

EP Lab Complex Case

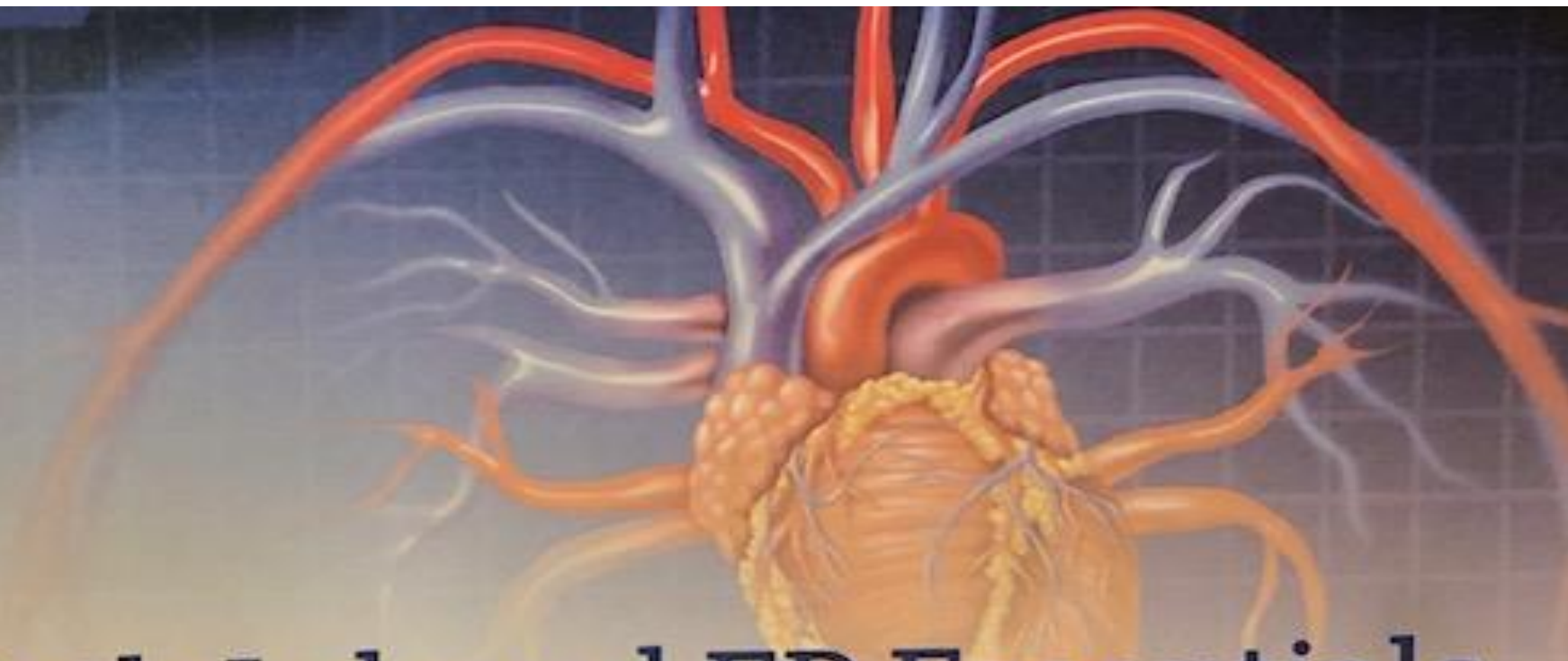
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**David M. Donaldson, MD, FACC
FHRS**

**2020 Cath Lab and EP Essentials CME
Conference**

February 1st 2020





2020 Cath Lab and EP Essentials CME Conference

Saturday, Feb. 1, 2020

UCI School of Medicine

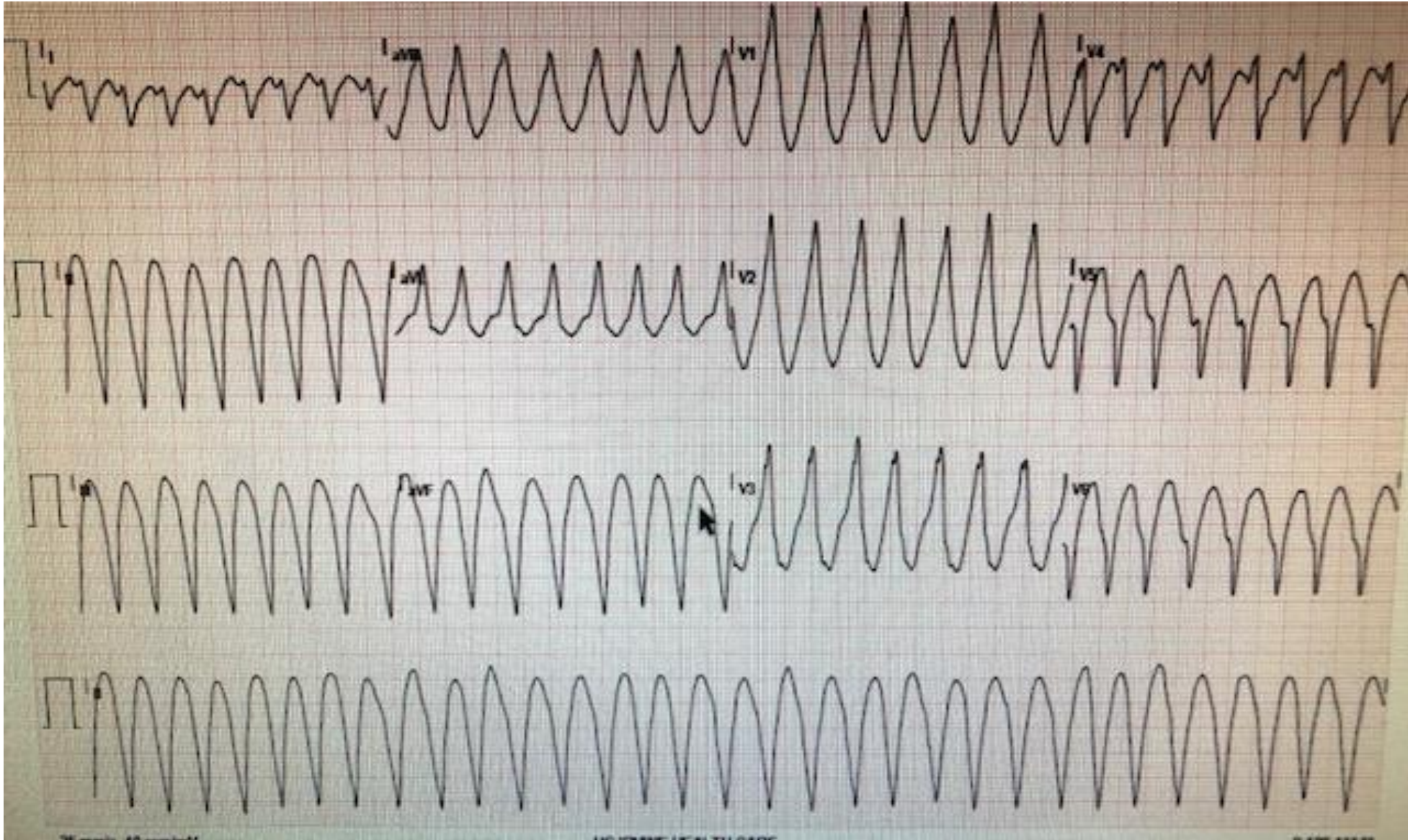
Disclosure

- **No** grant/research support, no consultant fees, nor stock holder in pharmaceutical or medical device company.
- This talk will be strictly **free** of commercial bias.
- This talk will be **balanced** view of therapeutic options, only generic names will be utilized.
- This lecture will **not** include discussion on unlabeled / investigational use of commercial products.
- Talk will be in compliance of ACGME, UCI policies to provide a balanced, independent, objective and scientifically rigorous educational talk.

Ventricular Tachycardia: Interesting Case: Patient DM

- 69 year old male with PMH: Moderate Cardiomyopathy (unclear etiology), COPD and ACTIVE TOBACCO, CHF NYHA class II / B, Ventricular Tachycardia in 2005 started on Sotalol 40 mg PO BID s/p Single chamber Medtronic PROTECTA XT ICD inserted in early 2000's and generator change on October 1st 2012; HTN; AAA s/p bypass; TIA on Coumadin transferred from OSH on November 10th 2019 with recurrent ICD shocks (estimated over 30 shocks) and episodes of LOC.
- Arrived in ER at OSH, started on AMIODARONE gtt yet recurrent shocks.
- Transferred to UCI for further management.
- Arrived in CCU at UCI, Amiodarone gtt continued and added Lidocaine gtt.

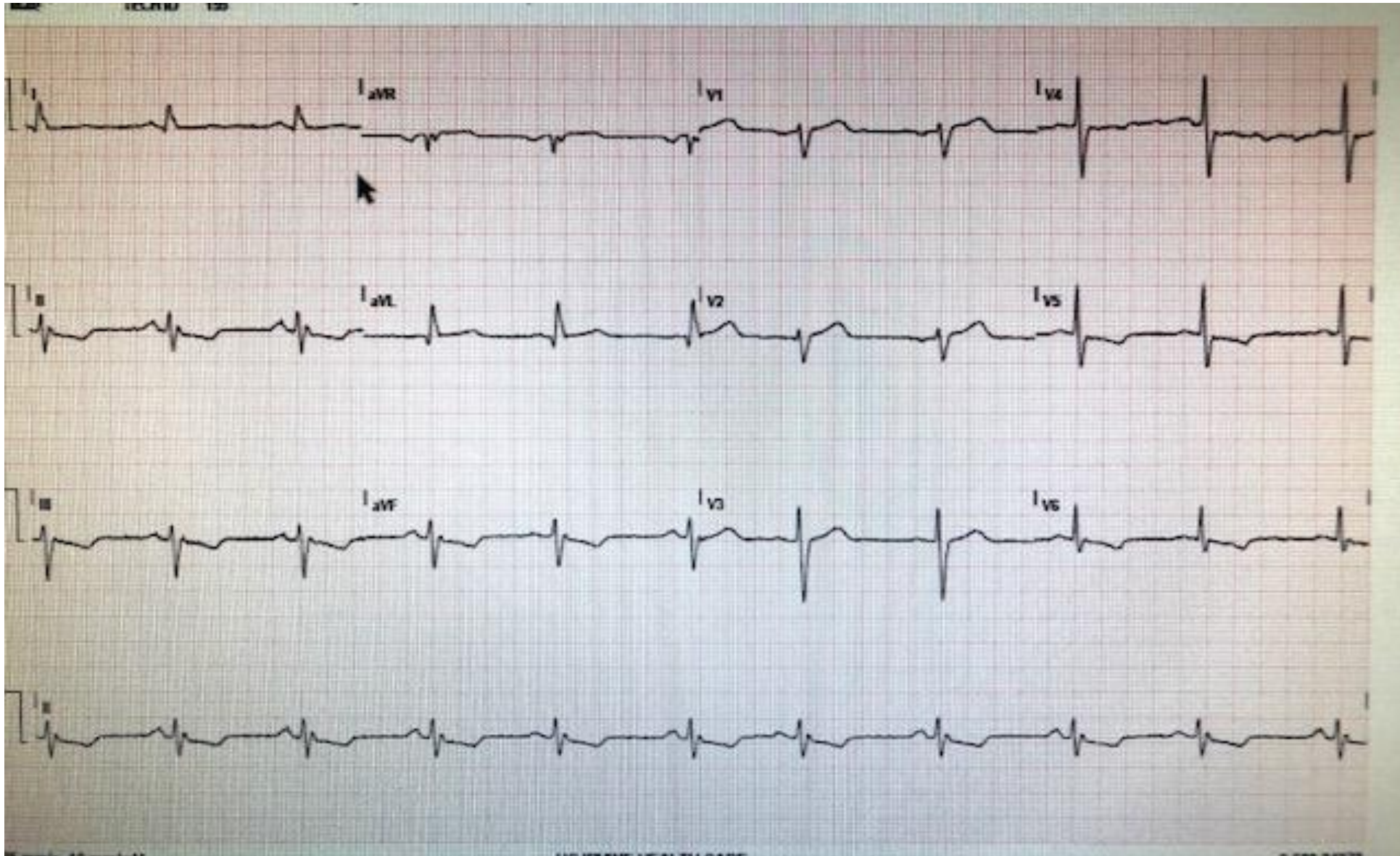
Ventricular Tachycardia: EKG



Ventricular Tachycardia: ICD Interrogation



Post Cardioversion EKG



Hospital Course:

TTE November 10th 2019:

- Left Ventricle: The left ventricular internal size is normal. Mild septal left ventricular hypertrophy. There is global moderately decreased left ventricular systolic function. Left ventricular ejection fraction is 42%.
- LV Wall Scoring: The basal and mid anterolateral wall and basal and mid inferolateral wall are akinetic. All remaining scored segments are normal.
- Right Ventricle: The right ventricular size is mildly enlarged.
- Mitral Valve: Structurally normal mitral valve. Trace mitral valve regurgitation is seen.
- Tricuspid Valve: Structurally normal tricuspid valve, trace tricuspid regurgitation was seen.
- Aortic Valve: The aortic valve was not well visualized. The aortic valve is tricuspid. Mild aortic valve sclerosis is present, with no evidence of aortic valve stenosis. No evidence of aortic valve regurgitation is seen.

Summary:

1. Moderately decreased left ventricular systolic function. The left ventricular ejection fraction is 42% by Biplane.
2. Basal and mid anterolateral wall and basal and mid inferolateral wall are akinetic.
3. Findings consistent with ischemic heart disease.
4. Mild septal left ventricular hypertrophy.

Hospital Course: Cardiac catheterization on November 13th 2019

- Coronary anatomy dominance: Right.
- Left Main Coronary Artery:
 - The left main coronary artery arises normally from the left coronary sinus of Valsalva and showed mild distal irregularities.
- Left Anterior Descending Coronary Artery Distribution:
 - The left anterior descending coronary artery is a large caliber vessel. The ostial LAD showed 30% stenosis. An additional lesion, located at the mid LAD, revealed 30% stenosis.
- Circumflex Coronary Artery Distribution:
 - The circumflex revealed mild irregularities.
- Ramus Intermedius:
 - The ramus intermedius is a large caliber vessel. The ramus intermedius showed no evidence of significant disease.
- Right Coronary Artery Distribution:
 - The RCA arises normally from the right sinus of Valsalva. The mid right coronary artery showed 40% stenosis. An additional RCA in mid to distal right coronary artery, revealed 40% stenosis.

Coronary Lesion Summary:

LAD 30% stenosis ostial

LAD 30% stenosis mid

RCA 40% stenosis mid and 40% stenosis mid to distal.

Ventricular Tachycardia: Interesting Case: Patient DM

- After TTE and cardiac catheterization, Amiodarone gtt and Lidocaine gtt continued.
- VT and NSVT and ICD shocks quieted DAY #1-#3, switched loaded oral Amiodarone, continued Lidocaine gtt.
- Late Day #3-4 on Amiodarone PO developed VT and Recurrent ICD shocks
- Amiodarone gtt restarted

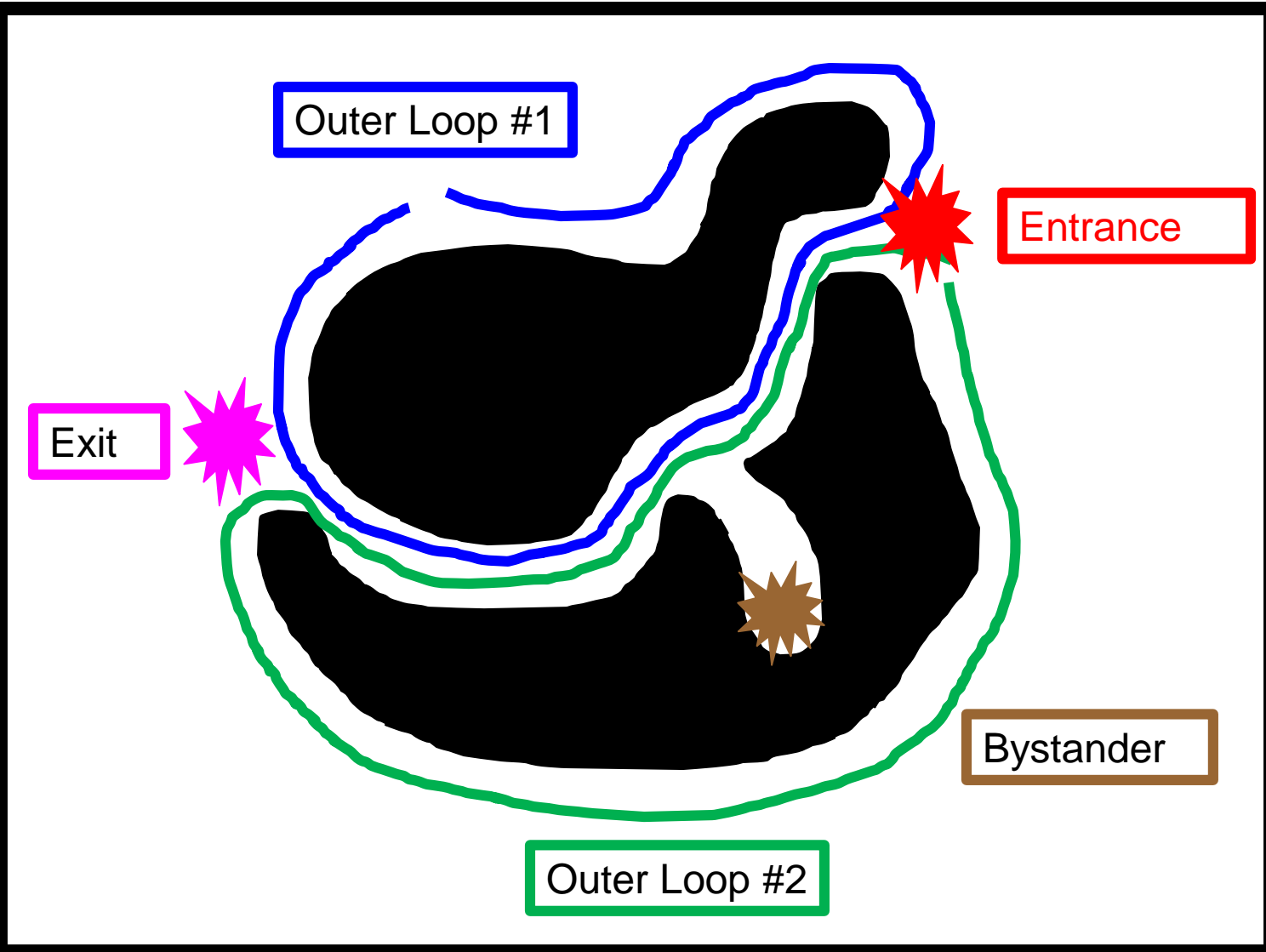
Ventricular Tachycardia: Ablation Therapy

4.5. Nonischemic Cardiomyopathy

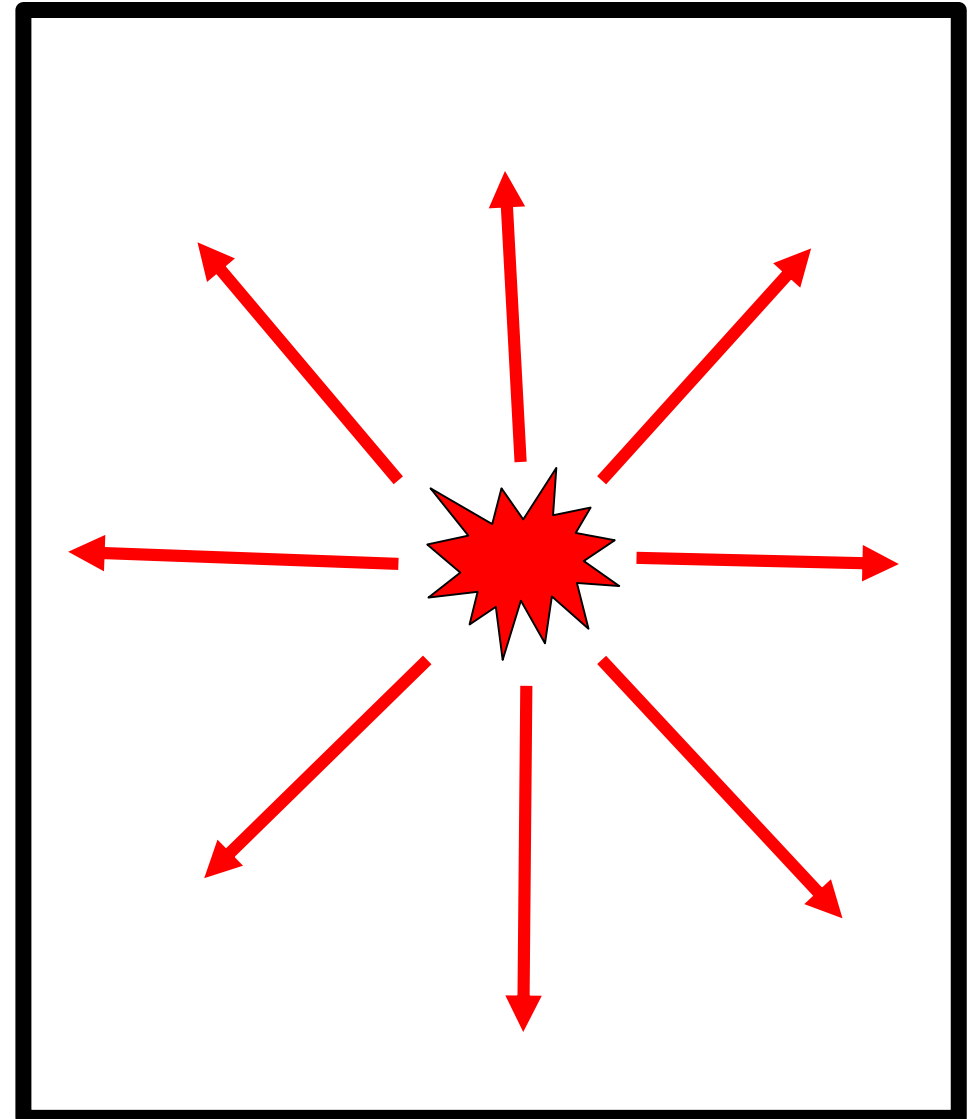
Recommendations for catheter ablation of VT in nonischemic cardiomyopathy (NICM)

COR	LOE	Recommendations
I	B-NR	1. In patients with NICM and recurrent sustained monomorphic VT for whom antiarrhythmic medications are ineffective, contraindicated, or not tolerated, catheter ablation is useful for reducing recurrent VT and ICD shocks.
I	B-NR	2. In patients with NICM and electrical storm refractory to AAD therapy, catheter ablation is useful for reducing recurrent VT and ICD shocks.
IIa	B-NR	3. In patients with NICM, epicardial catheter ablation of VT can be useful after failure of endocardial ablation or as the initial ablation approach when there is a suspicion of an epicardial substrate or circuit.
IIa	B-NR	4. In patients with cardiac sarcoidosis and recurrent VT despite medical therapy, catheter ablation can be useful to reduce the risk of VT recurrence and ICD shocks.
IIa	C-EO	5. In patients with NICM and recurrent sustained monomorphic VT for whom antiarrhythmic medications are not desired, catheter ablation can be useful for reducing recurrent VT and ICD shocks.
IIb	B-NR	6. In patients with NICM related to lamin A/C (<i>LMNA</i>) mutations and recurrent VT, catheter ablation may be considered as a palliative strategy for short-term arrhythmia control.

Reentrant Circuit



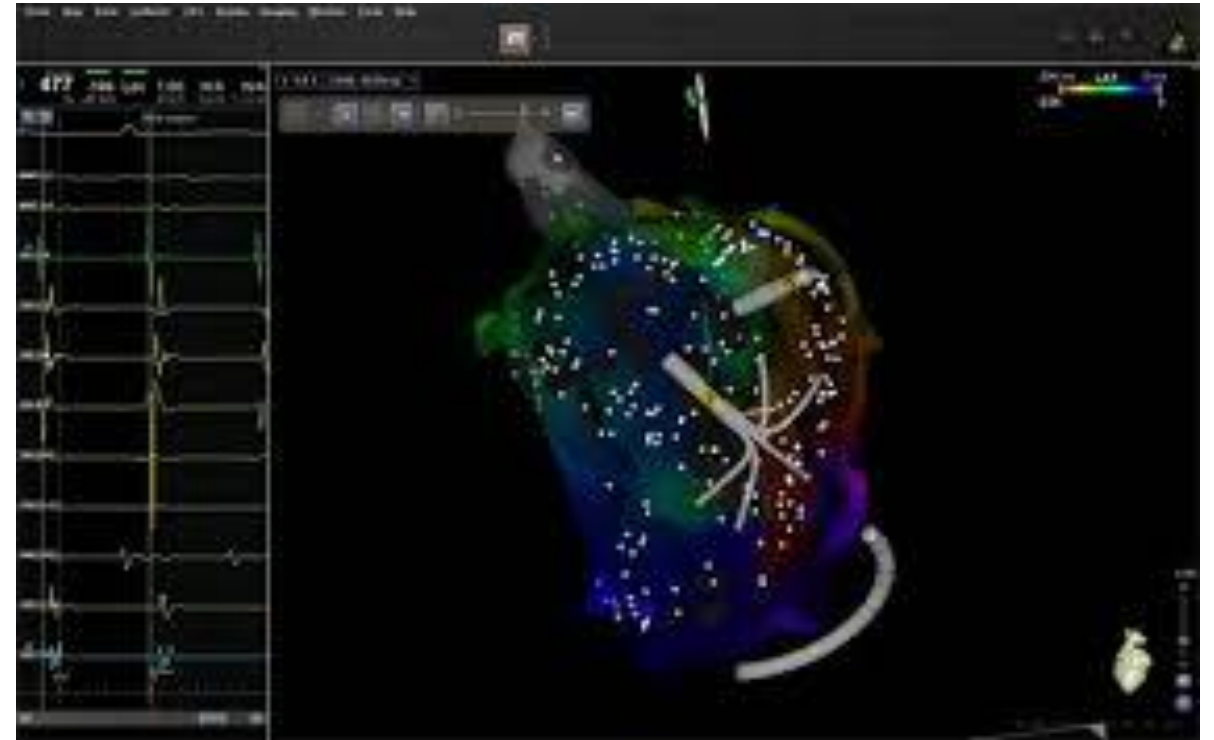
Focal



Ventricular Tachycardia: Ablation November 15th 2019:

- ICE mapping and endocardial mapping RA / RV / LA / LV via transseptal
- PENTA mapping catheter and irrigated ablation catheter.
- The PENTA catheter were easily advanced into the left ventricle to map the LV and papillary muscles, this was merged with ultrasound mapping system

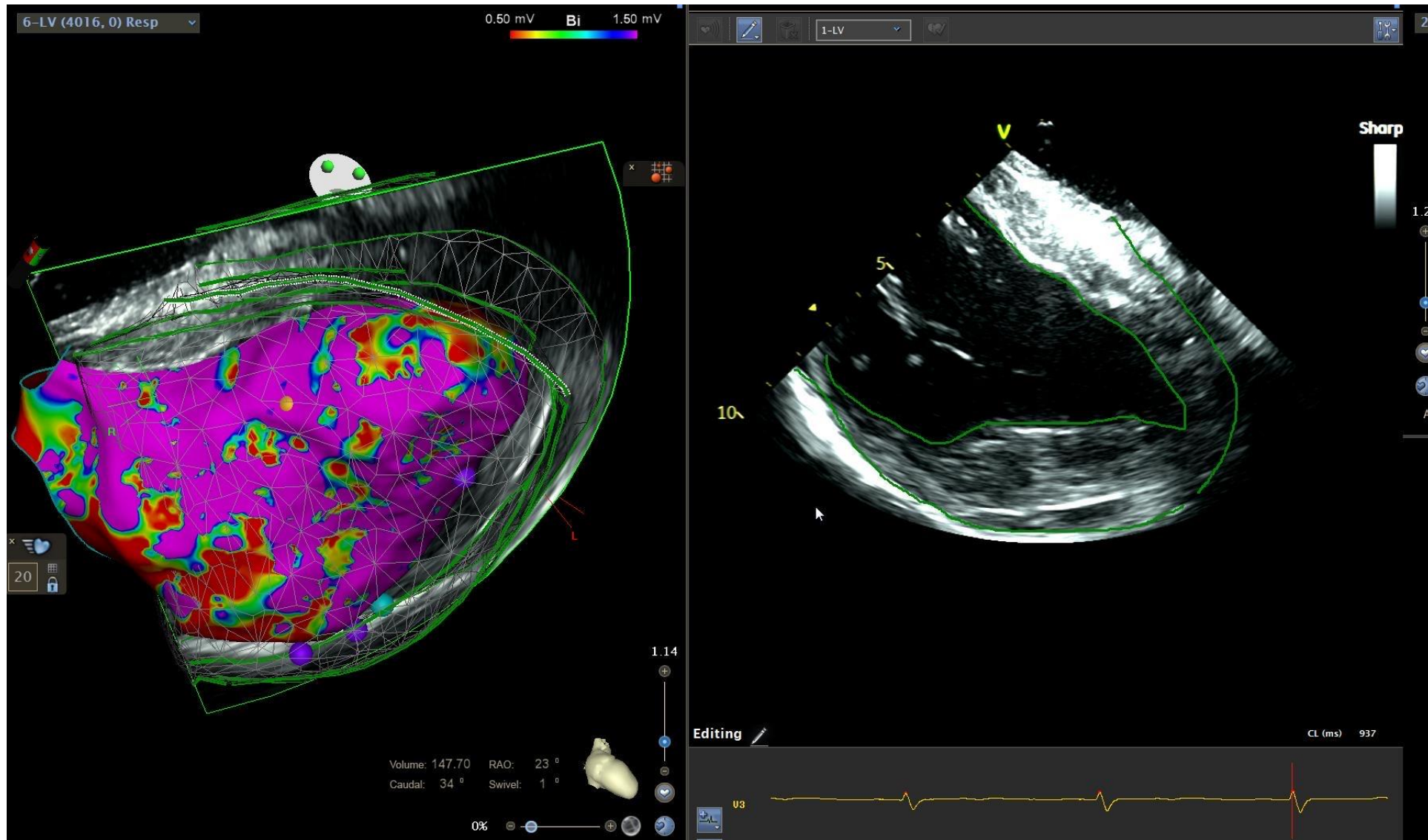
Ventricular Tachycardia: Ablation November 15th 2019:



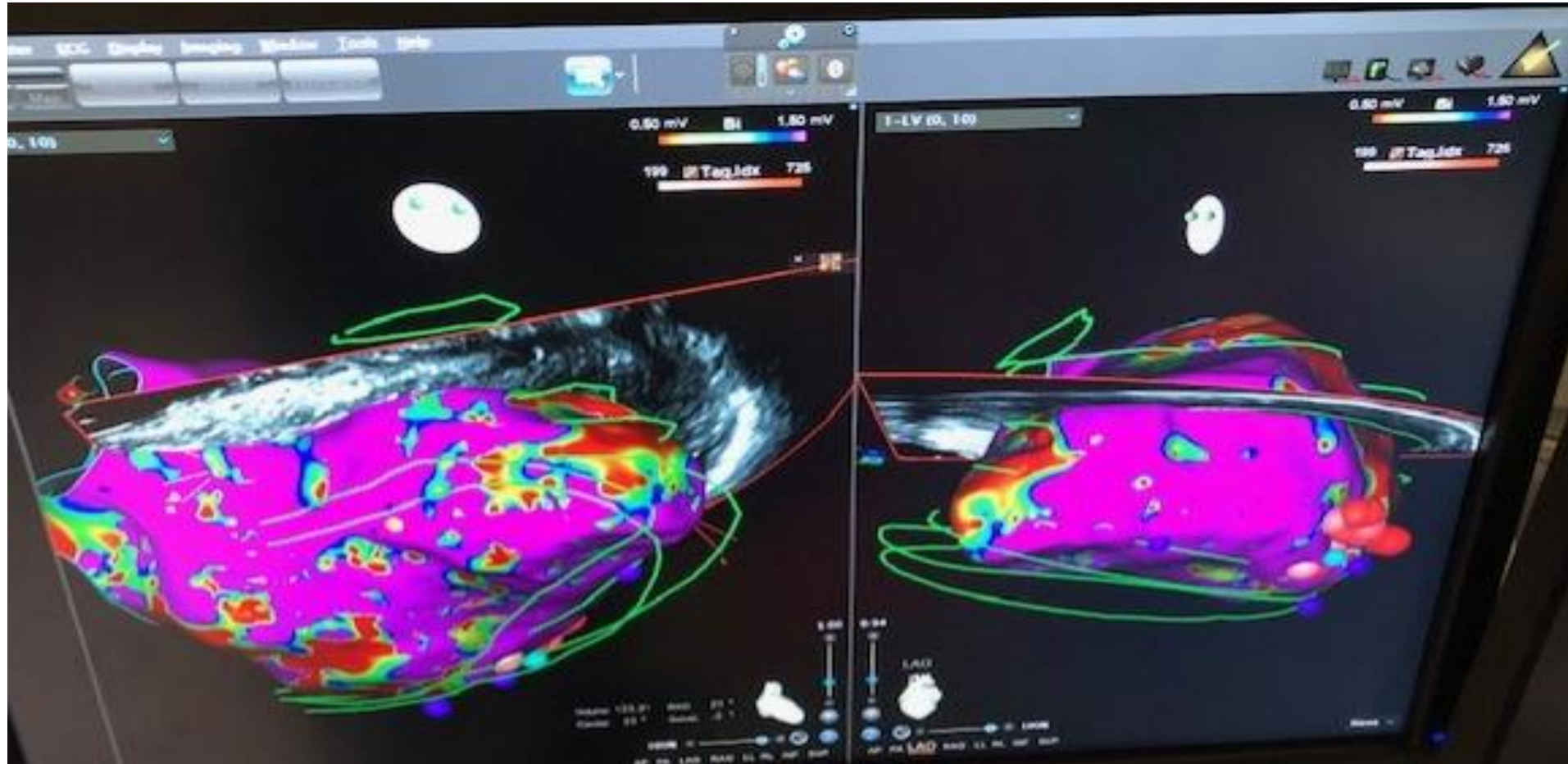
Ventricular Tachycardia: Ablation November 15th 2019:

- An extensive map of the left ventricle and a map of the right ventricle was performed
- Left ventricle had a small apical scar
- There was a large scar in the basal left ventricle most prominently seen in the anterior lateral and anterior septal aspects
- The patient went into several runs monomorphic ventricular tachycardia which was Right bundle block transition at lead V4, superior axis, (-) in lead 1, (+) AVR, AVL consistent with his clinical arrhythmia.
- VT was able to be mapped and had a 97% match with pace mapping.
- Focus was at the border of the scar between the anterior lateral and anteroseptal aspects there were no features consistent with reentrant ventricular arrhythmias and activation mapping, pace mapping and entrainment were all consistent with a triggered arrhythmia coming from this focus.

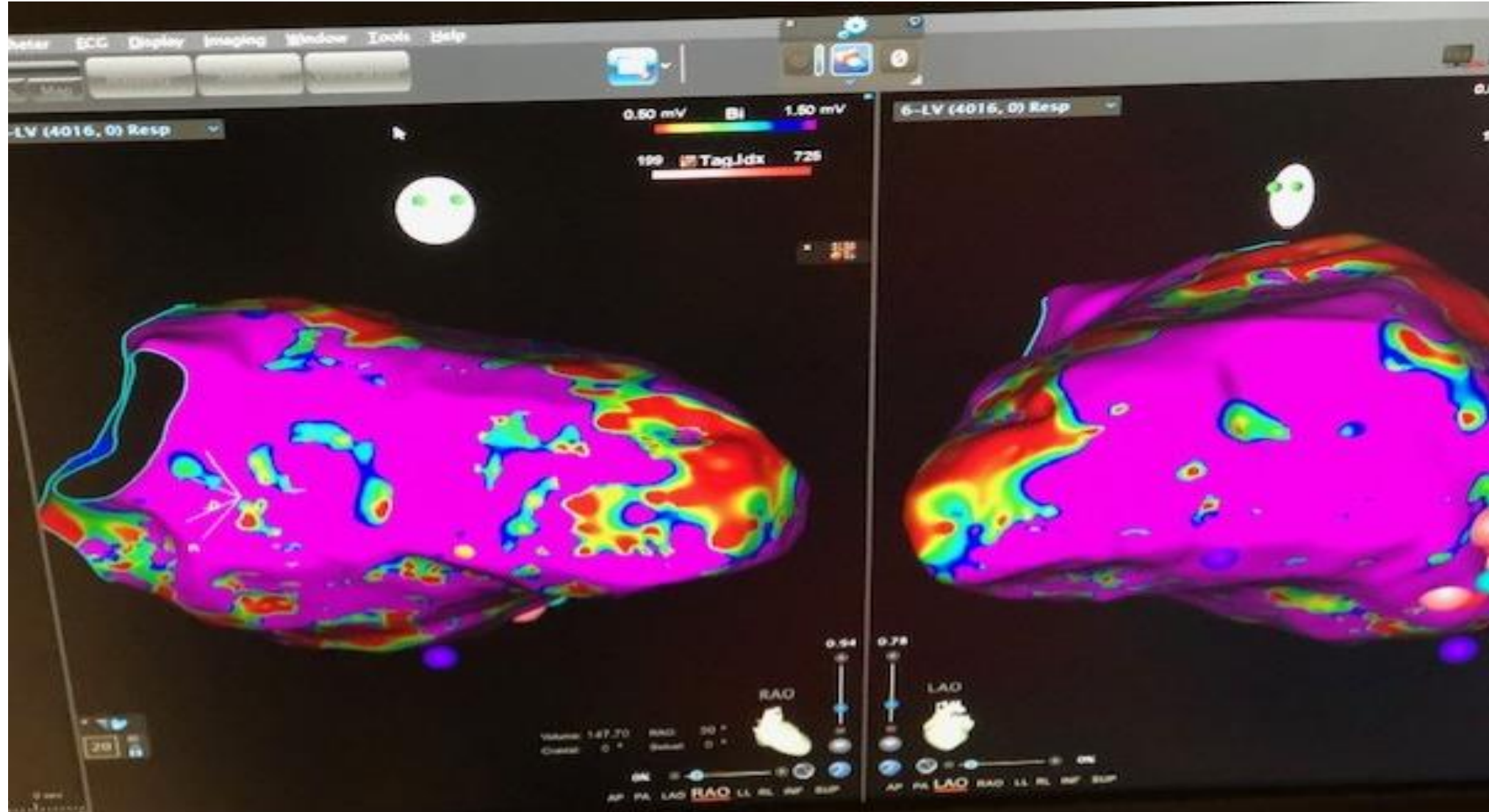
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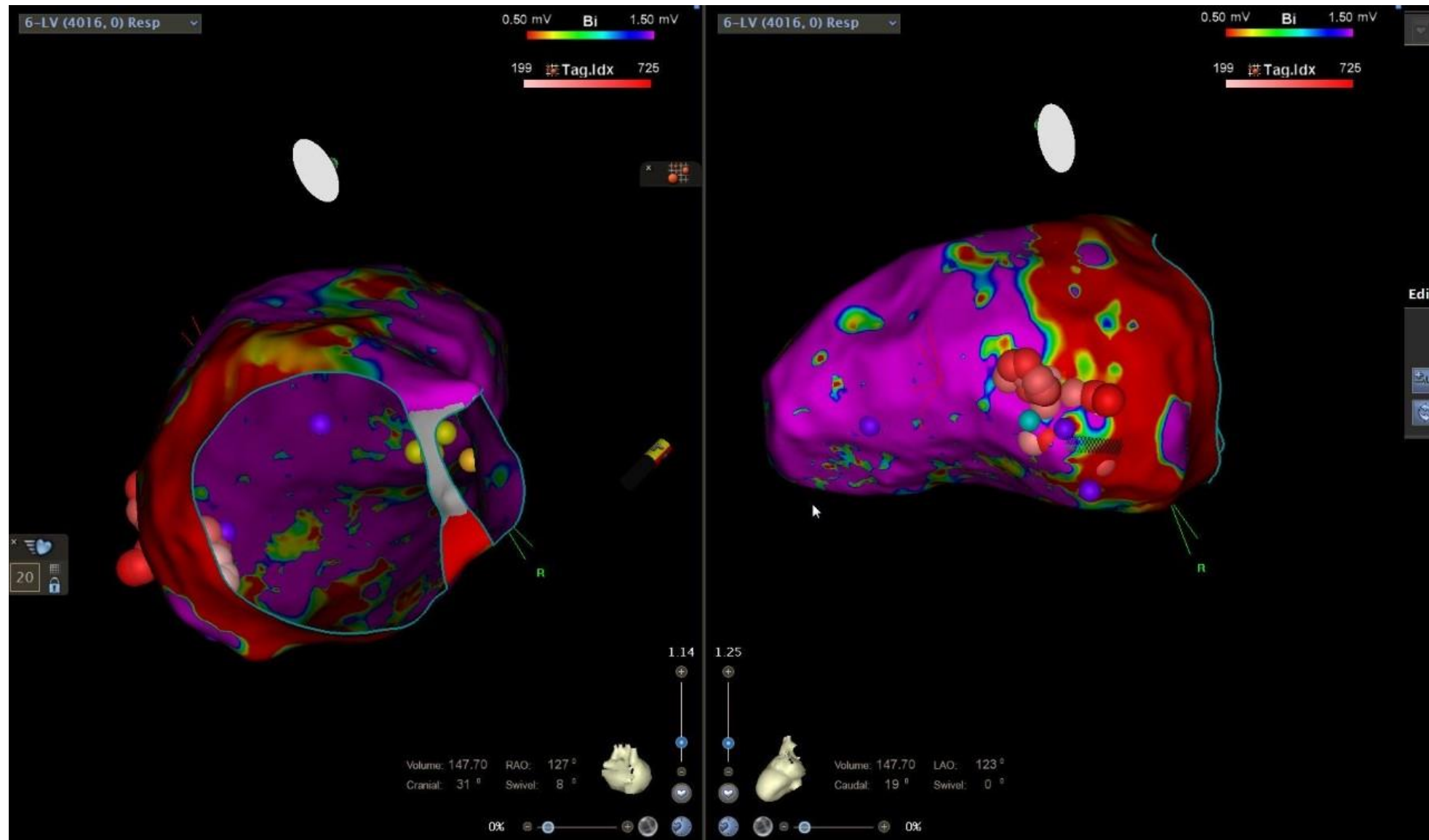
Ventricular Tachycardia: Ablation November 15th 2019:



Ventricular Tachycardia: Interesting Case: Patient DM

- The ablation was performed between 35 and 40 Watts with appropriate drop in impedance and catheter stability and after delivery based on mapping.
- Extensive lesions in regions with fractionated potentials.
- With ablation there was triggered activity, VT and NSVT
- VT was terminated.
- Pacing for induction of the arrhythmia was noninducible and infusion of high-dose isoproterenol as tolerated by the patient's blood pressure the arrhythmia was not inducible nor were there any PVCs.

Ventricular Tachycardia: Ablation November 15th 2019:



Ventricular Tachycardia: Interesting Case: Patient DM

- Followed up in clinic January 6th 2020
 - No VT and no ATP / Shocks
 - Underwent ICD generator change successfully

Which patient is the best candidate for a successful VT ablation?

1. A 56 year old male with CAD s/p PCTI 14 days ago who presents with new chest pain and NSVT.
2. A 63 year old female with no PMH who presents with STEMI and PMVT on admission.
3. A 72 year old male with CAD, CABG 2012, CHF NYHA III, BiV ICD on GDMT and TST (-) on AMIO with sustained palpitations and several ICD appropriate shocks for MMVT at TCL 170-180 bpm.
4. A 78 year old male with severe ICM, mechanical MVR, severe AS, with a new LV apical thrombus and severe PVD and ICD with syncope / ICD shocks for rapid and sudden onset VT 220-240 bpm.
5. A 36 year old female with Chagas Disease, ICD, recurrent ICD shocks for multiple morphologies of rapid VT and two prior ablations via endocardial approach and two ablations with both epicardial / endocardial.



3. A 72 year old male with CAD, CABG 2012, CHF NYHA III, BiV ICD on GDMT and TST (-) on AMIO with sustained palpitations and several ICD appropriate shocks for MMVT at TCL 170-180 bpm.

- Patients with UA and NSVT or STEMI with PMVT need ischemia evaluation and not VT ablation.
- Patients with access issues, LV thrombus, or rapid VT (not well tolerated) have lower success rates
- Patients with infiltrative CM as the trigger of the VT require Epicardial and Endocardial ablation with lower success rates and higher associated complications.
- Patients that are well optimized, with one obvious VT that is more stable and likely scar mediated tend to respond to therapy favorably.

Reference: Cardiac Electrophysiology: From Cell to Bedside: Zipes and Jalife; edition 4; chapters 61, 62, 78, 101, 106, 118

Reference: Cronin et al; Heart Rhythm 2019; HRS/EHRA/APHRS/LAHRS Expert Consensus statement of Catheter Ablation of Ventricular Tachycardia



Thank you and enjoy the day!

