

Ablation of Ventricular Tachycardia in Ischemic Cardiomyopathy

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Ischemic Cardiomyopathy as a Substrate for VT

- Most common cause for cardiomyopathy
- A minority of patients will develop VT
- The increasing number of patients, increased longevity, and the aging population contribute to an increasing number of candidates for ablation

VT in Ischemic CMP: what to do?

- R/O ischemia: role of history and objective assessment of the coronary circulation with invasive and non-invasive measures
- Assess HF status, and optimize therapy
- Anti-arrhythmic drugs are still first line therapy: Amiodarone, Sotalol, Dofetilide. Class-IC are contra-indicated.
- Recurrent VT ==> evaluation for ablation
- VT storm ==> ablation

VT Ablation: Cure or Palliation?

- VT ablation in the setting of SHD is not curative
- VT ablation is not a substitute for ICD therapy (? slow tolerated VT)
- VT ablation proven to reduce ICD shocks

Which VT is Relevant?

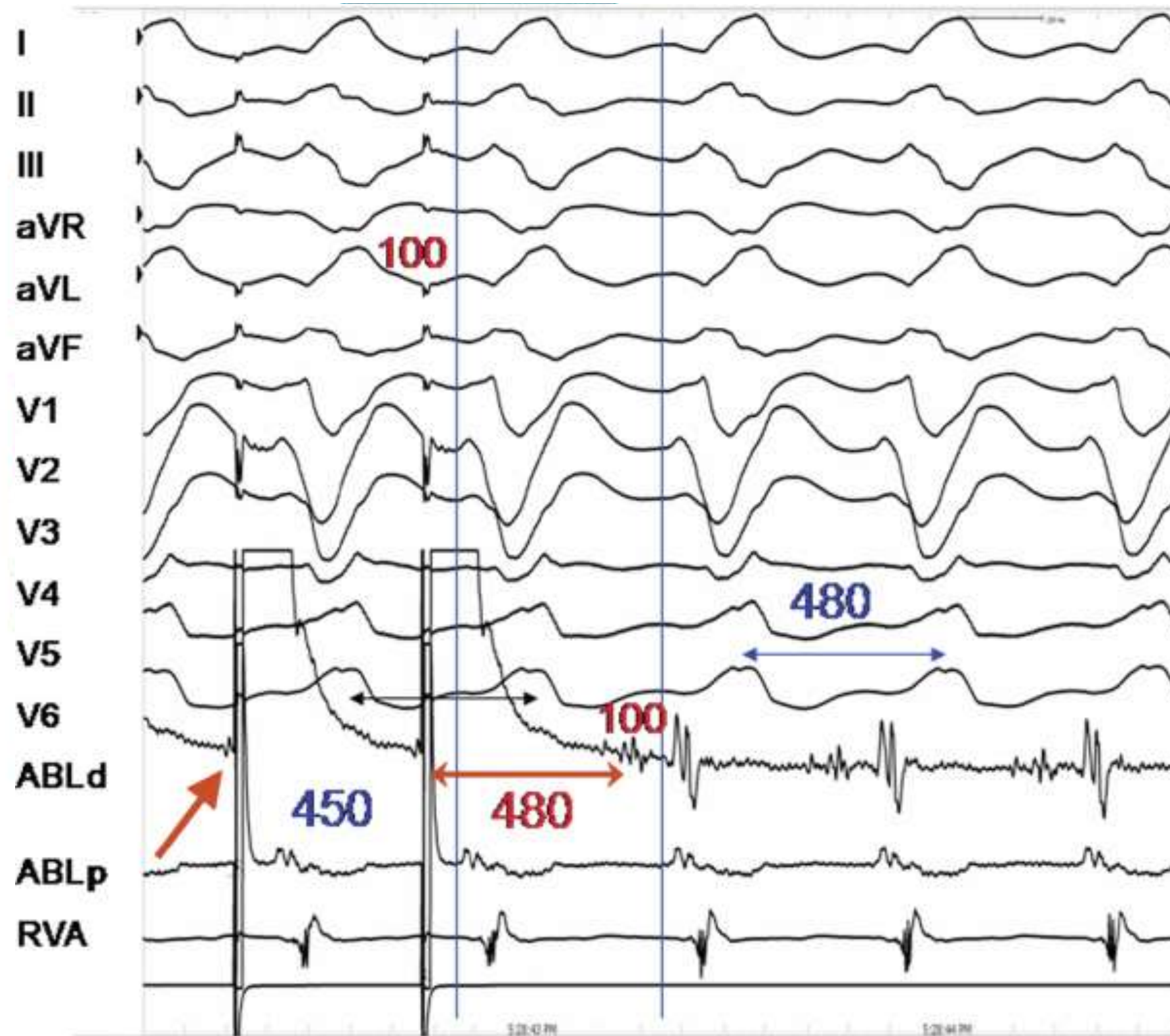
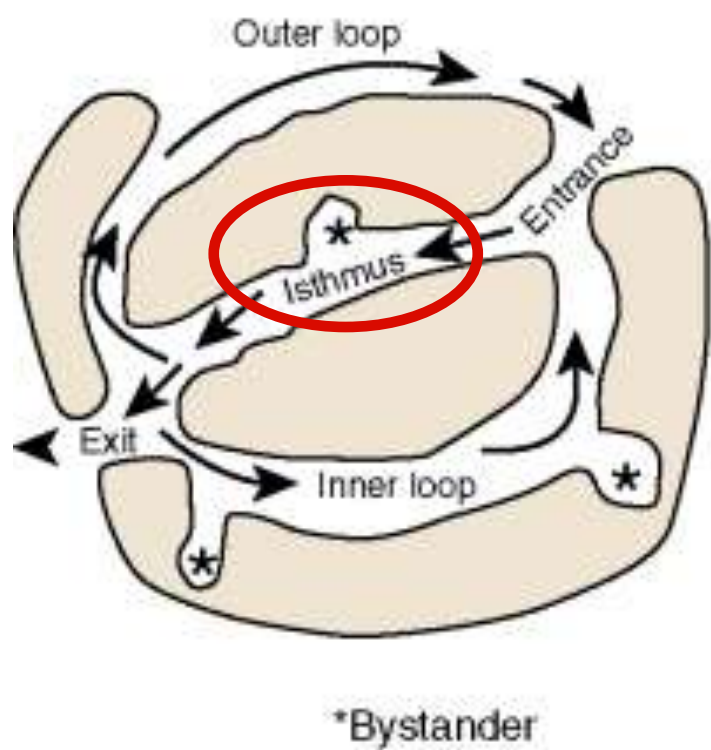
- ICD EGMs are key
- Clinical VT is priority
- Reproducibly inducible VT that is not clinical should still be targeted
- Non-clinical VT CL < 270 msec does not necessarily need to be targeted

Mapping and Ablation Strategies

- Tolerated VT : Entrainment mapping
 - Effect of sedation/anesthesia
- Non-tolerated VT: Substrate mapping
- Polymorphic VT: Ablation of triggering PVC

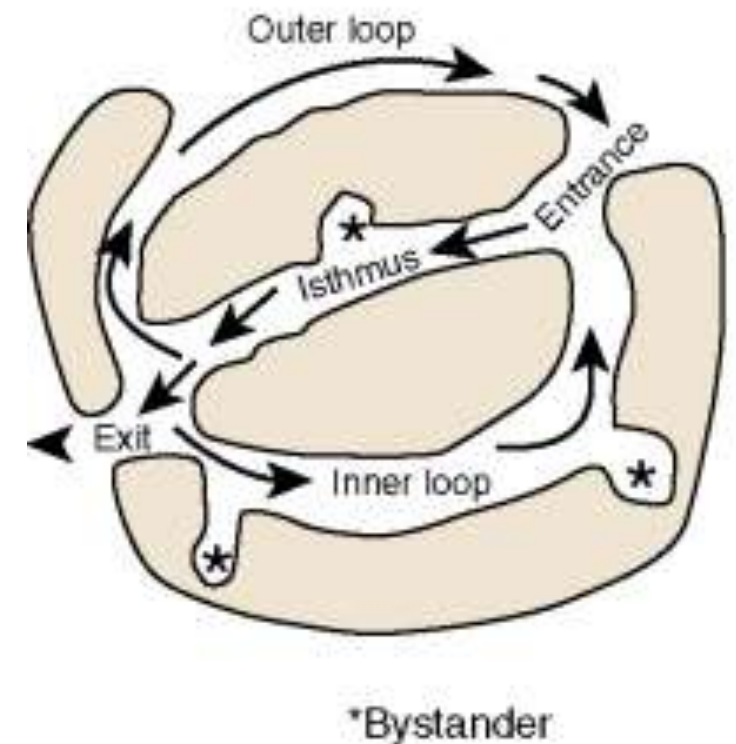
Entrainment Mapping

- Entrainment is continuous resetting with fusion of the tachycardia by pacing slightly faster than the TCL
- Manifest fusion indicates being away from the protected isthmus
- Concealed fusion indicates being close to the protected isthmus
- PPI approximating the TCL (± 30 msec) indicates being in the protected isthmus (with concealed fusion)
- S-QRS/TCL ratio identifies different parts of the critical isthmus, if S-QRS=EGM-QRS
- Inner loop sites need to be identified



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Ablation Targets



- Inner /outer loop sites are not effective.
- RF likely to terminate VT at mid-isthmus sites (S-QRS > 60 msec, < 70% of the TCL).
- Substrate modification should be performed as discussed later

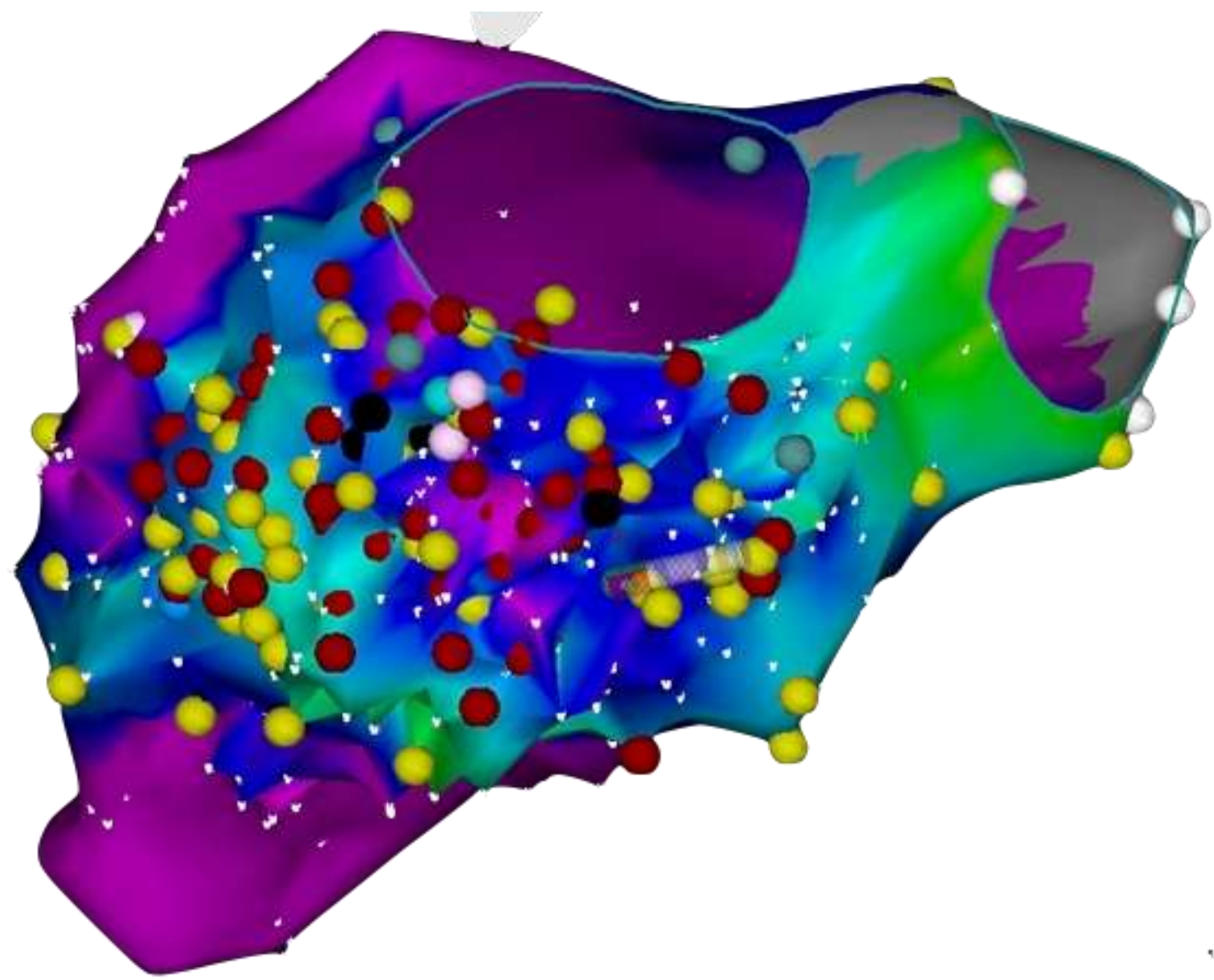
Substrate Mapping

- Non-tolerated, non-inducible VT
- 90% of VT cases need substrate-based ablation
- Based on Surgical experience at U Penn, after Endocardial peeling
- Voltage mapping identifying scar / healthy tissue

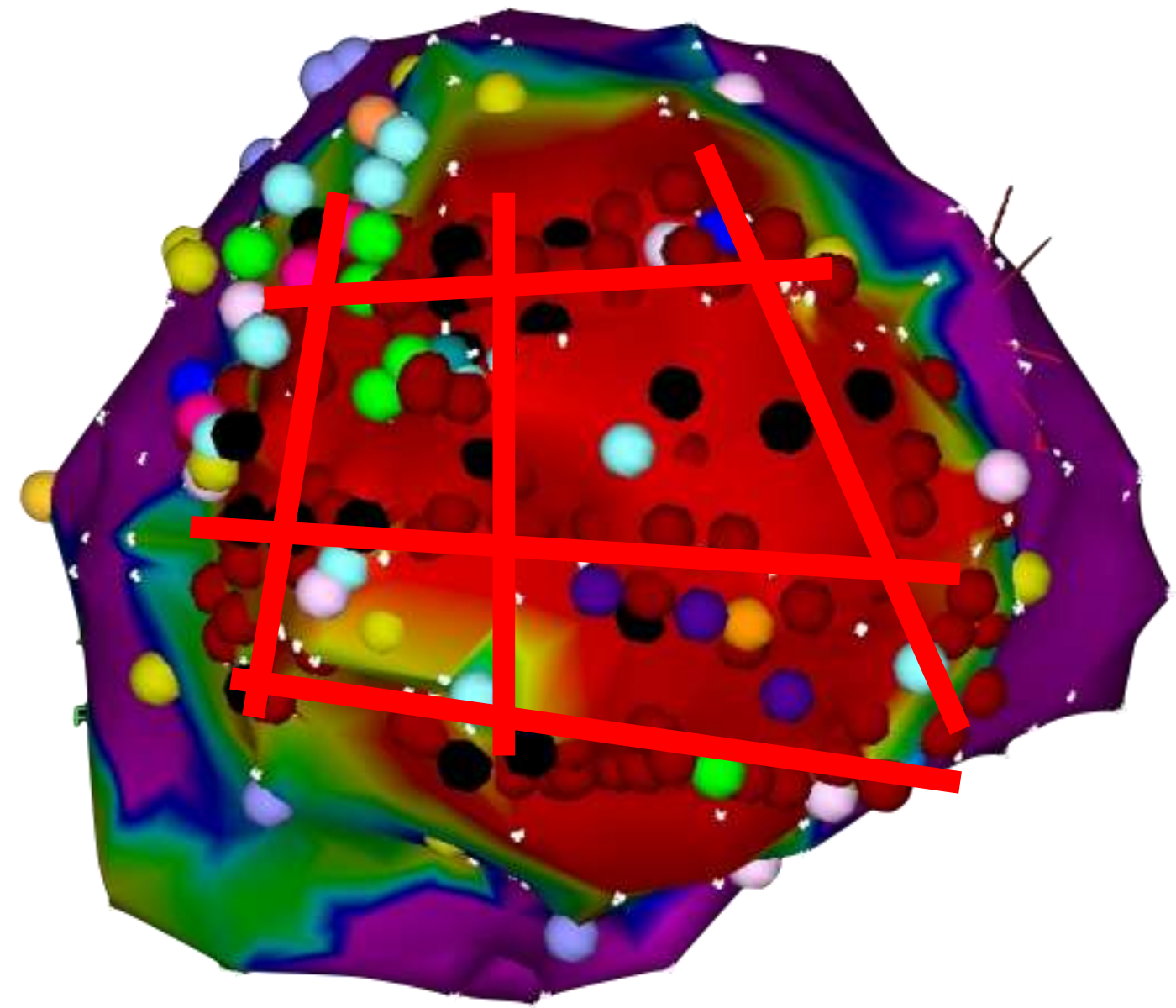
Ablation Targets

- Late or fractionated potentials
- Good pacemap sites
- Channels between dense areas of scar
- Long S-QRS sites

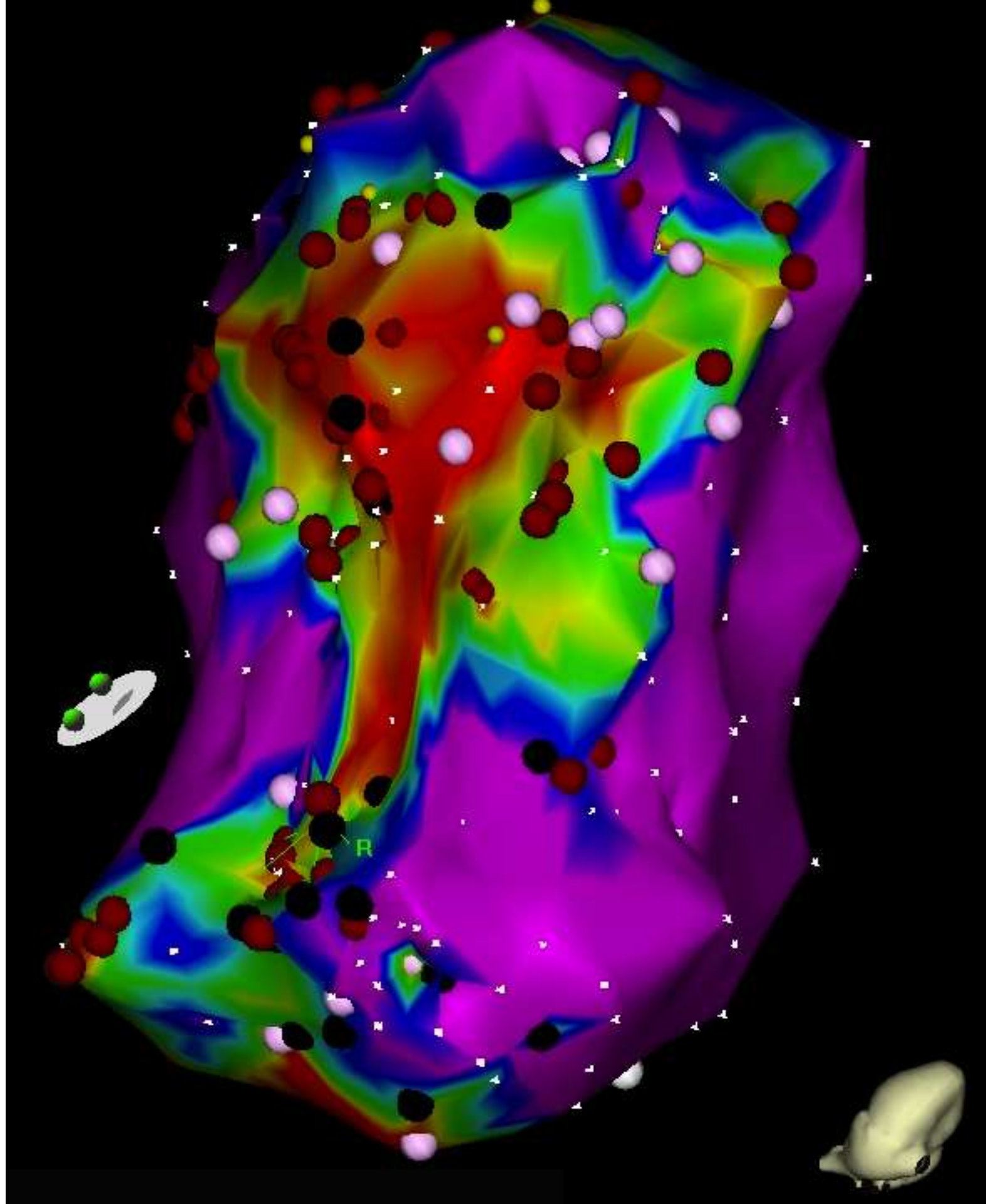
Case 1



Case 2



Case 3



Mapping with Ventricular-Assist Devices

- Permanent VADs, e.g HeartMate II, etc
- Percutaneous VADs, e.g Impella devices
- Allows for prolonged mapping during VT, i.e. entrainment mapping
- Better clinical course, no improvement in terms of freedom from VT has been demonstrated yet

Post-Procedure Management

- Continuing anti-arrhythmic medications
- Post-Procedure NIPS

Prognosis

- Acute success rate 70-90%, “on treatment basis”
- Long term freedom from targeted VT is high as well
- Risk of developing new VT is high
- Even with aggressive approach, and repeat ablations, risk of developing VT is 30-46% over few years
- 50% mortality in patients requiring ablation at 5 years