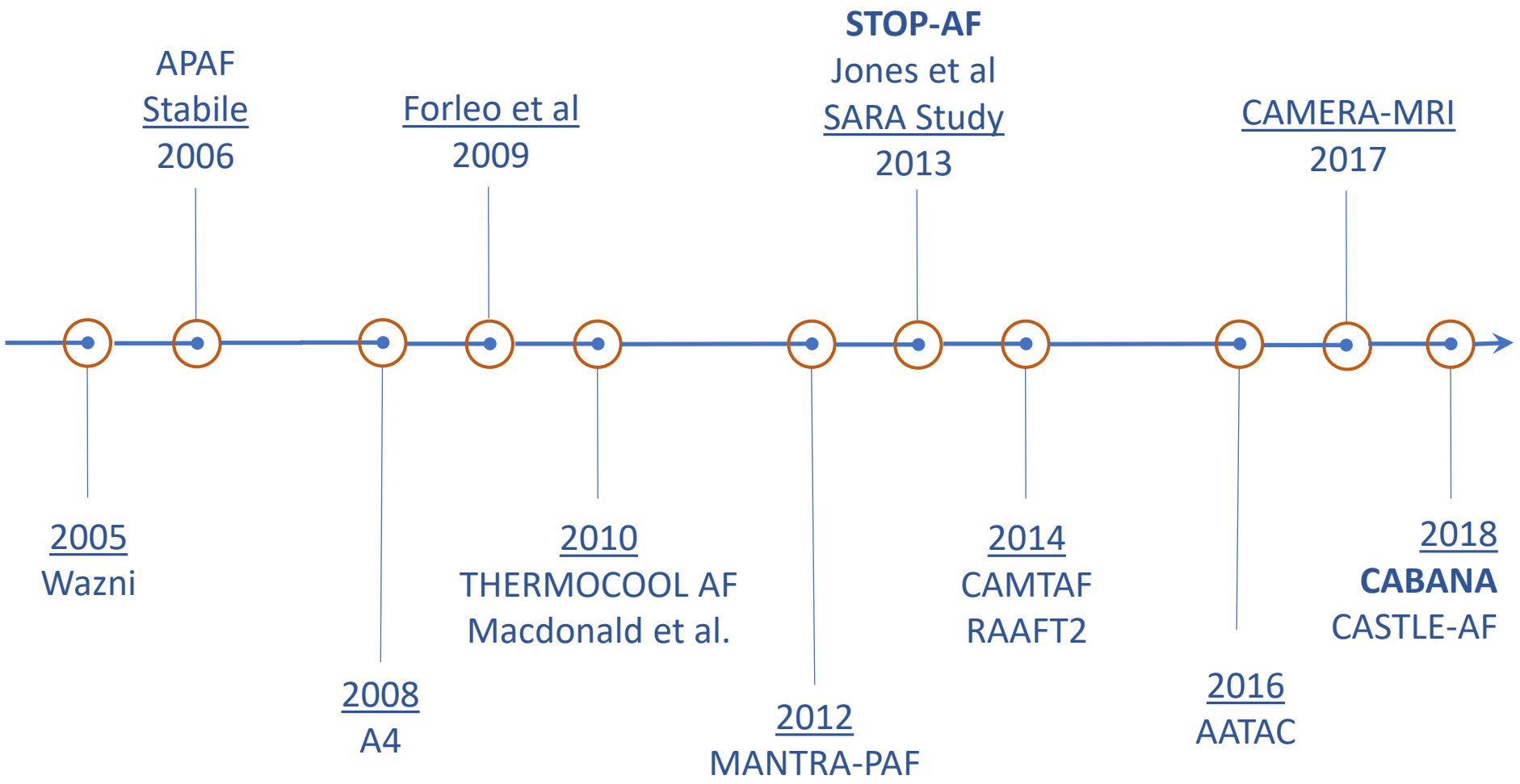
- In this multicenter, randomized trial comparing early rhythm control with usual care in patients with early atrial fibrillation and cardiovascular conditions, early rhythm control reduced the rate of death from cardiovascular causes and cardiovascular complications and did not affect the number of nights in the hospital.

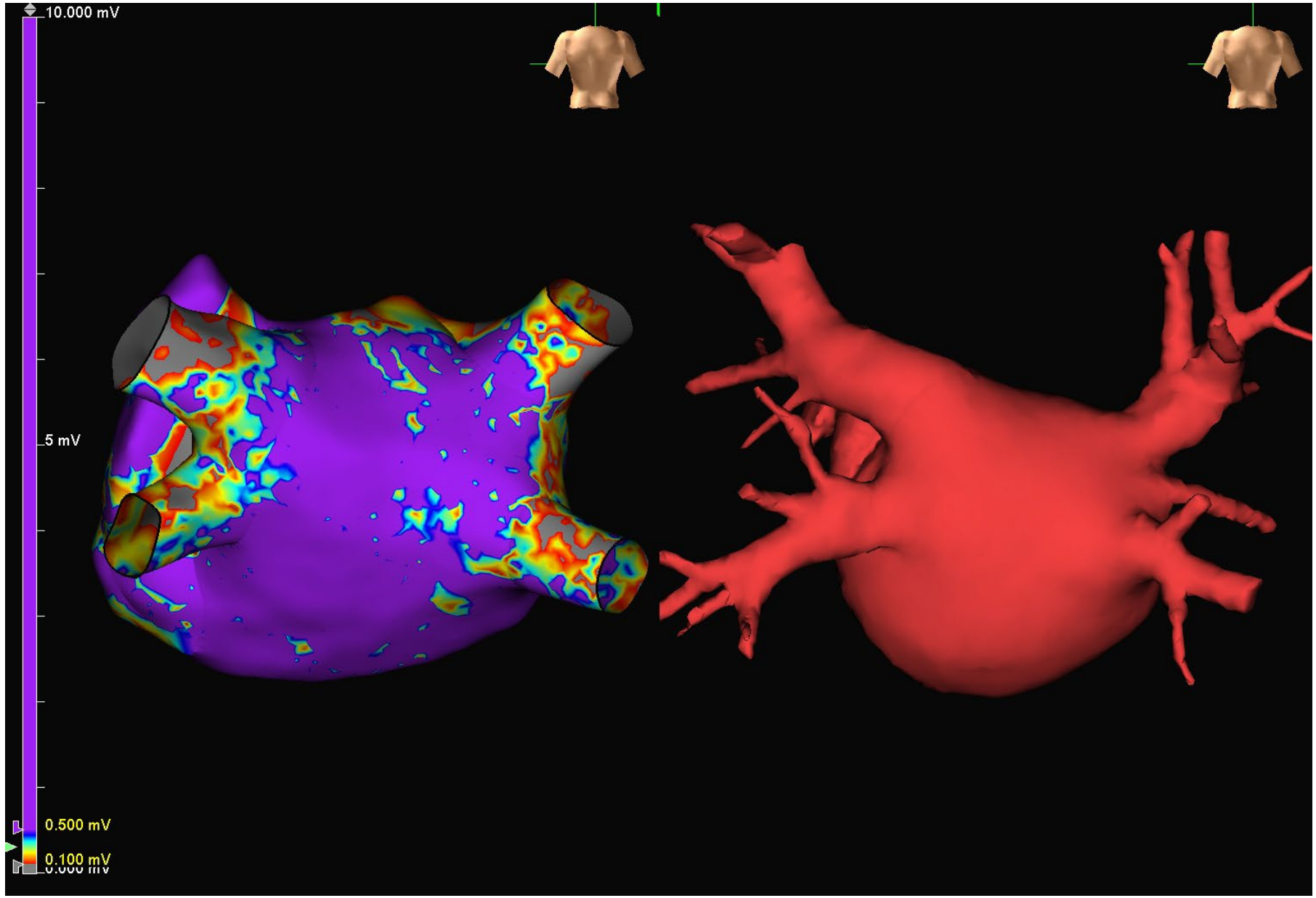


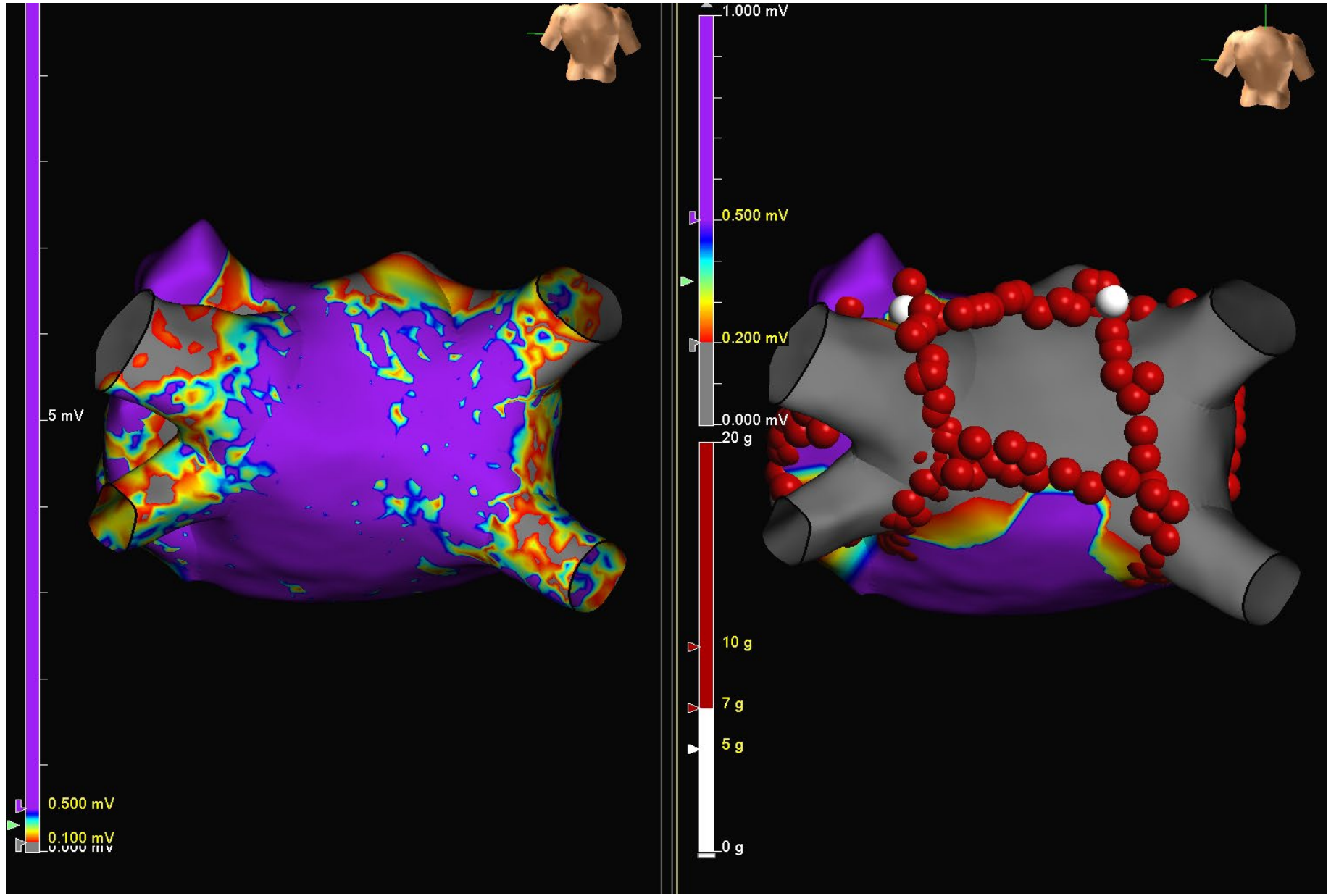
Kirchhof P et al. N Engl J Med 2020;383:1305-1316

The NEW ENGLAND JOURNAL of MEDICINE

Catheter ablation Clinical Trials




10.000 mV
5 mV
0.500 mV
0.100 mV


5 mV
0.500 mV
0.100 mV
1.000 mV
0.500 mV
0.200 mV
0.000 mV
20 g
10 g
7 g
5 g
0 g

Atrial Fibrillation – When to Refer

- Any time
  - In particular:
    - Symptomatic
    - Heart failure (subjective or objective)
    - Questions around anticoagulation, rhythm control
    - “Cryptogenic” stroke
- Consider workup:
  - Echocardiogram
  - TSH with reflex
  - ? Ambulatory monitor
    - If rate control is in question – generally a 7-day extended CAM

How to refer

- In Epic:
  - “Cardiology” vs “Cardia Electrophysiology”
  - Many patients have both a general cardiologist and an electrophysiologist, so often the default is to see general cardiology first, and then refer to EP as indicated
  - In patients without other substantial cardiovascular problems, isolated EP referral and management is appropriate
- If any question as to how the patient should be referred, please feel free to call

How to Contact

Cardiology Clinic

Talbot Professional Center
4011 Talbot Road S Ste 500

Renton, WA 98055

Phone: 425.690.3482

Fax: 425.690.9082

Sawyer_Gillespie@valleymed.org

Cell: 206-390-8598