Cardiovascular Magnetic Resonance in Hypertrophic Cardiomyopathy

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DISCLOSURE

- Gadolinium is FDA off-label use for CV imaging

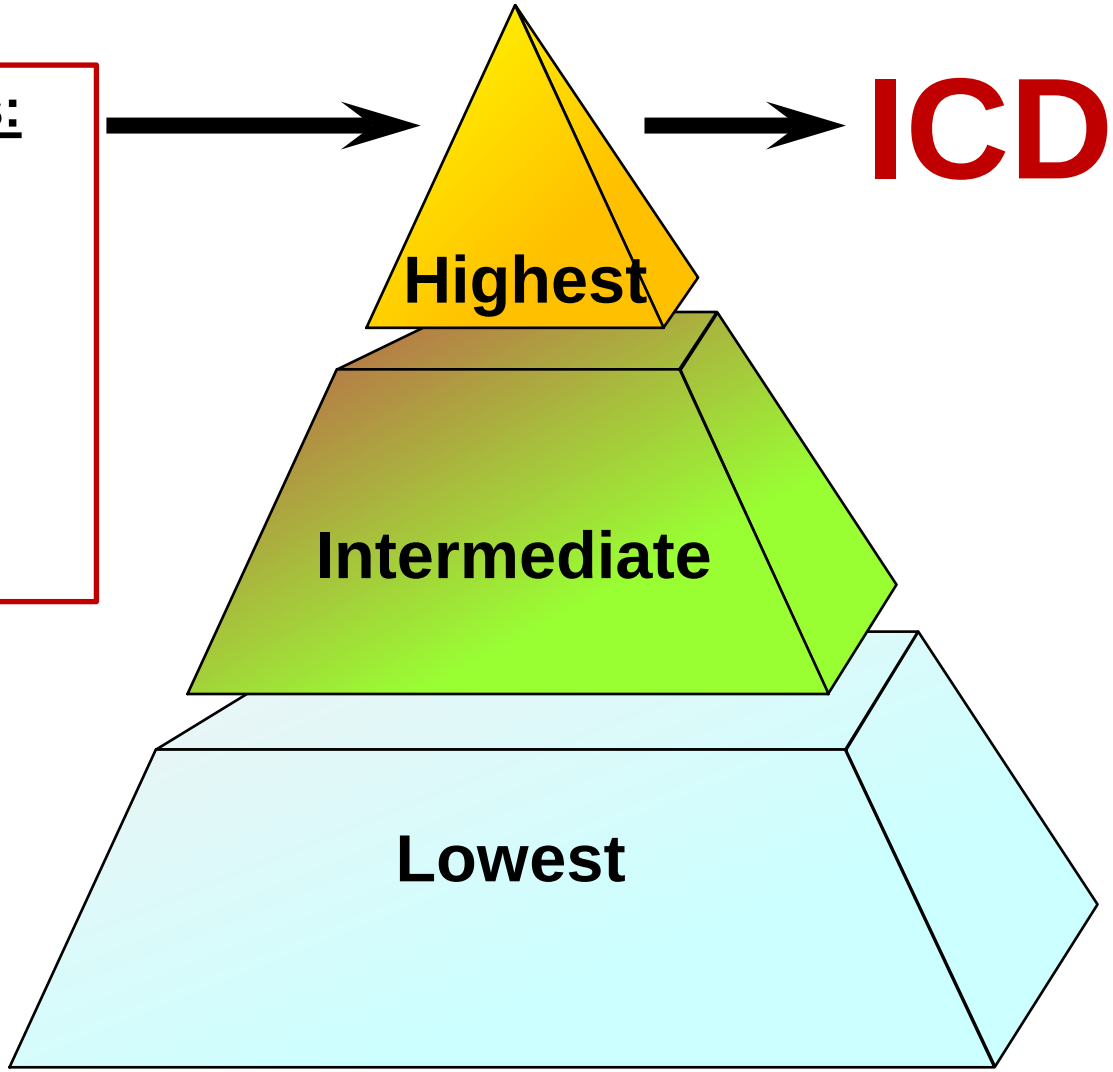
Tufts Medical Center

Strongest Risk Factors

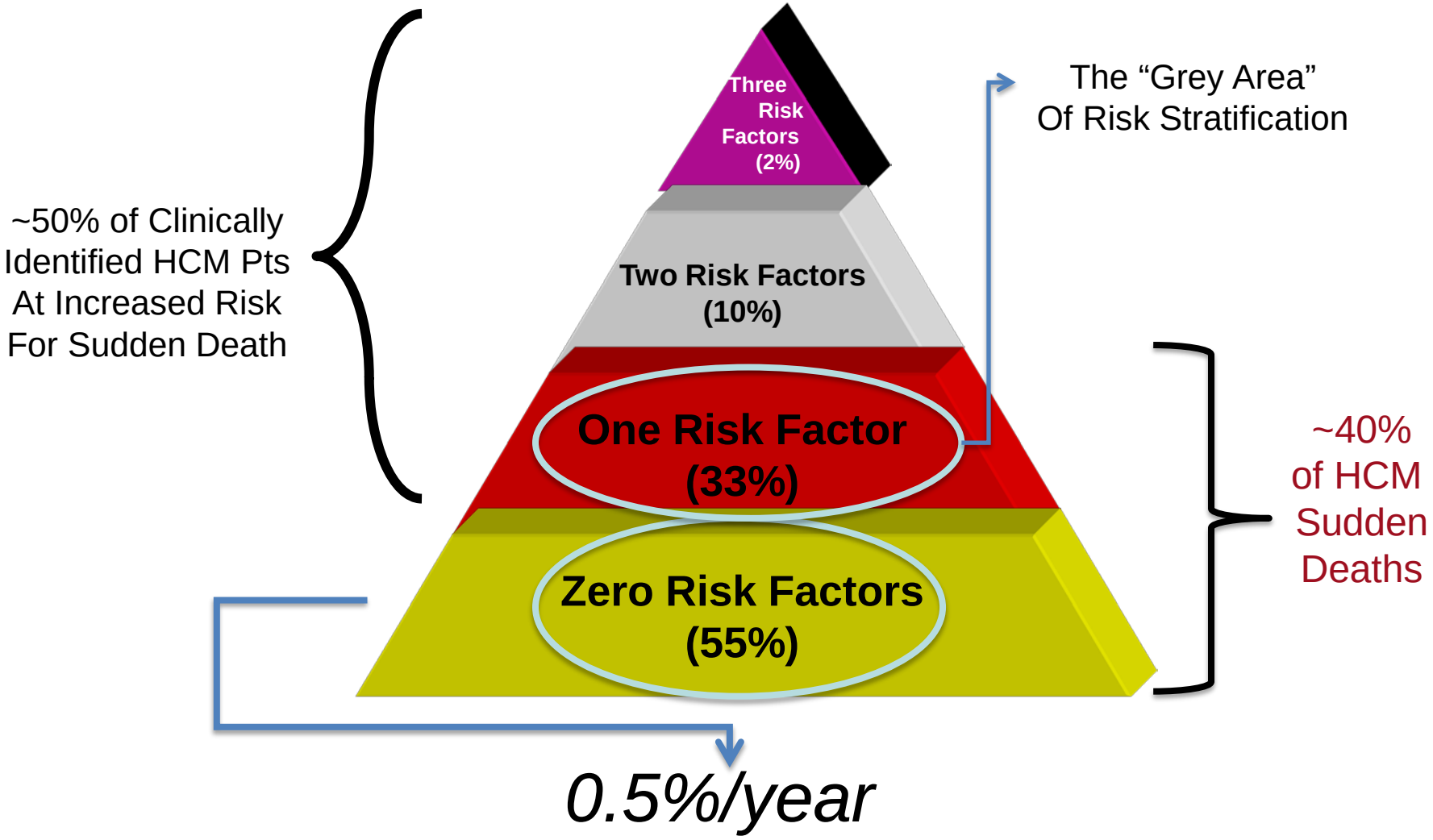
Strongest Risk Factors:

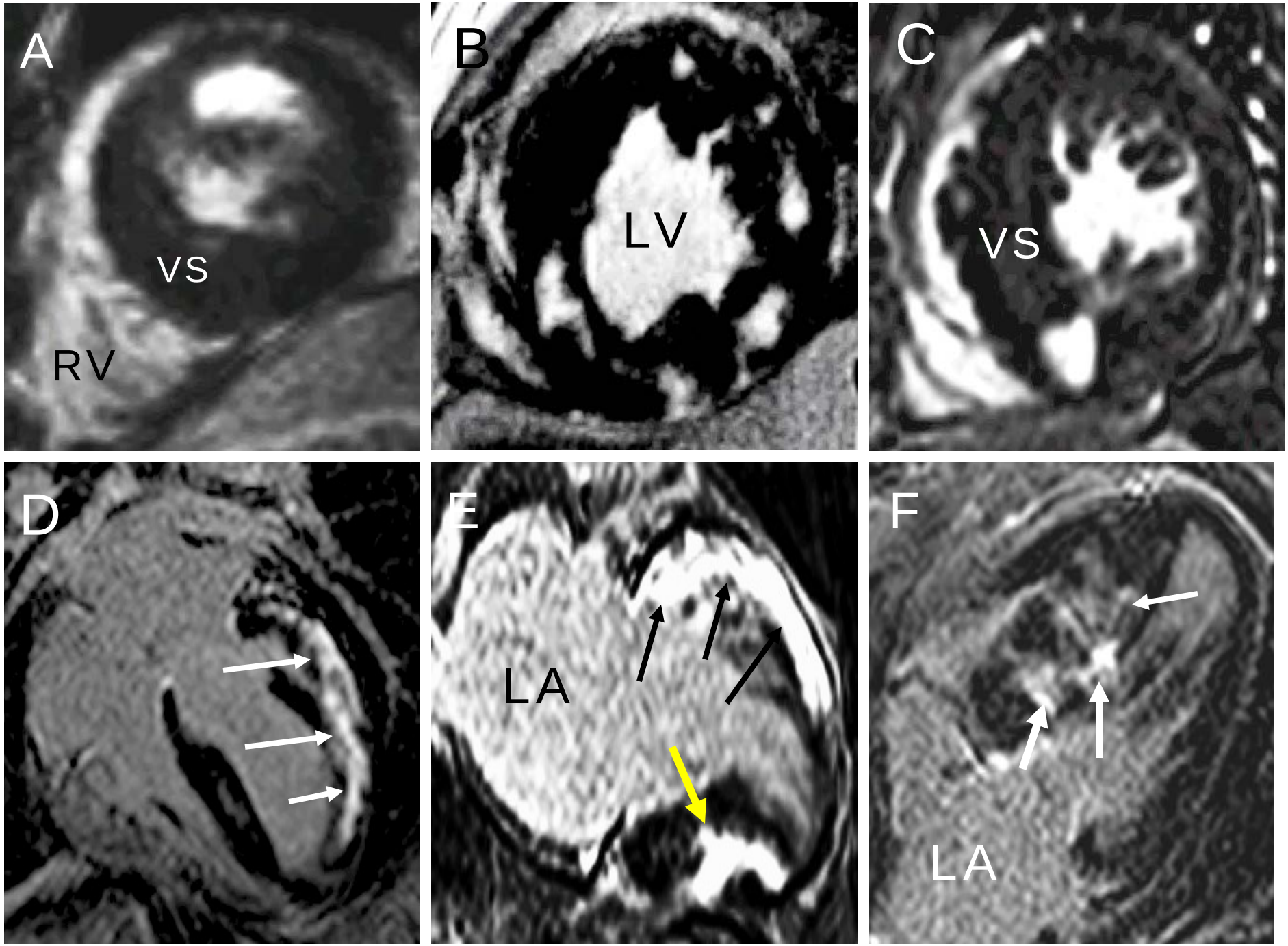
Cardiac arrest/Sus. VT.

Familial Hx of SD
Syncope
Multiple-repetitive NSVT
↓BP — exercise
Massive LVH ≥30 mm



Challenges of Risk Stratification in HCM

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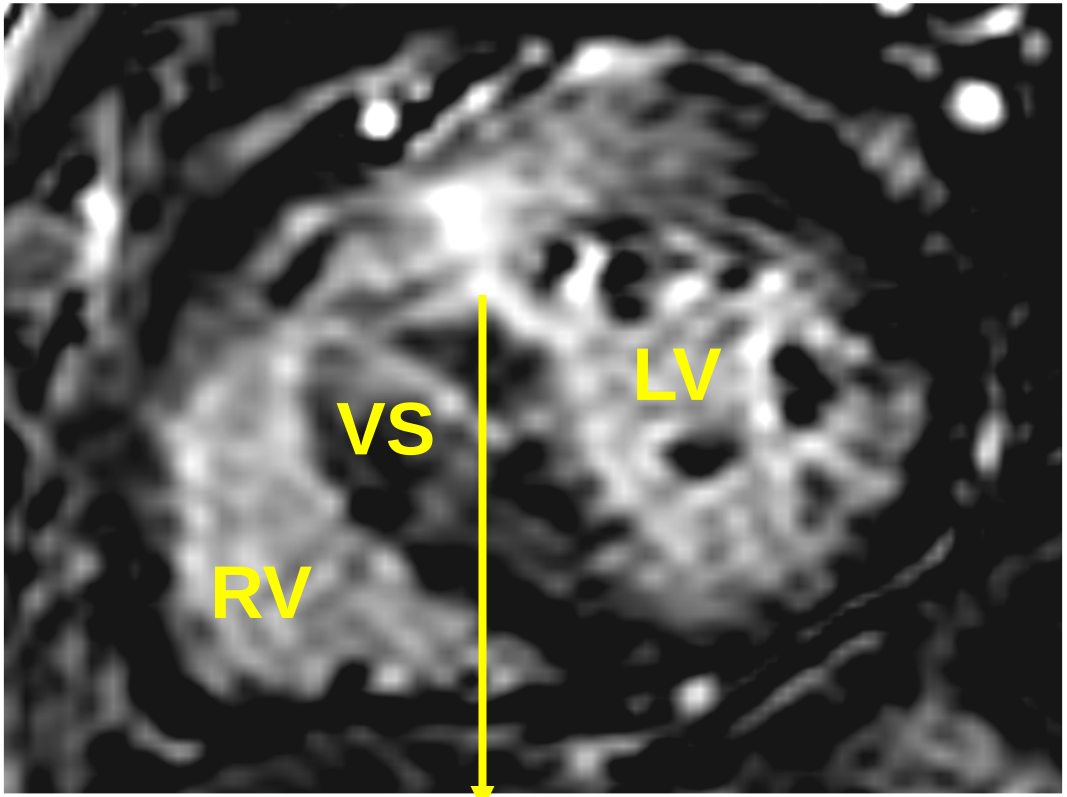
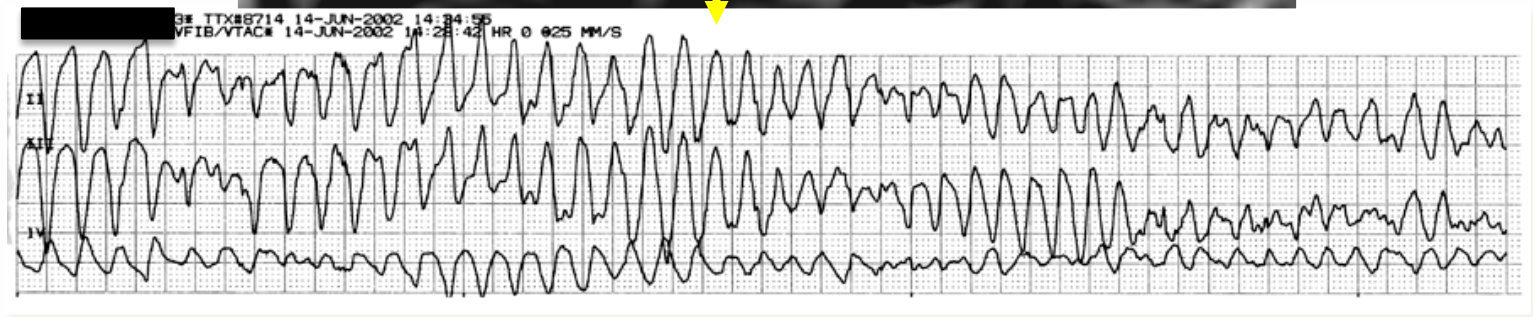
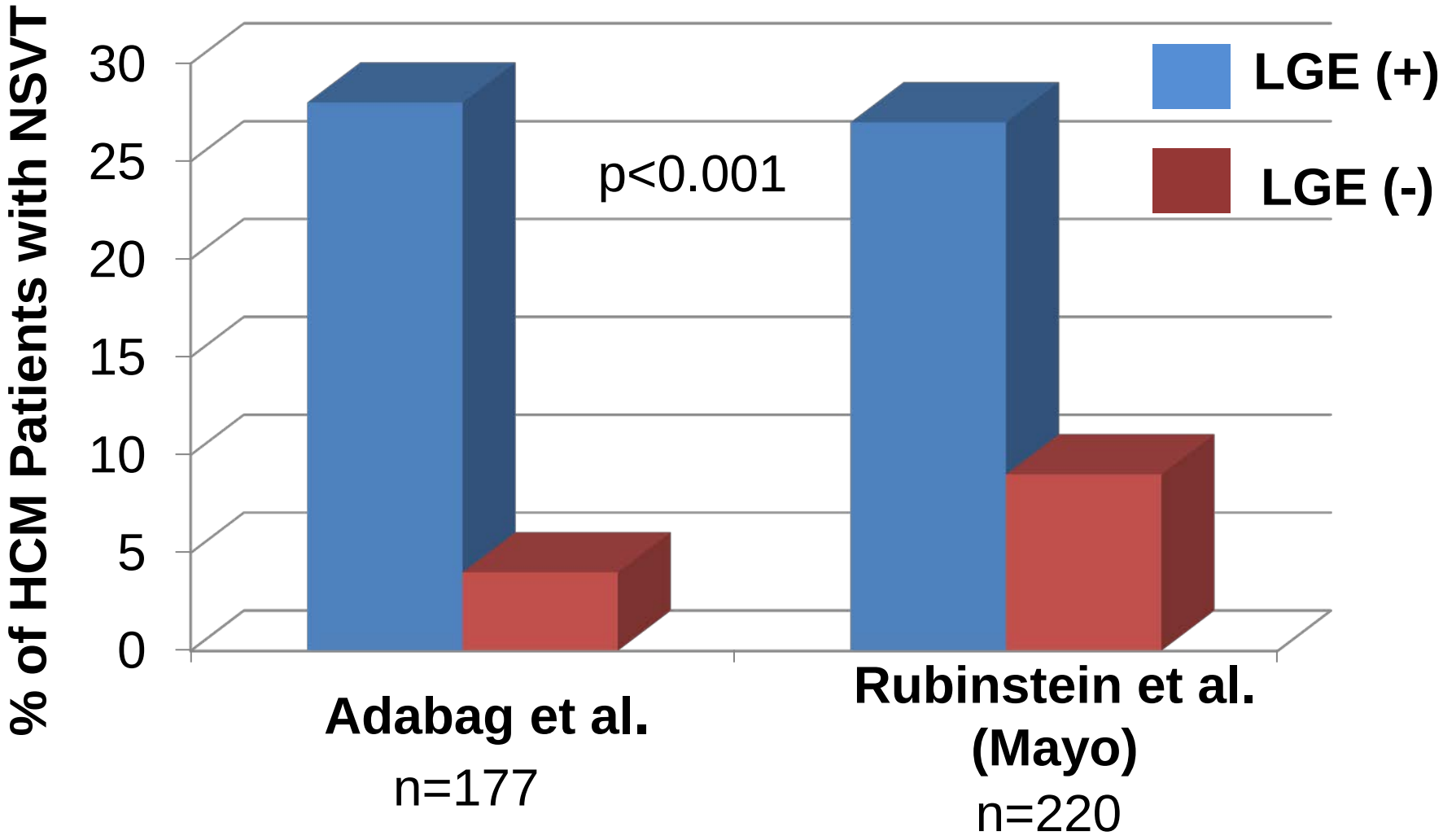
Foci for Ventricular Arrhythmias?





Holter NSVT and Presence of LGE



LGE for Prognosis in HCM Multicenter Study

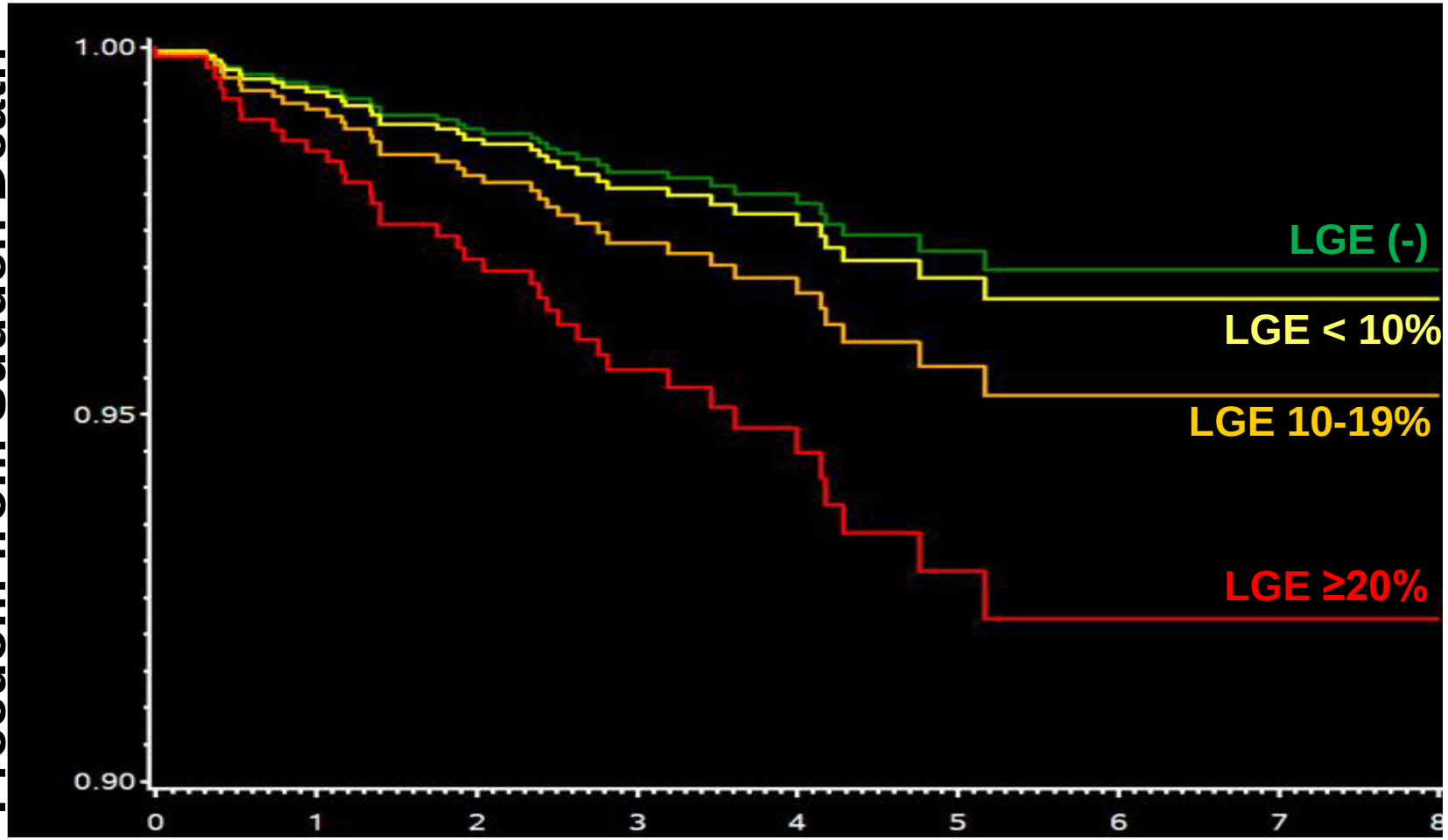
- Tufts Medical Center, Boston, MA
- Minneapolis Heart Institute
- Toronto General Hospital, Canada
- Azzendia Carregia, Florence, Italy
- Bologna, Italy
- Pisa, Italy
- Rome, Italy
- **PERFUSE CMR Core Laboratory**

1,293 HCM Patients

3.5±1.7

SCD Event

Relation Between Sudden Death and Extent of LGE in 1293 HCM Patients



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Sudden Death Event Rates in HCM Patients without Conventional Risk Factors

% LGE	Adjusted HR	Est. 5-year Event Rate(%)
0%	1.0	2.5
5%	1.3	3.2
10%	1.6	4.0
15%	2.0	5.0
20%	2.6	6.3
25%	3.2	8.0
30%	4.2	10.0
40%	6.7	15.5

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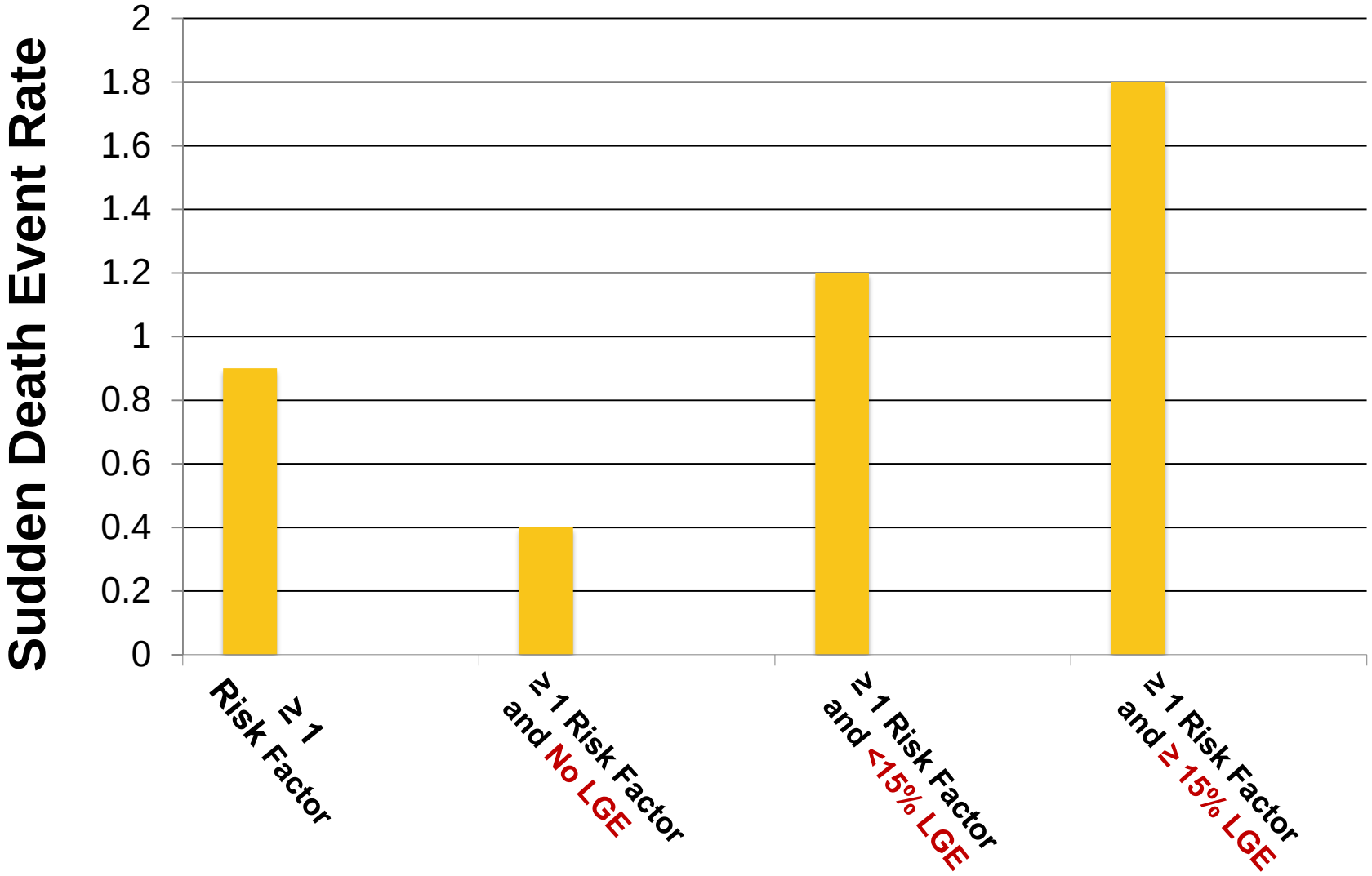
Improvement of Sudden Death Prediction with Addition of %LGE to Risk Model



When Extensive LGE Counts

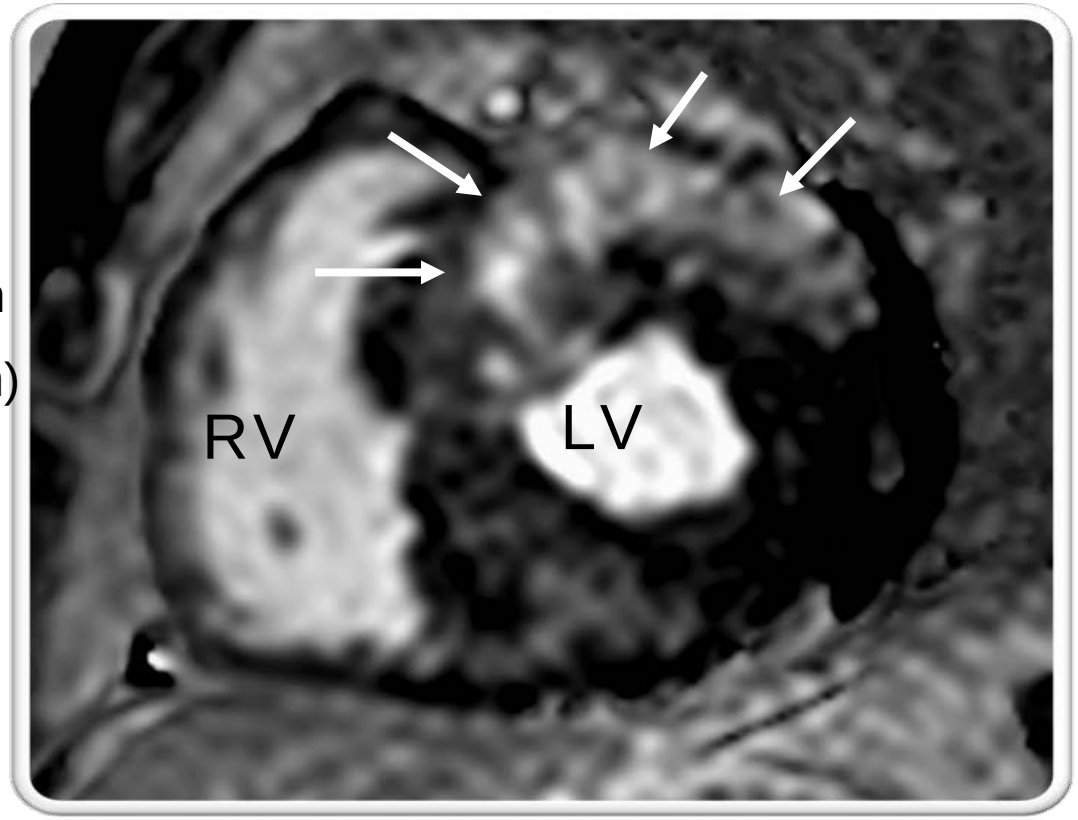
32 year-old man with Sudden Death

Asymptomatic (Max LV WT = 26 mm)

Normal Ejection Fraction

No Traditional Risk Factors RF

LGE = 22% of the LV Mass

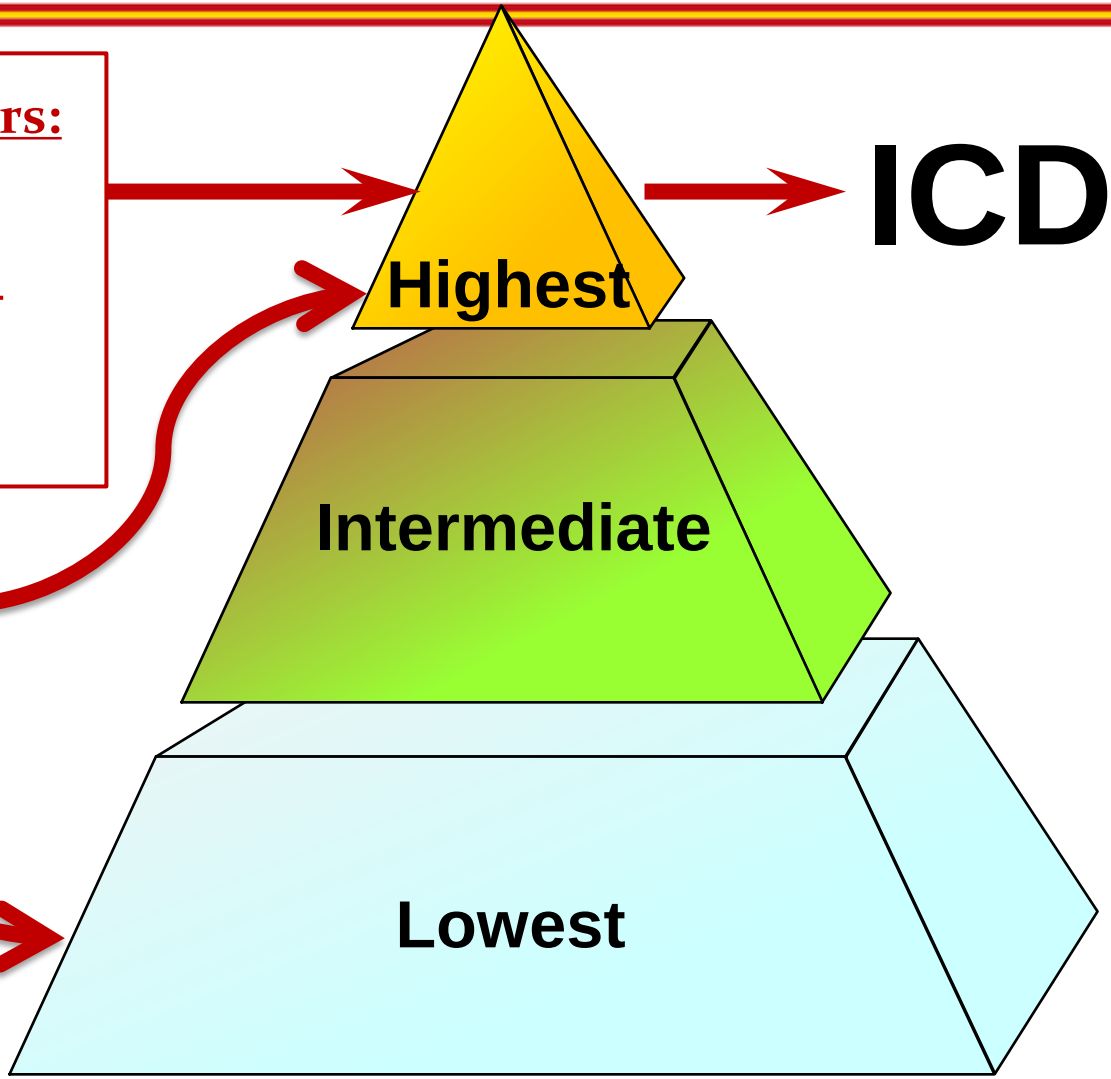


Strongest 1° Risk Factors:

Familial Hx of SD
Syncope
Multiple-repetitive NSVT
↓BP — exercise
Massive LVH ≥30 mm

CMR LGE ≥15%

NO LGE



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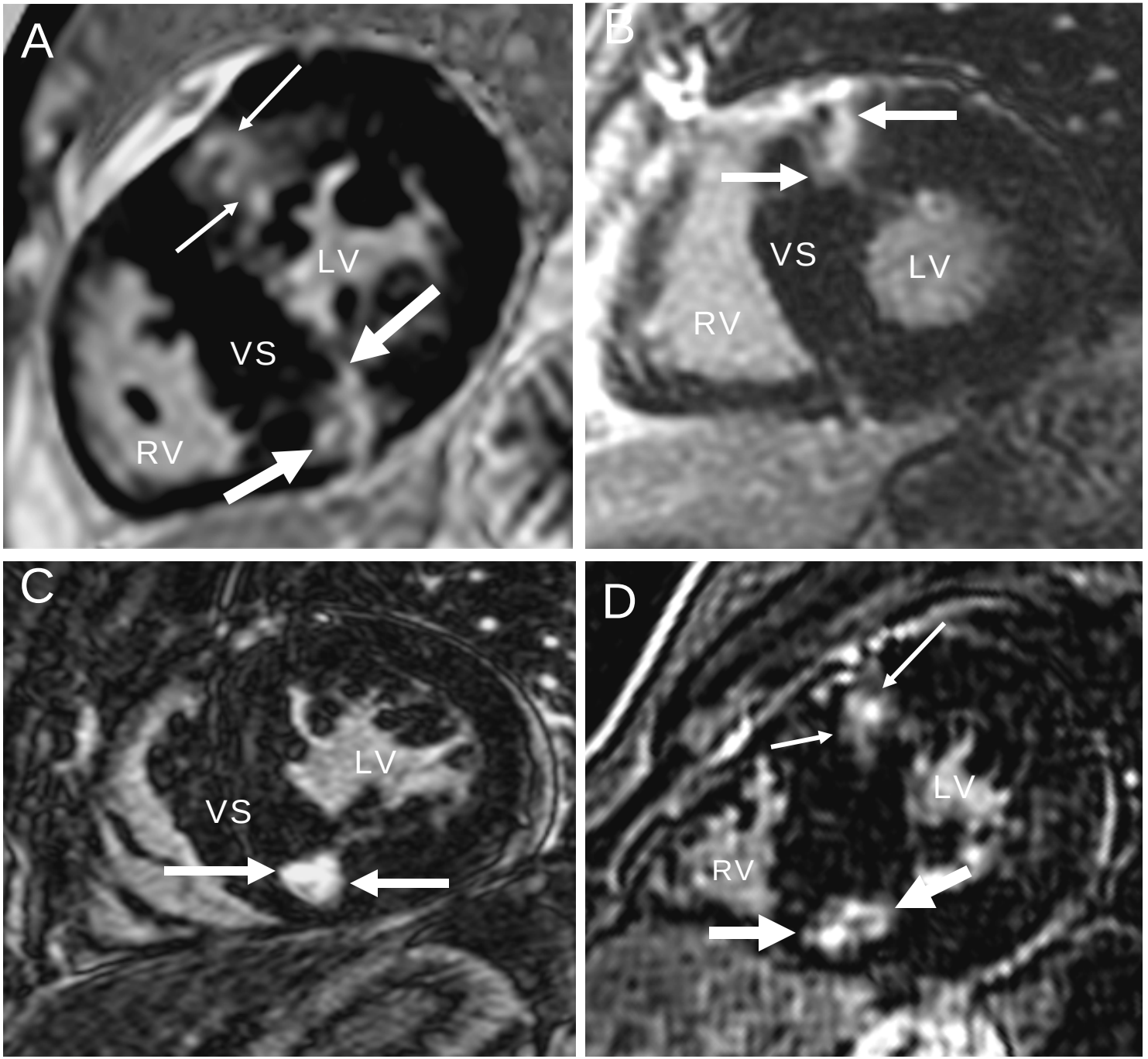
Risk Factors

Risk of SD is about the **Amount** of LGE…***Not*** its Pattern or Location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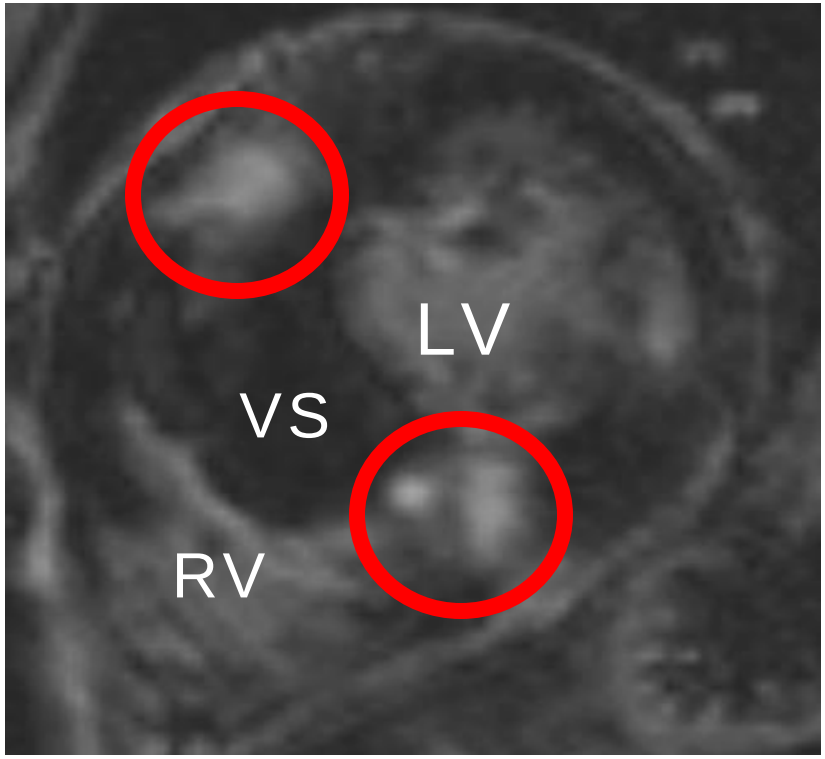
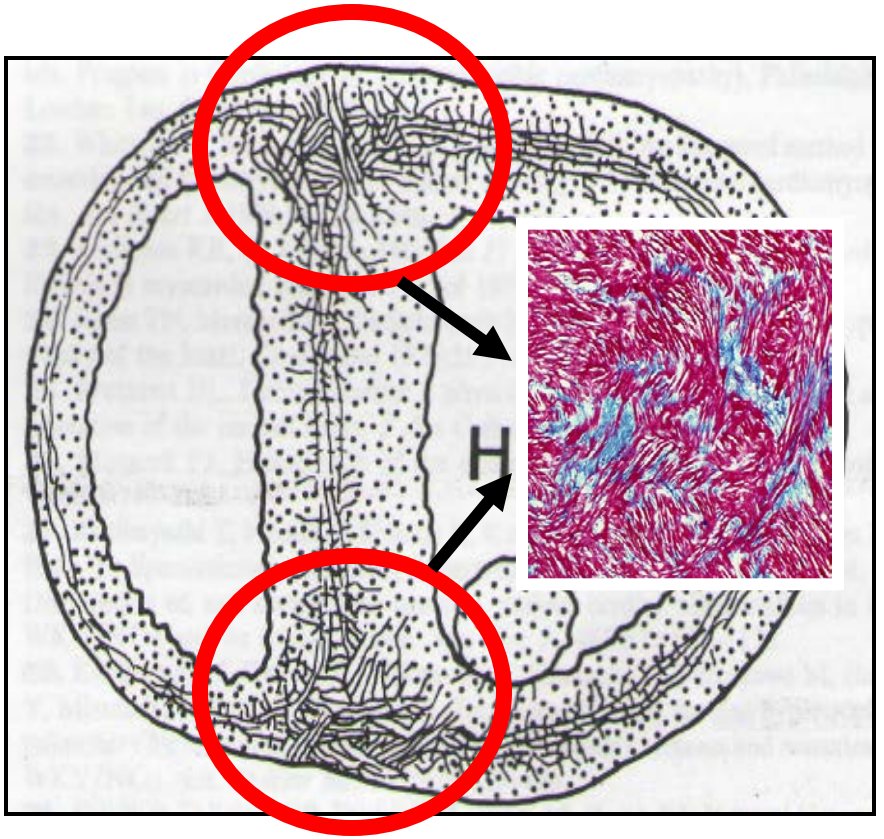
RV Insertion Point LGE in HCM = Expanded Extracellular space

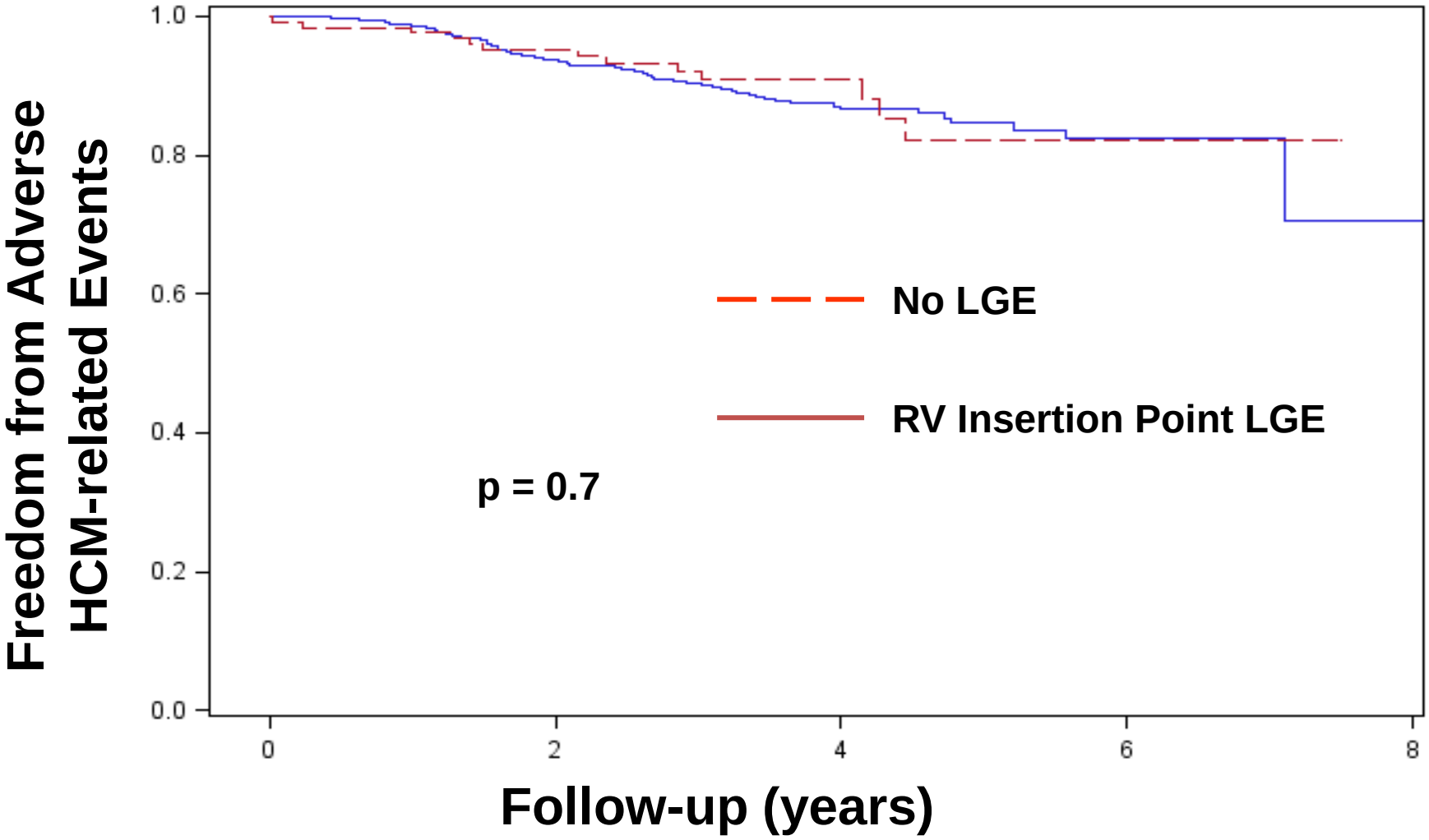


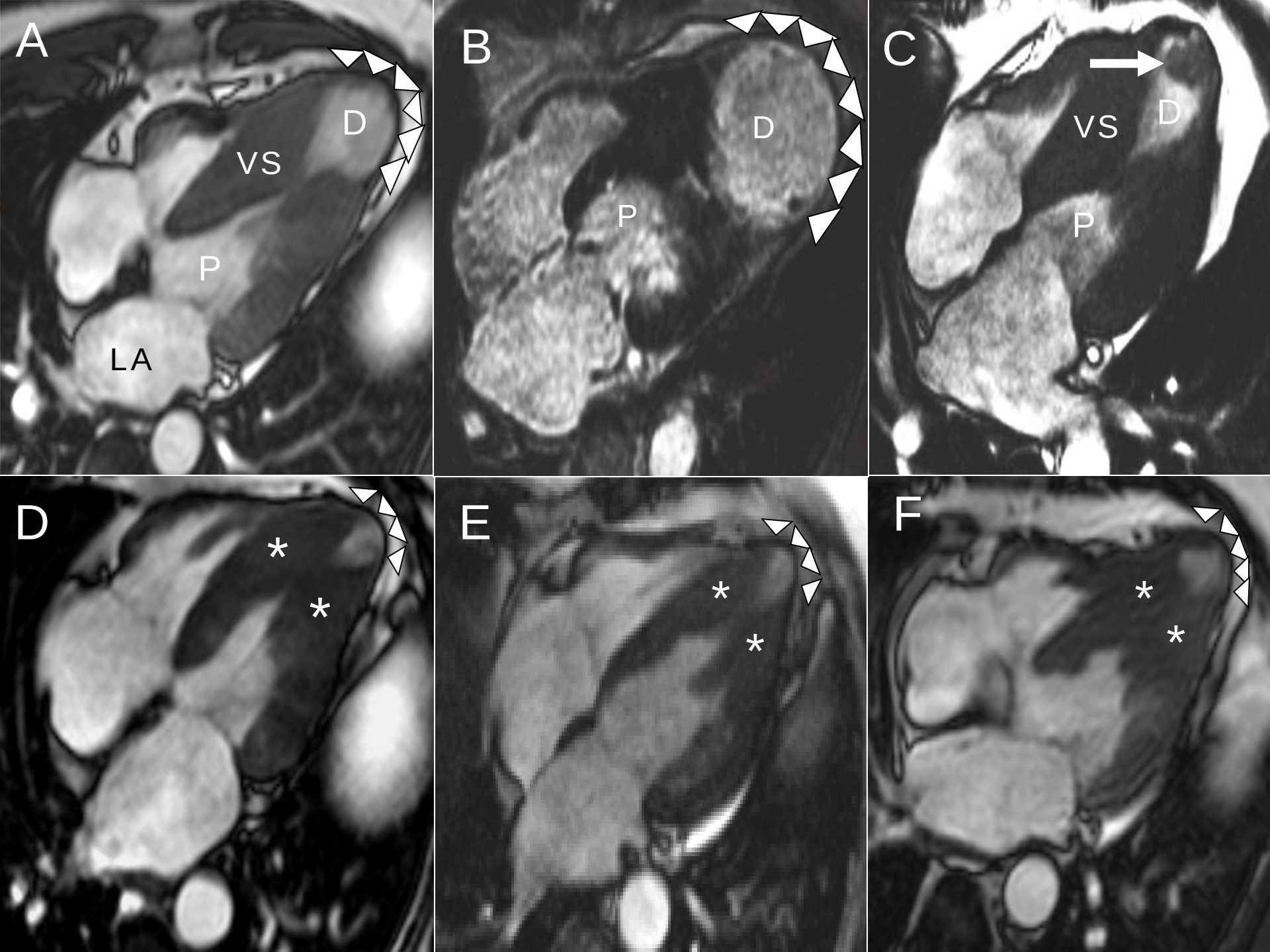


Not Likely Replacement Fibrosis

Roberts, WC AJC 1992

Sudden Death Risk in Patients with RV Insertion Point LGE Only

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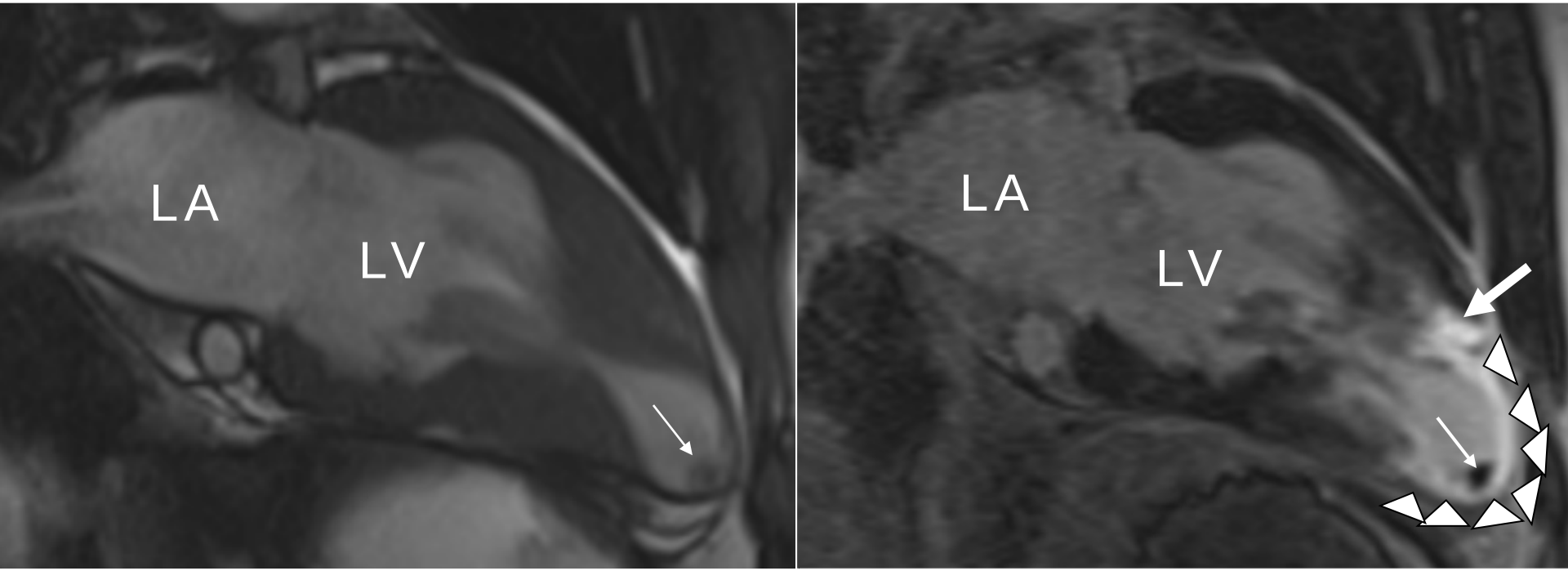
LV Apical Aneurysm with Thrombus



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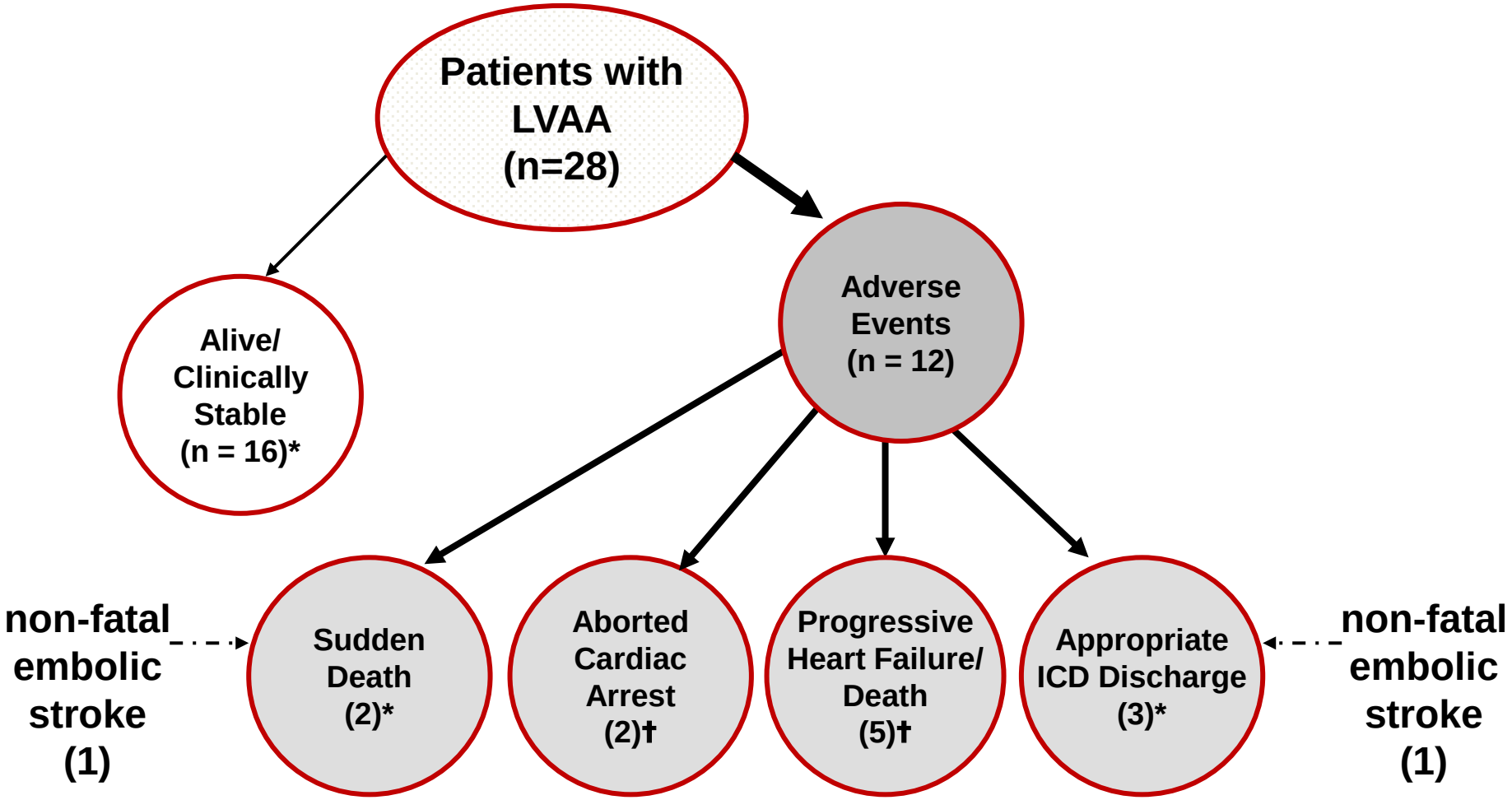
Cardiovascular Event Rate = 11%/yr



Maron MS et al. Circulation 2009

CMR in HCM

- Particularly well suited to characterize the diverse phenotypic expression of this complex disease…
- Superior to echo for HCM diagnosis…ie., **anterolateral wall, apex**
- Management strategies for invasive septal reduction therapy...ie., **mitral valve, anomalous insertion of papillary muscles**
- Sudden Death Risk Prediction...**Extensive LGE** (≥15% of LV) identifying a novel subgroup of HCM patients at increased risk for SD that would not be considered without CMR and may now be candidates for ICD
- **Absence of LGE** associated with **low risk**….may serve to influence decision-making against ICD implants in “grey-zone” situations

Heart & Vascular Center

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Physicians

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