대한심장학회 추계학술대회 111204

심장전문의가 알고 있어야 할 부정맥 시술들
언제? 어떤 환자를?

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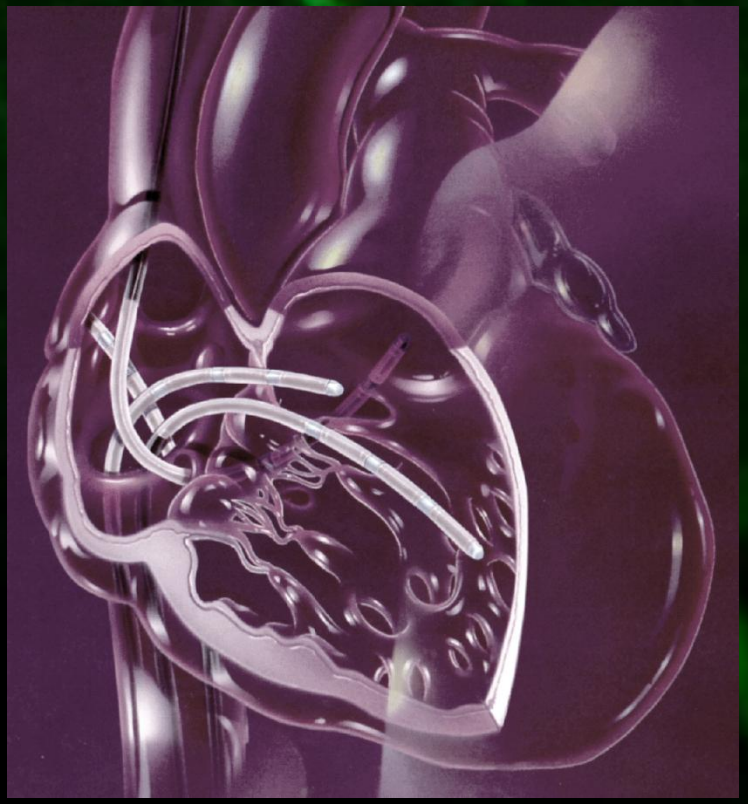
Division of Cardiology
Yonsei University Health System

CATHETER ABLATION



Supraventricular Tachycardia

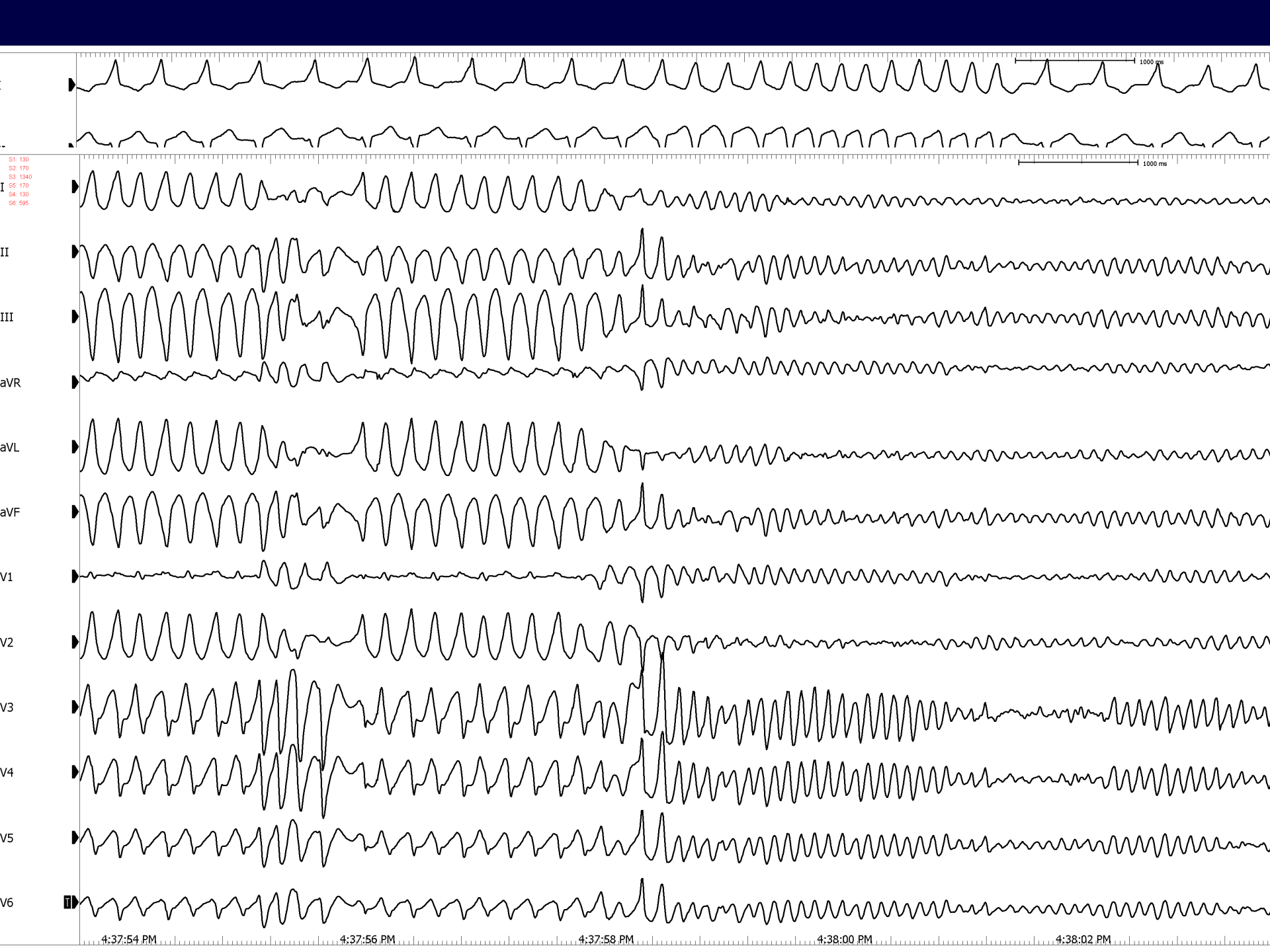
2003 ACC-AHA-ESC Guidelines

AV Nodal Reentry

Clinical Presentation	Recommendation	Class	Level of Evidence
Hemodynamically intolerant AVNRT	RFCA	I	B
	CCB,BB,	IIa	C
	AAD	IIa	C
Recurrent AVNRT	RFCA	I	B
	CCB, BB	I	B
Infrequent well tolerated AVNRT	No Tx (Valsalva)	I	B
	Pill-in the pocket	I	C
	CCB, BB	I	B
	RFCA	I	B

AVRT (Accessory Pathway)

Clinical Presentation	Recommendation	Class	Level of Evidence
Symptomatic WPW, well tolerated	RFCA	I	B
	AAD	IIa	C
	CCB, Digoxin	III	C
WPW with AF	RFCA	I	B
AVRT without delta-wave	RFCA	I	C
	AAD	IIa	C
	BB	IIb	C
	CCB, digoxin	III	C
Asymptomatic WPW	None	I	C
	RFCA	IIa	B


1000 ms
S1: 130
S2: 170
S3: 1340
S5: 170
S4: 130
S6: 595
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
4:37:54 PM
4:37:56 PM
4:37:58 PM
4:38:00 PM
4:38:02 PM

Atrial Tachycardia

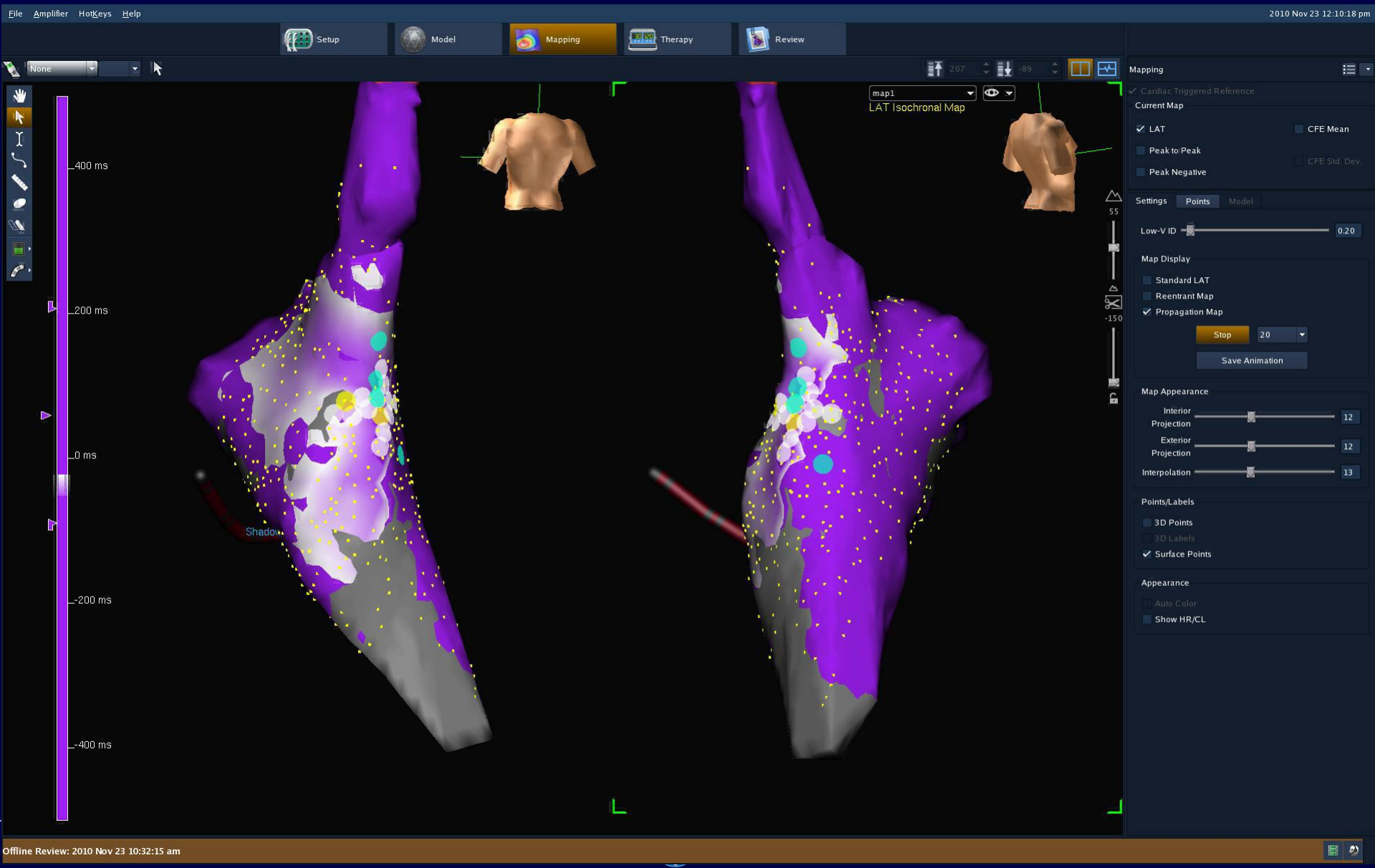
Clinical Presentation	Recommendation	Class	Level of Evidence
Recurrent symptomatic AT	RFCA	I	B
	BB, CCB	I	C
	AAD	IIa	C
Incessant AT with or without Sx	RFCA	I	B
Asymptomatic nonsustained AT	No Tx	I	C
	RFCA	III	C

SVT During Pregnancy

Clinical Presentation	Recommendation	Class	Level of Evidence
Acute conversion of PSVT	Vagal Maneuver, Adenosine, Cardioversion	I	C
	BB	IIa	C
	CCB	IIb	C
Prophylactic Tx	Digoxin, Metoprolol	I	B~C
	Propranolol, sotalol, flecainide	IIa	B~C
	RFCA	IIb	C
	Atenolol, Amiodarone	III	C

Incessant AT.

F/30, IUP 17wks. Fluoro time 1'30"

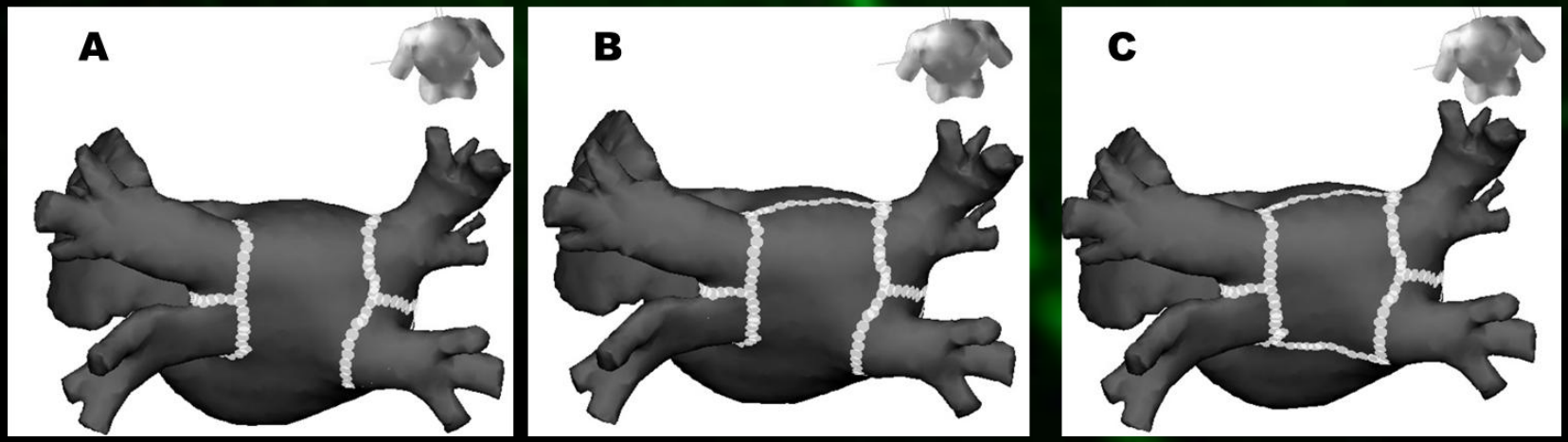


Atrial Flutter

Clinical Presentation	Recommendation	Class	Level of Evidence
1st well-tolerated AFL	Cardioversion	I	B
	RFCA	IIa	B
Recurrent well-tolerated AFL	RFCA	I	B
	Dofetilide	IIa	C
	Other AAD	IIb	C
Poorly tolerated AFL	RFCA	I	B
AAD Failed AFL	RFCA	I	B

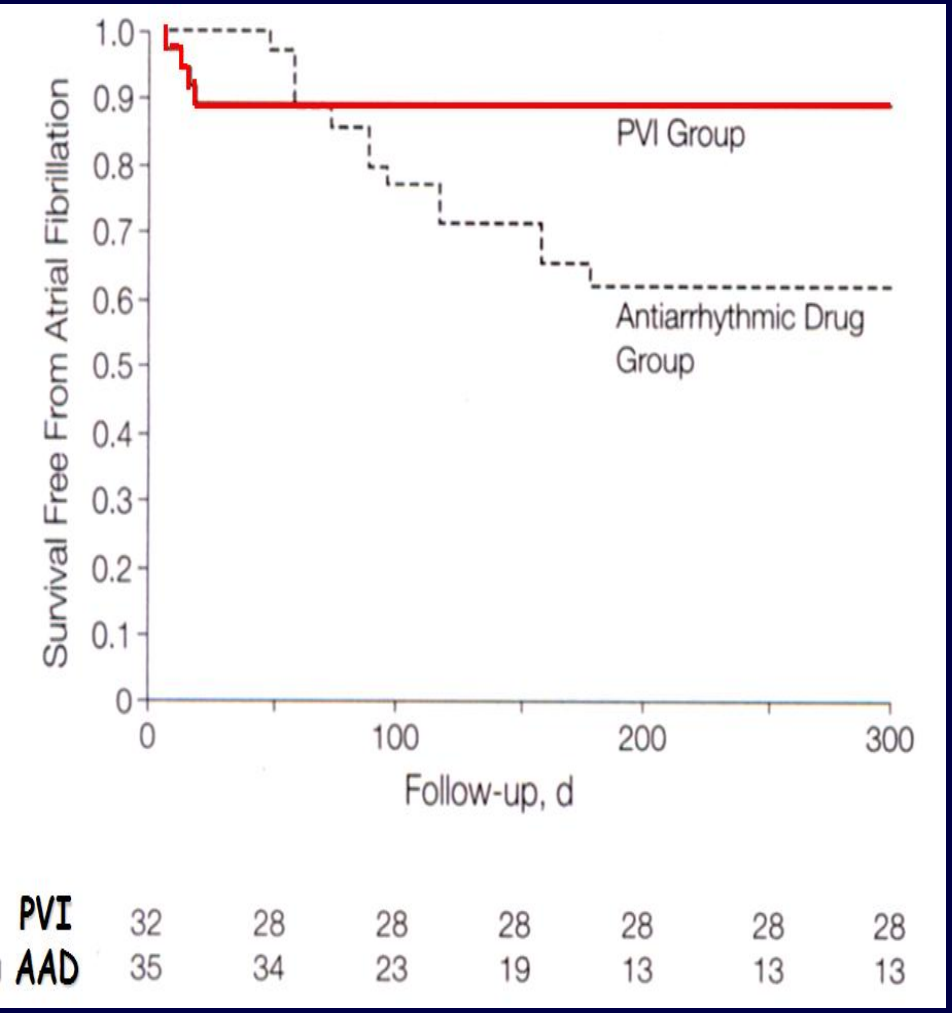
Atrial Fibrillation

2012 HRS/EHRA/ECAS Expert Consensus Statement

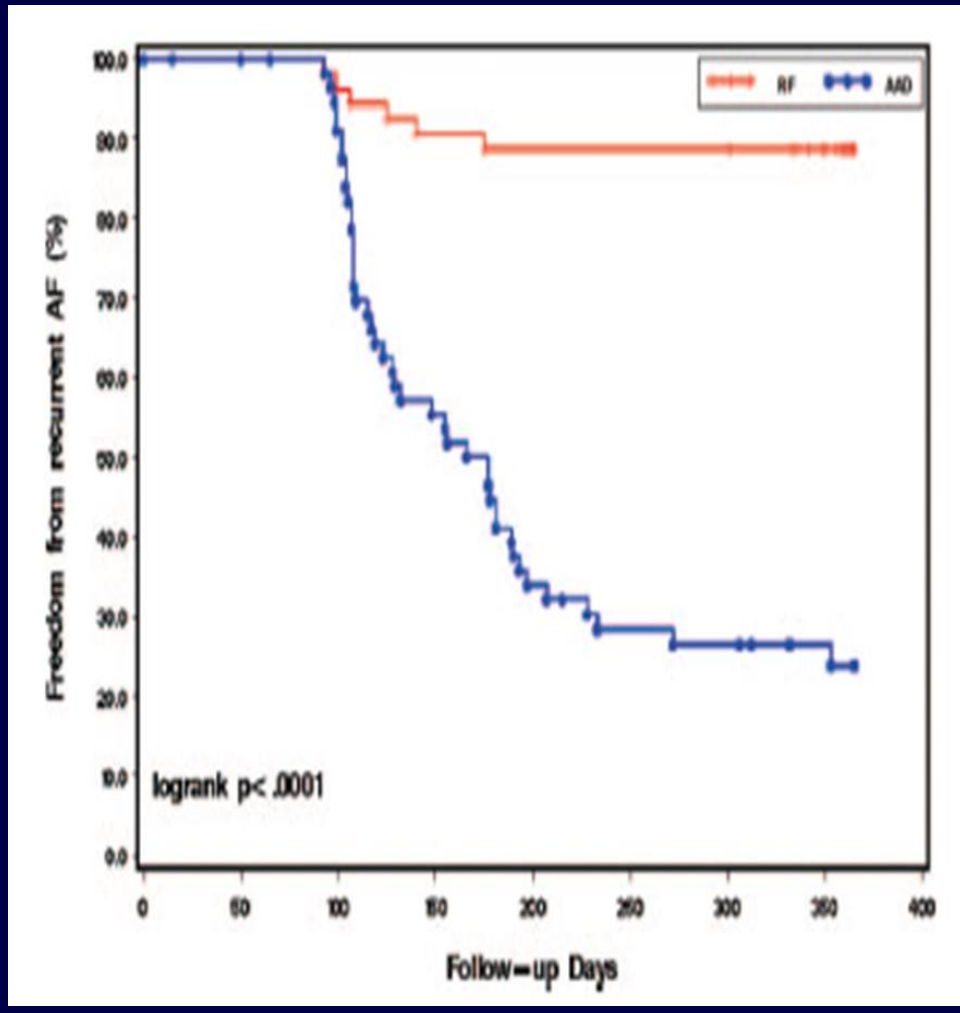


1st Line PVI Is Better Than AAD.

Wazni et al. JAMA 2005;293:2634-40



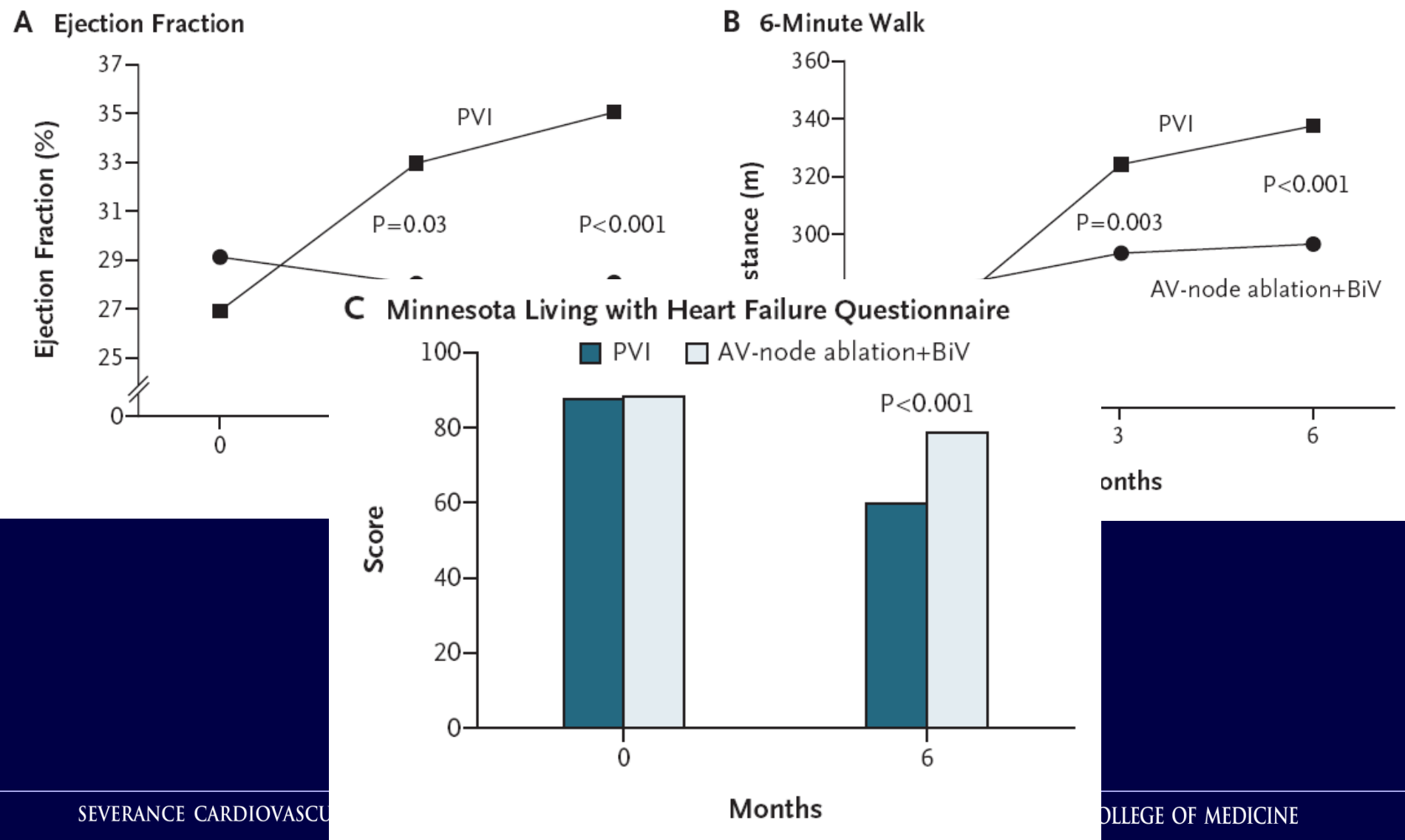
Jaiss et al. Circulation 2008;118:2498-505



AF Ablation vs. CRT in AF+HF

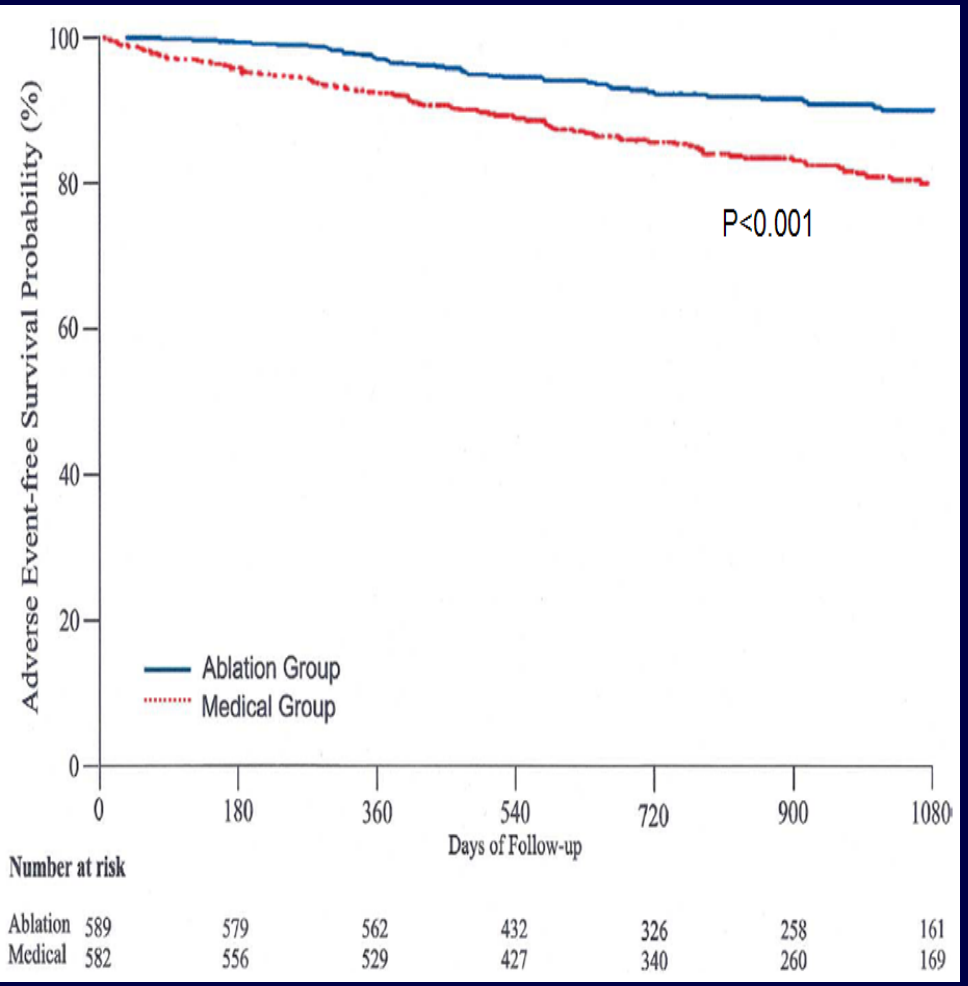
PABA-CHF Trial

Khan MN. Et al. N Eng J Med. 2008;359:1778-85.

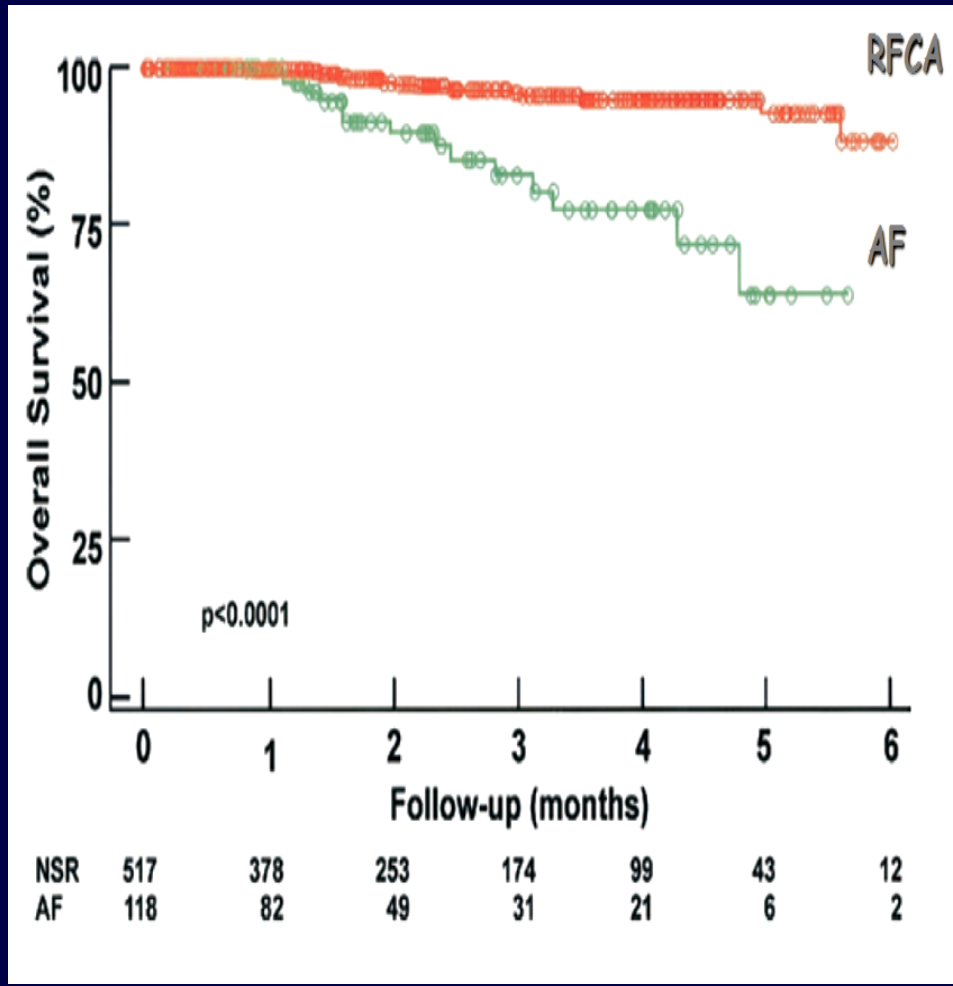


PVI Has a Mortality Benefit.

Pappone et al. JACC 2003;42:185-97



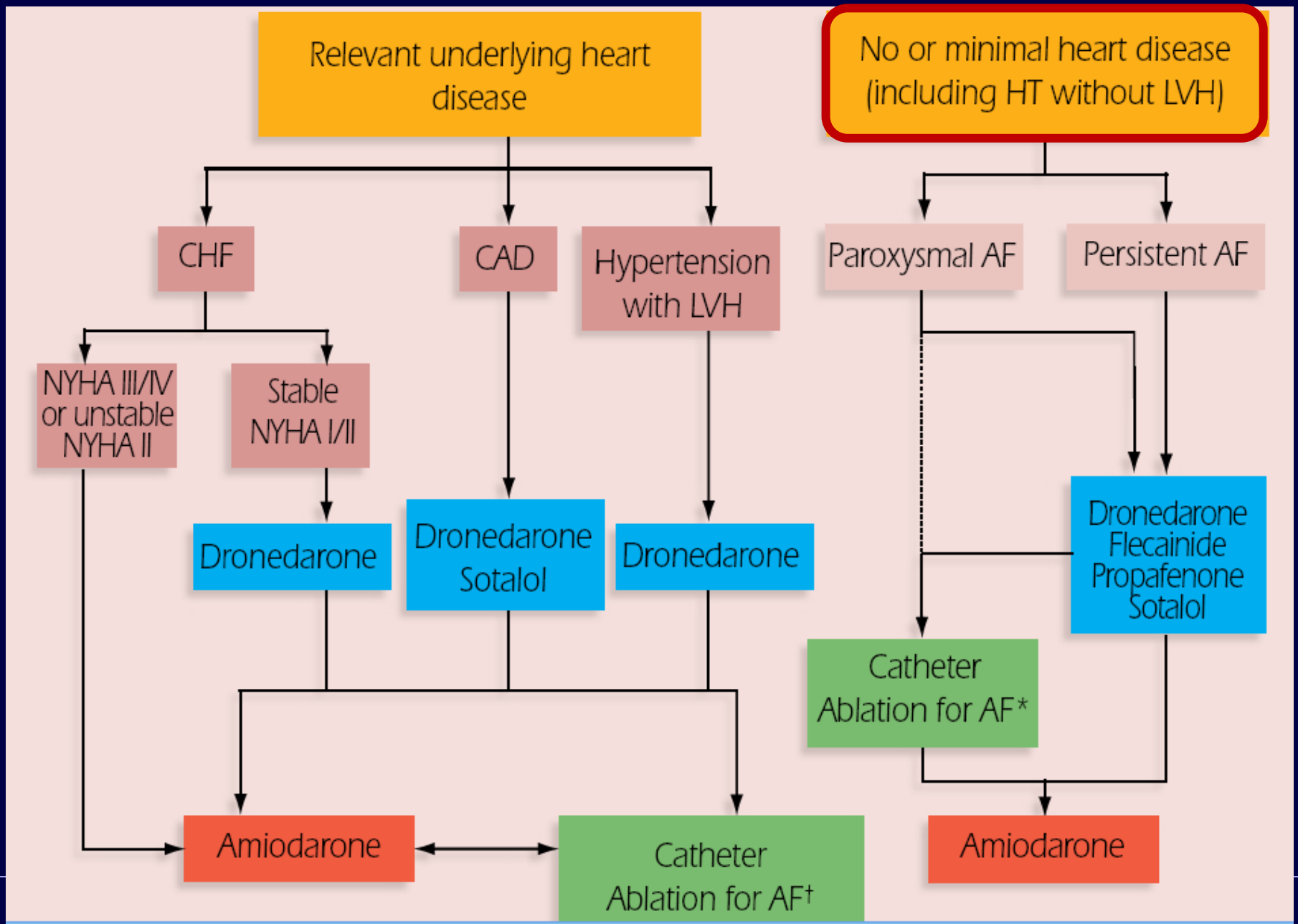
Nademanee et al. JACC 2008;51:843-9



Choice of Catheter Ablation

2010 ESC Guideline

2010 ESC Guideline



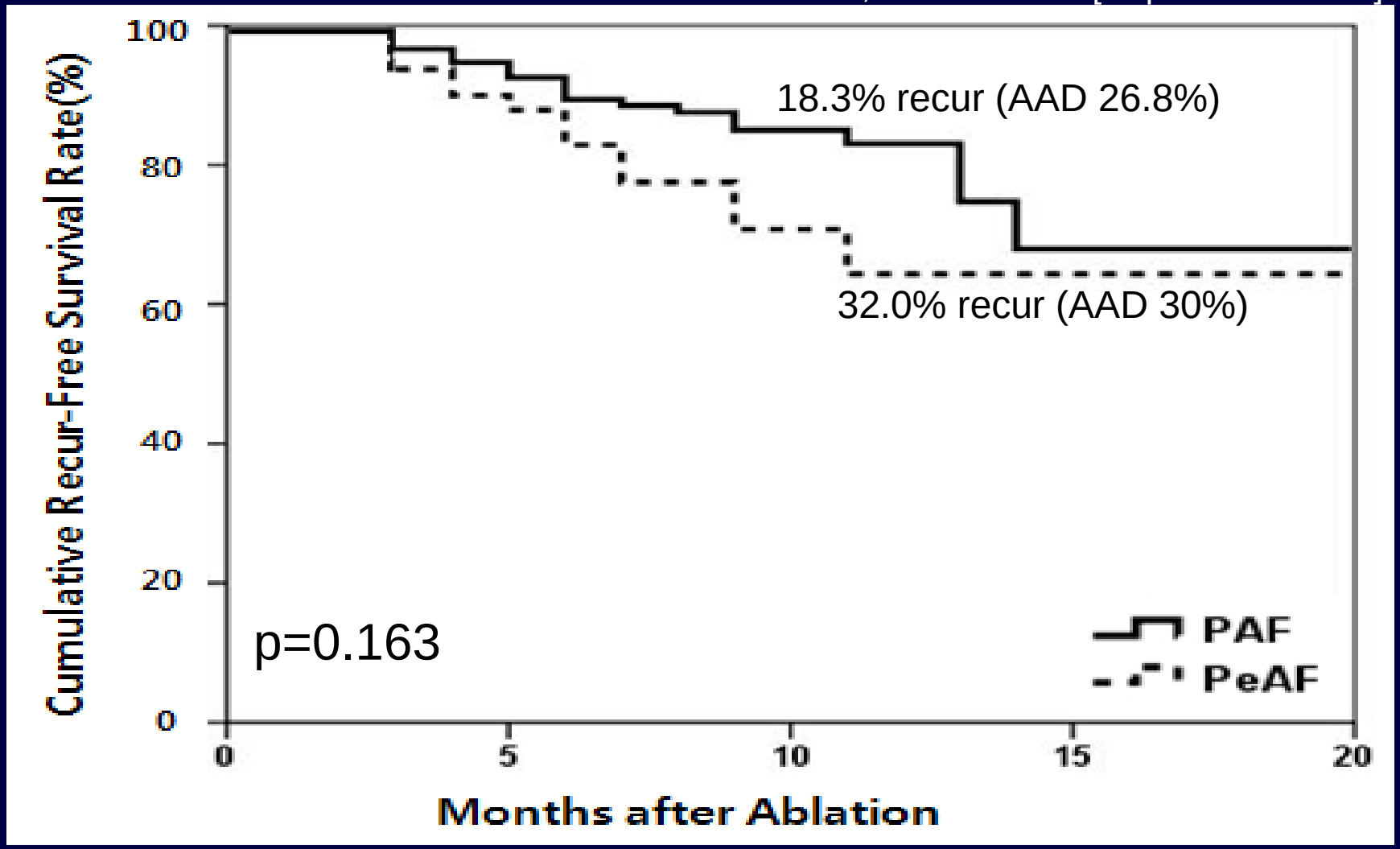
Indications for AF RFCA

2012 HRS/EHRA/ECAS Expert Consensus Statement

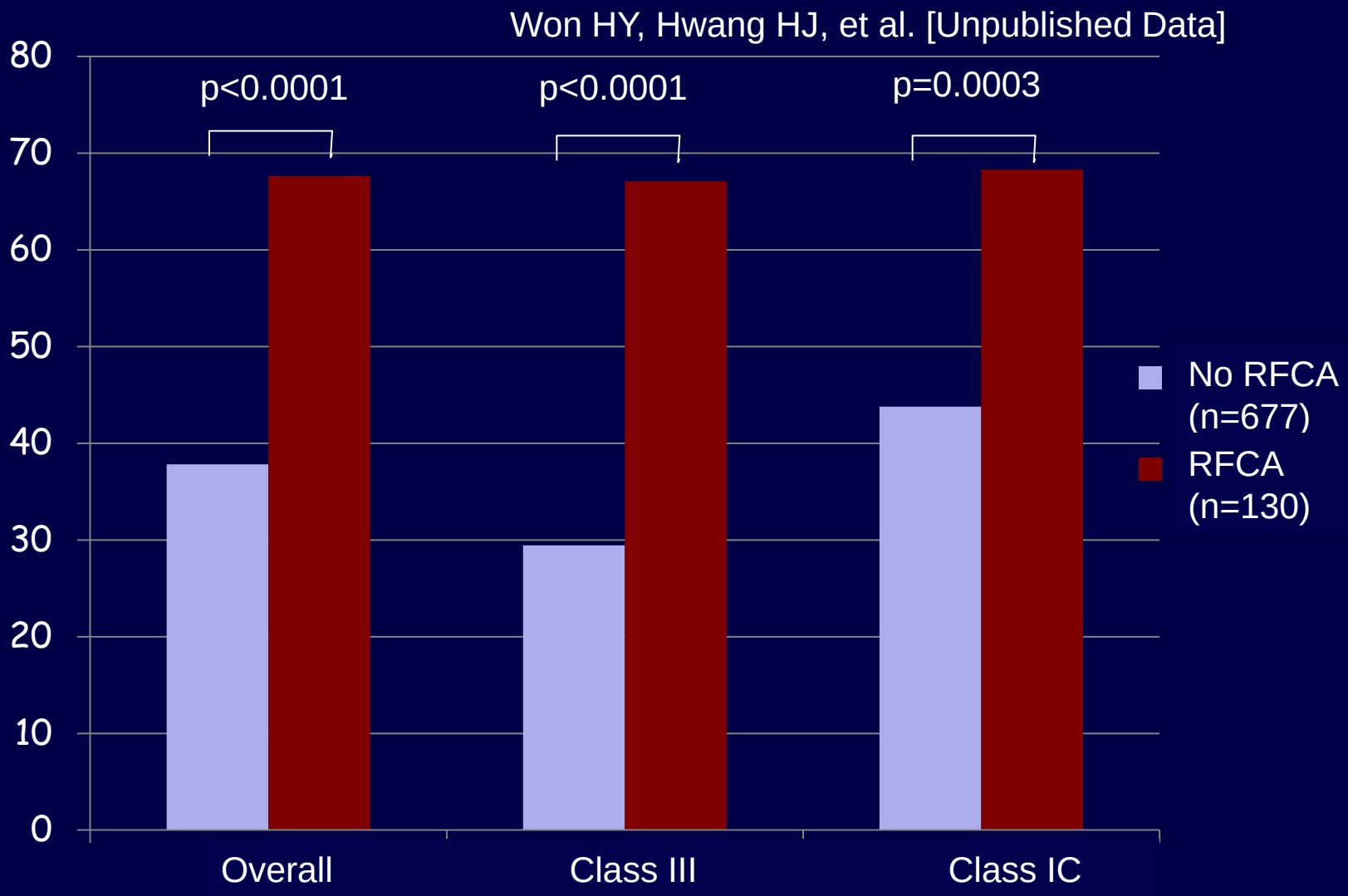
Clinical Presentation	Class	Level of Evidence
Symptomatic AF Refractory or Intolerant to ≥ 1 AAD		
PAF: RFCA is recommended	I	A
PeAF: RFCA is reasonable	IIa	B
Longstanding PeAF: RFCA may be considered	IIb	B
Symptomatic AF without prior initiation of AAD		
PAF: RFCA is reasonable	IIa	B
PeAF: RFCA may be considered	IIb	C
Longstanding PeAF: RFCA may be considered	IIb	C

Clinical Outcome After RFCA of PAF vs. PeAF (n=575)

Shim JM, Pak HN et al. [Unpublished Data]

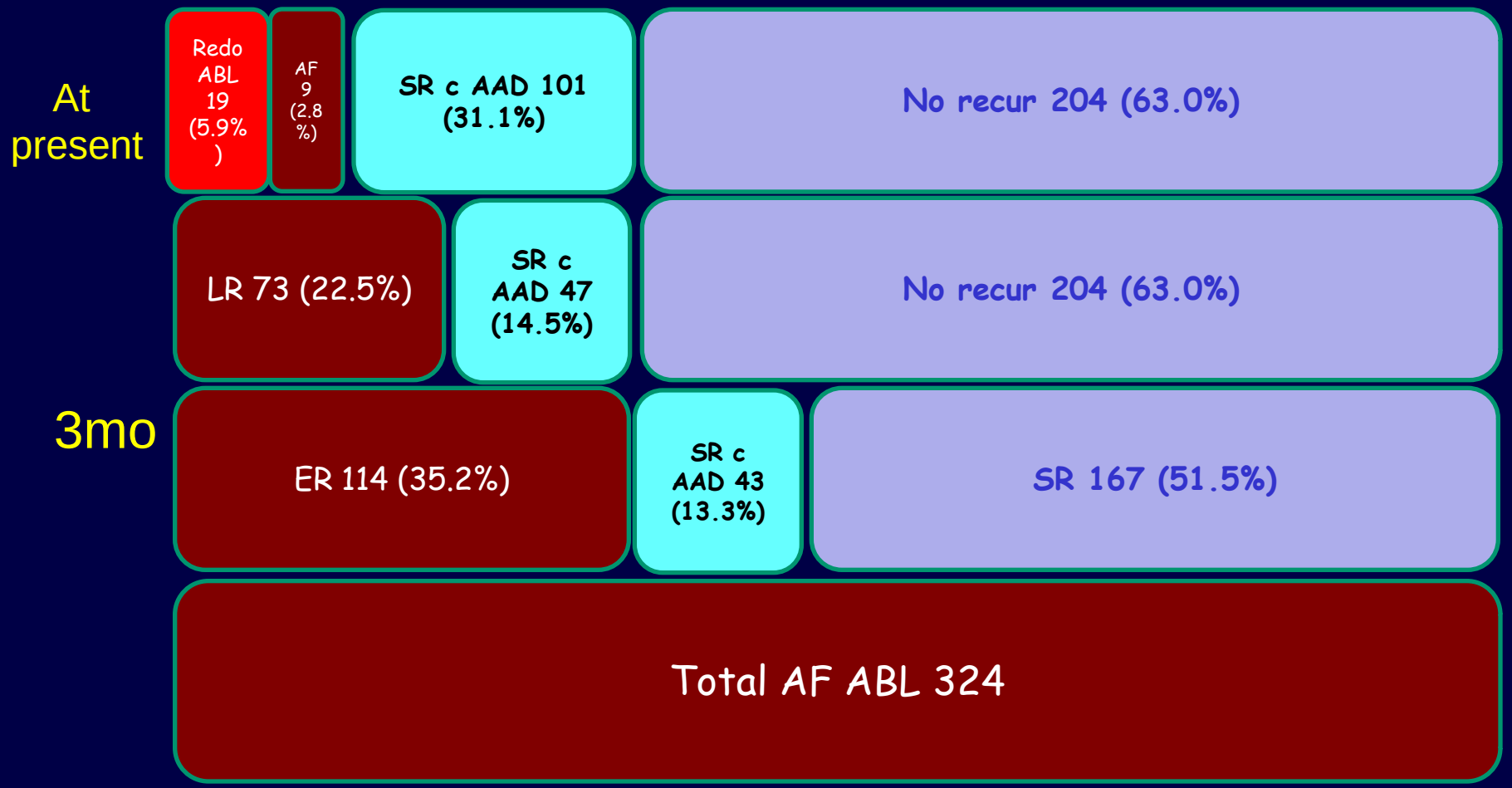


Effects of AAD



Effects of AAD

Won HY, Pak HN, et al. [Unpublished Data]



Current Indications for AF Ablation

- Paroxysmal AF with Tachycardia-bradycardia Syndrome
- Failed Rhythm control with 1st line AAD
- Symptomatic AF
- High Risk AF with stroke/ heart failure
- (LA size $\leq$ 50mm)

Ventricular Tachyarrhythmias

2008 EHRA/HRS Expert Consensus

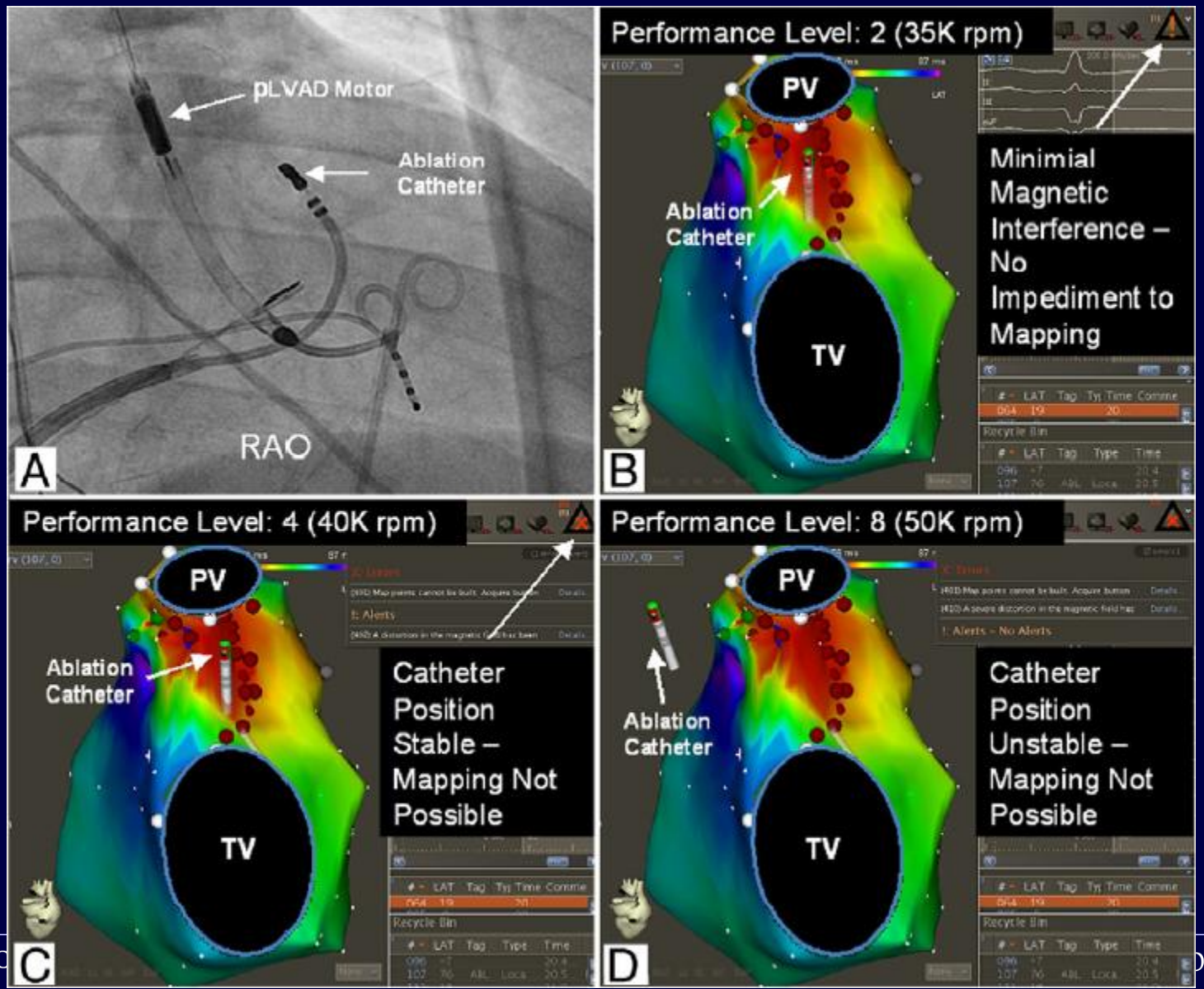
Indications for VT Ablation

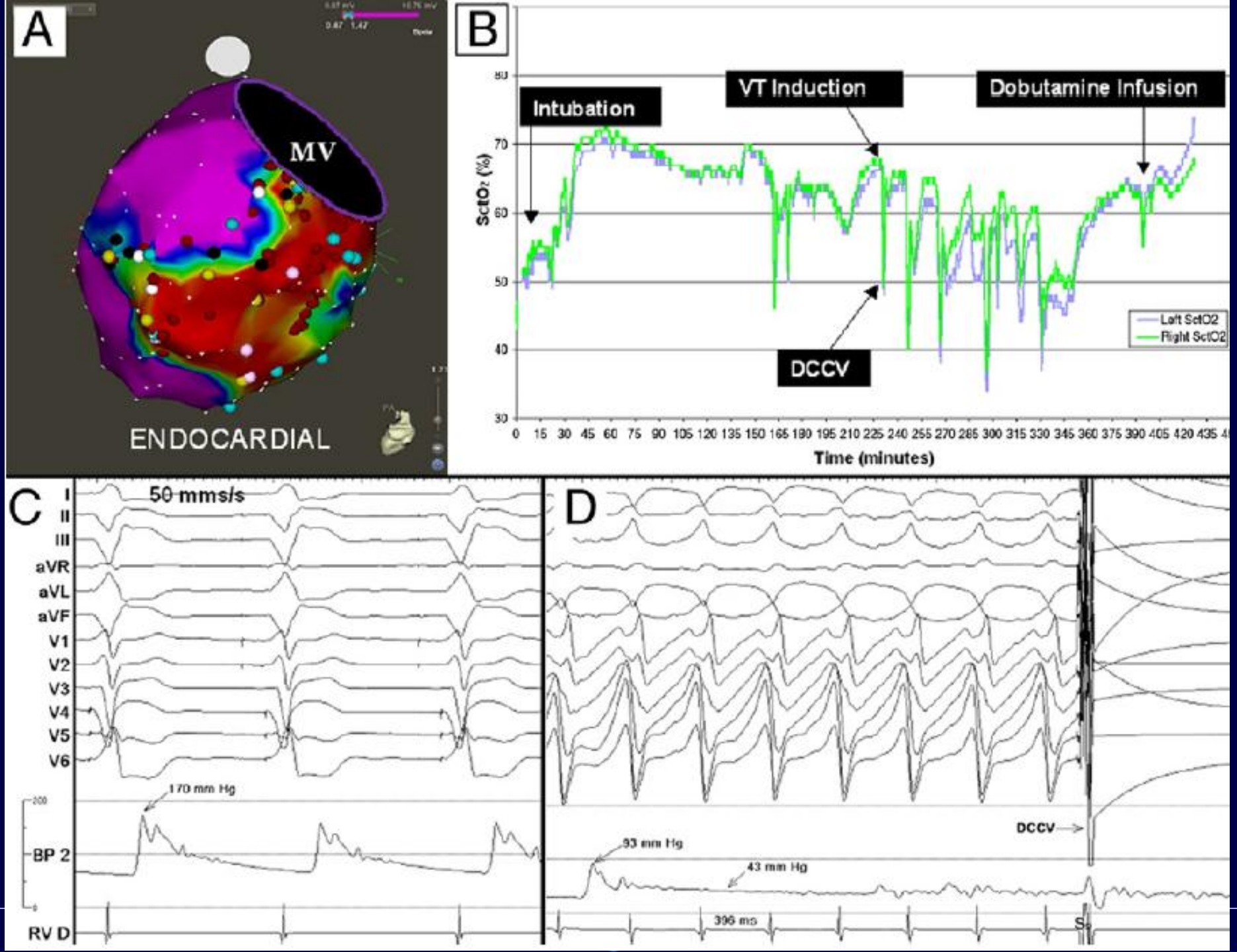
Patients with Structural Heart Disease

- VT ablation is Recommended (Class I)
  - Symptomatic sustained monomorphic VT (SMVT)
  - Incessant SMVT or VT storm
  - Frequent PVC, NSVT with potential cause of LV dysfunction
  - BBR-VT, Interfascicular VT
  - AAD refractory sustained PVT or VF with a suspected trigger

Catheter Ablation of VT Storm

Miller and Reddy et al. JACC 2011;58:1363-71.




A
MV
ENDOCARDIAL
B
Intubation
VT Induction
Dobutamine Infusion
DCCV
StO2 (%)
Left StO2
Right StO2
Time (minutes)
C
50 mms/s
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
170 mm Hg
BP 2
RV D
D
DCCV
93 mm Hg
43 mm Hg
396 ms

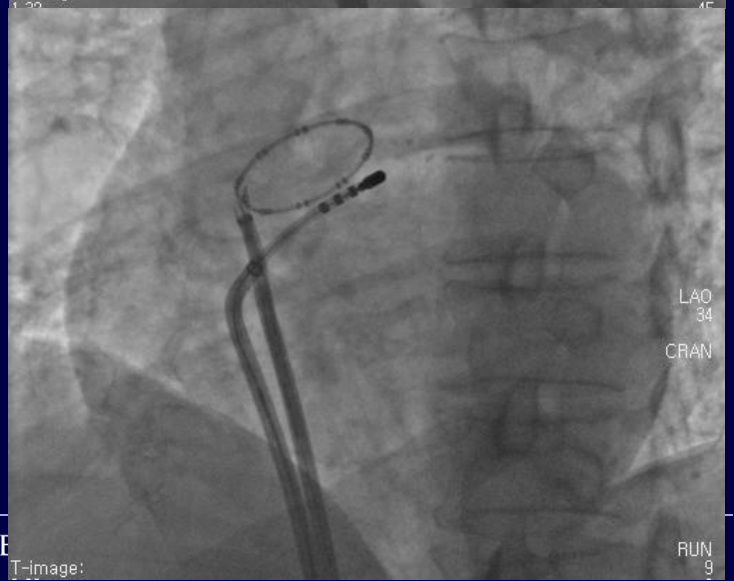
Indications for VT Ablation

Patients without Structural Heart Disease

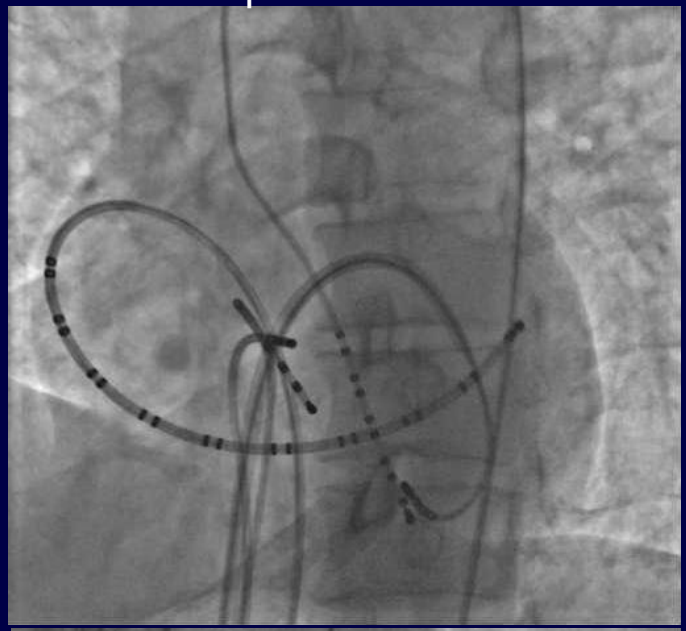
- Idiopathic VT ablation is Recommended (Class I)
  - Symptomatic MVT
  - MVT, when AAD is not effective, not tolerated, or desired.
  - AAD refractory sustained PVT or VF with a suspected trigger.

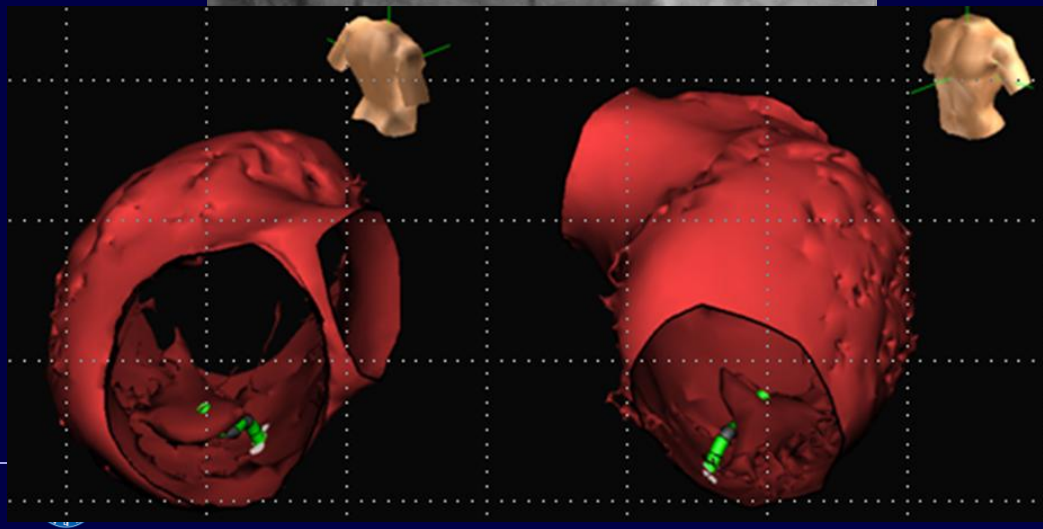
Idiopathic VT

RVOT VT



Idiopathic LV VT



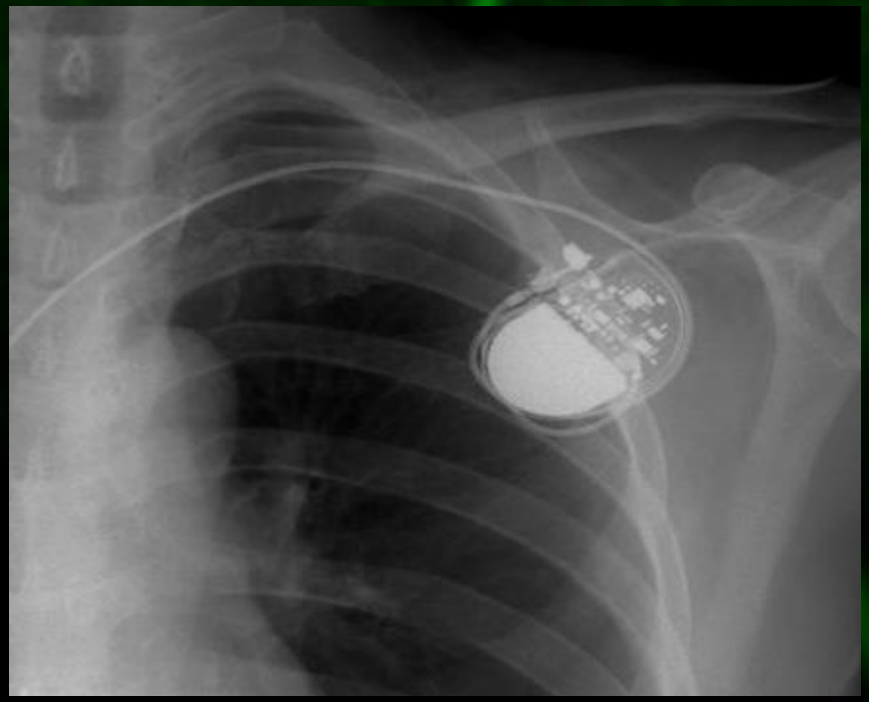


CARDIAC IMPLANTABLE ELECTRONIC DEIVCES (CIEDs)

2008 ACC/AHA/HRS Guidelines

Permanent Pacemaker

2008 ACC/AHA/HRS Guidelines

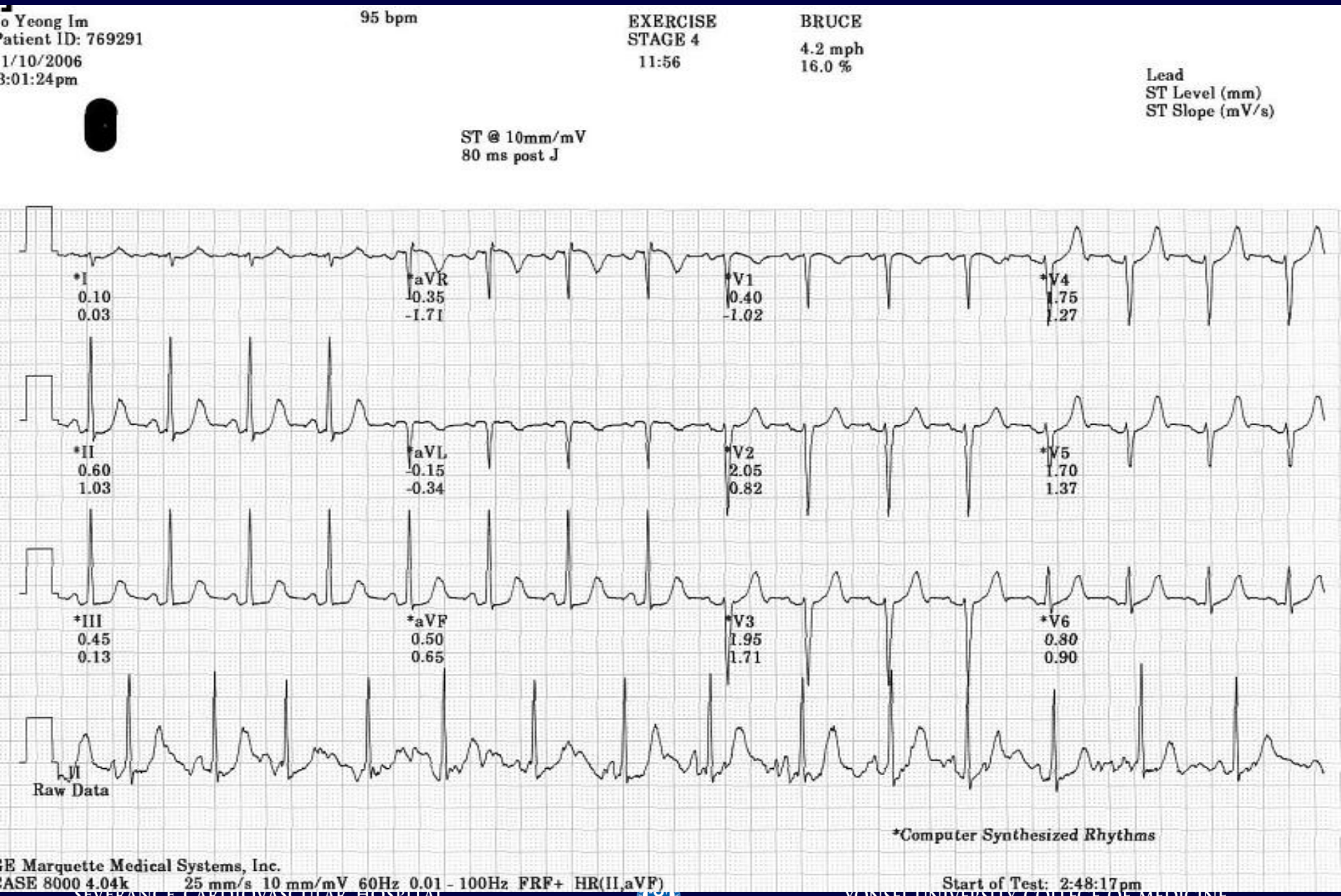


SND

- CLASS I

1. SND with symptomatic bradycardia
2. Symptomatic chronotropic incompetence
3. Symptomatic sinus bradycardia that results from required drug therapy for medical conditions

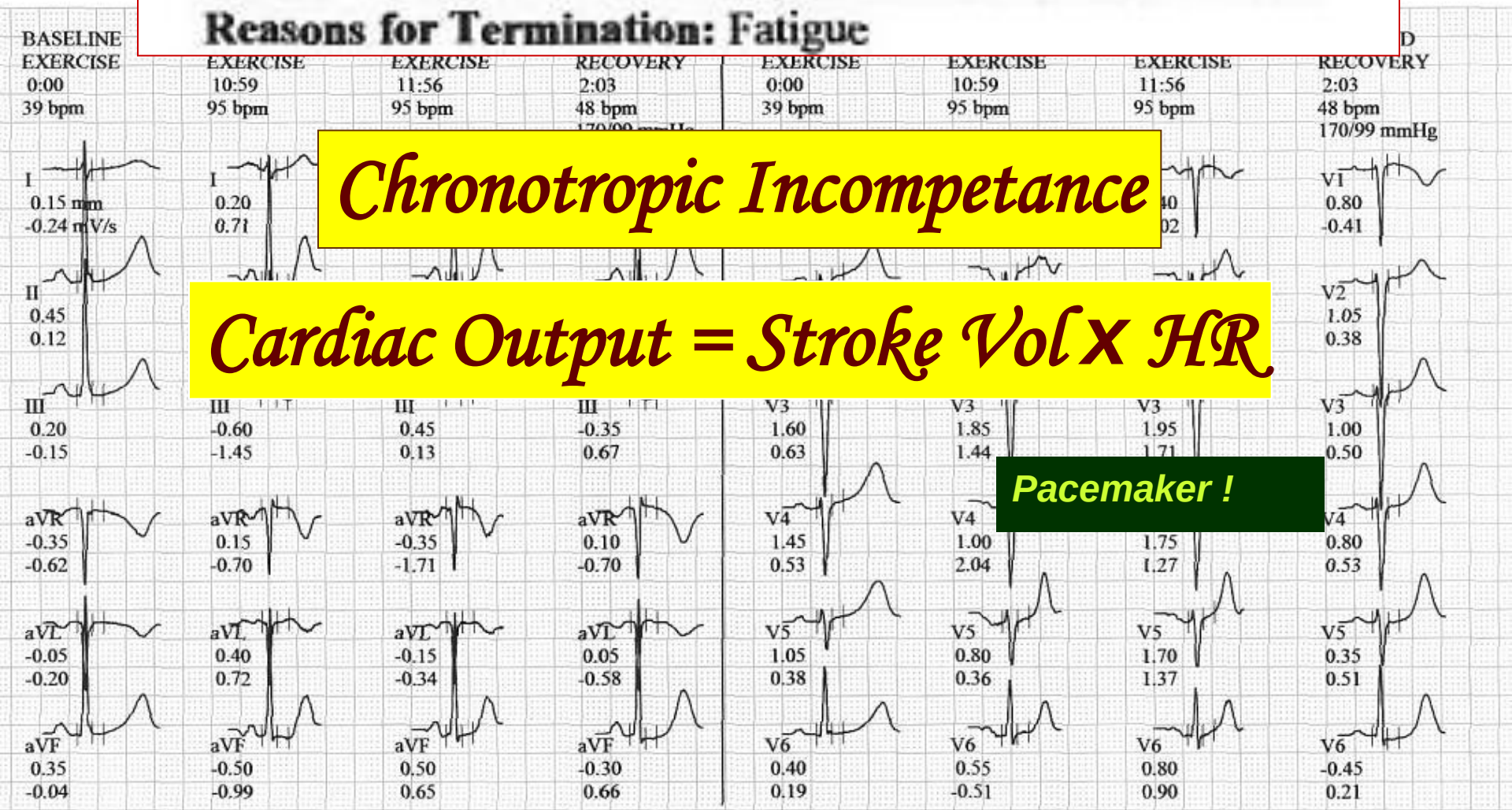
F/48. Weakness. Peak Exercise 13.4 METS



Patient ID 769291
01/10/2006
2:48:17pm

BRUCE Total Exercise Time 11:56
Max HR: 98 bpm 56% of max predicted 172 bpm
Max BP: 179/99 Maximum Workload: 13.40 METS
Max ST Level -0.60 mm in III; EXERCISE STAGE 4 10:59
Reasons for Termination: Fatigue

1 resting
nges: none.



Chronotropic Incompetance

Cardiac Output = Stroke Vol x HR

Pacemaker !

GE Marquette Medical Systems, Inc.
CASE 8000 4.04k 10mm/mV 60Hz 0.01-100Hz FRF+

Confirmed by:

Attending MD:

AVB

CLASS I

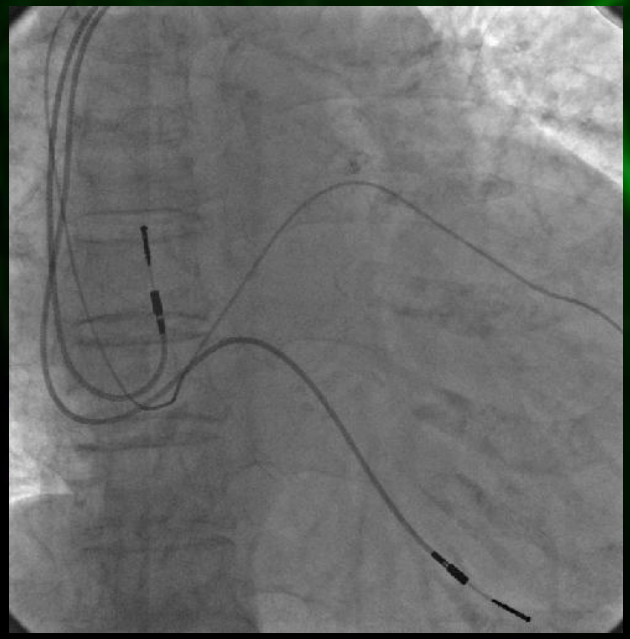
1. Symptomatic bradycardia or VT related to 3AVB or advanced 2AVB
2. Symptomatic 3AVB or advanced 2AVB that results from required drug therapy for medical conditions

3. Awake, symptom-free 3AVB or advanced 2AVB with documented asystole ≥ 3.0 sec or infra-HISian escape rhythm < 40 bpm
4. Awake, symptom-free 3AVB or advanced 2AVB associated with AF and documented pause ≥ 5.0 sec
5. Asymptomatic persistent 3AVB with cardiomegaly or LV dysfunction

6. 3AVB or advanced 2AVB after RFCA or cardiac surgery
7. Exercise induced 3AVB or 2AVB in the absence of myocardial ischemia

CRT

2008 ACC/AHA/HRS Guidelines



Indication of CRT

- CLASS I

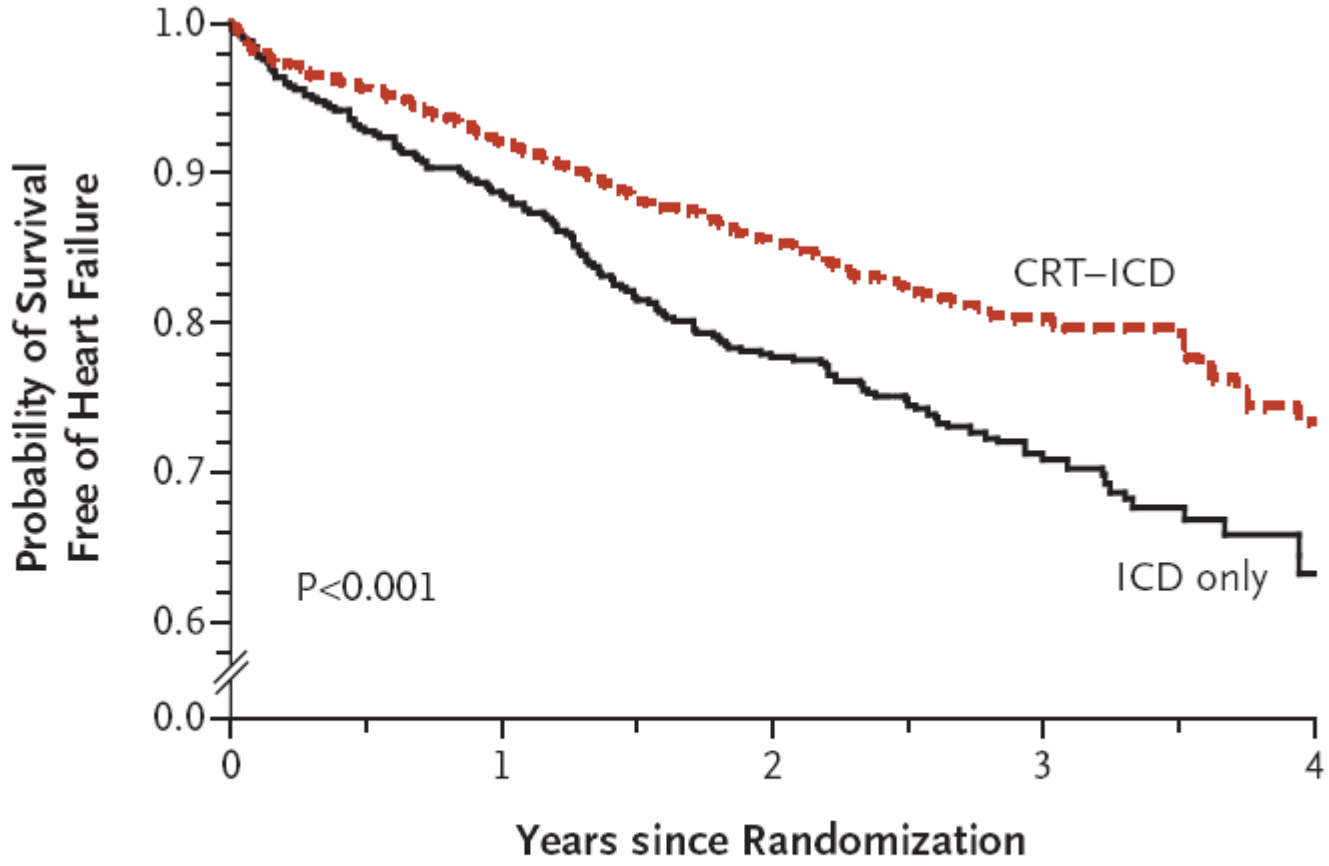
1. LVEF ≤ 35%
2. QRS ≥ 0.12 sec
3. Sinus rhythm
4. NYHA III or ambulatory NYHA IV heart failure
5. Optimal recommended medical therapy

(Level of Evidence: A)

CRT-D is Better Than ICD in HF

MADIT-CRT

Moss et al. N Eng J Med. 2009;361:1329-38



No. at Risk (Probability of Survival)					
ICD only	731	621 (0.89)	379 (0.78)	173 (0.71)	43 (0.63)
CRT–ICD	1089	985 (0.92)	651 (0.86)	279 (0.80)	58 (0.73)

Good Responders to CRT

MADIT-CRT

Goldenberg et al. Circulation. 2011;124:1527-36.

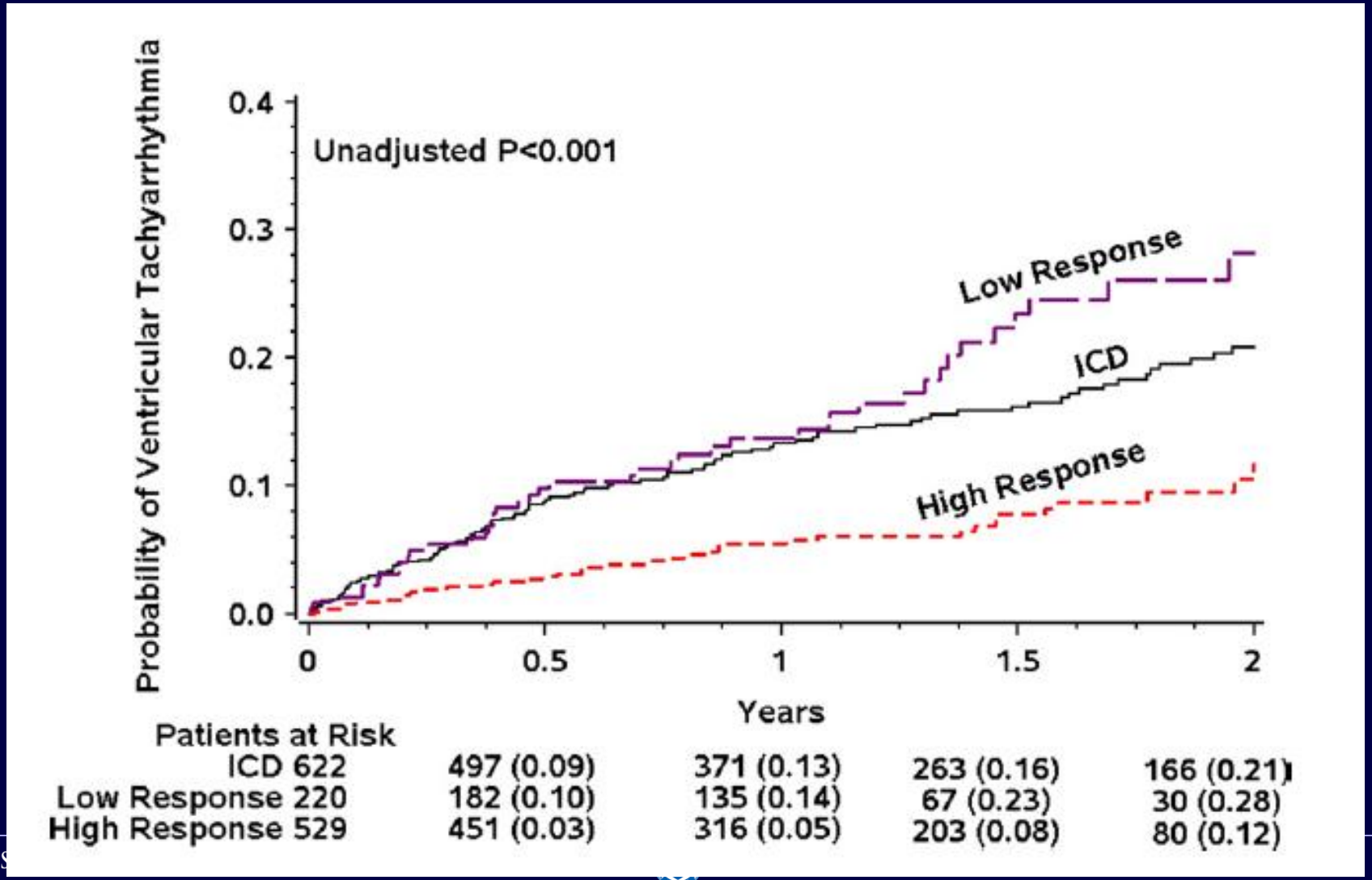
Reduction in LVEDV after CRT

	High Response				High vs Low*		
Risk Factor (Covariate)	Definition	n	Reduction (SD), %	>10% Reduction, %	Difference in Reduction (SE), %*	*P*	Score†
Sex	Women	275	−24 (11)	91	−2.9 (1.0)	0.003	2
CMP origin	Nonischemic	491	−24 (12)	90	−4.2 (0.9)	<0.001	2
QRS	≥150 ms	688	−22 (12)	88	−2.7 (0.9)	0.003	2
QRS pattern	LBBB	750	−22 (11)	88	−3.4 (1.0)	<0.001	2
Prior HF hospitalization	Yes	493	−22 (12)	87	−1.9 (0.8)	0.02	1
Baseline LVEDV	≥125 mL/m^2	803	−21 (11)	88	−4.2 (1.1)	<0.001	2
Baseline LAV	<40 mL/m^2	258	−23 (12)	87	−5.6 (1.0)	<0.001	3

Reverse Remodeling Reduces VT Risk

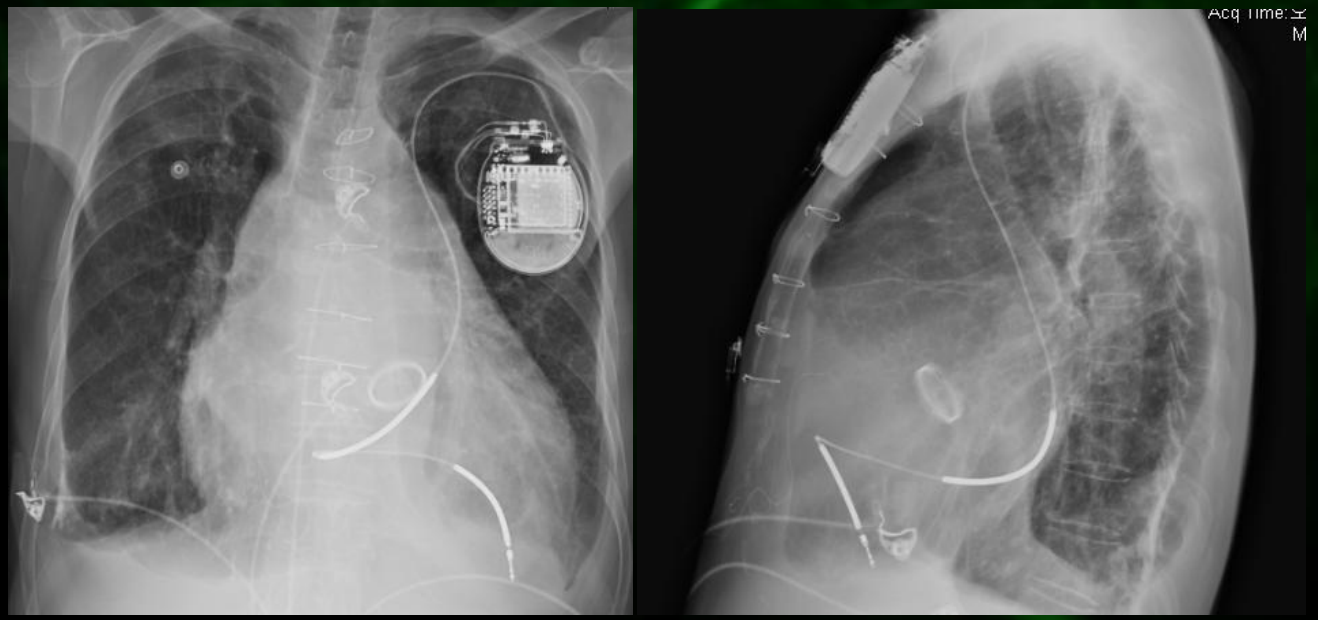
MADIT-CRT

Barsheshet et al. J Am Coll Cardiol. 2011;57:2416-23



ICD

2008 ACC/AHA/HRS Guidelines



ICD Class I Indications

1. SCA (d/t VT or VF) Survivors without reversible cause
2. Spontaneous sustained VT with structural heart disease
3. Syncope of undetermined origin with clinically relevant, inducible VT/VF at EPS

4. Ischemic cardiomyopathy with EF≤35% and NYHA class II~III. (post-MI ≥ 40 days)
5. Nonischemic DCM with EF≤35% and NYHA class II~III
6. Ischemic cardiomyopathy with EF≤30% and NYHA class I (post-MI ≥ 40 days)
7. NSVT due to prior MI, LVEF ≤ 40%, and inducible VF or sustained VT at EPS

ICD Class III Indication

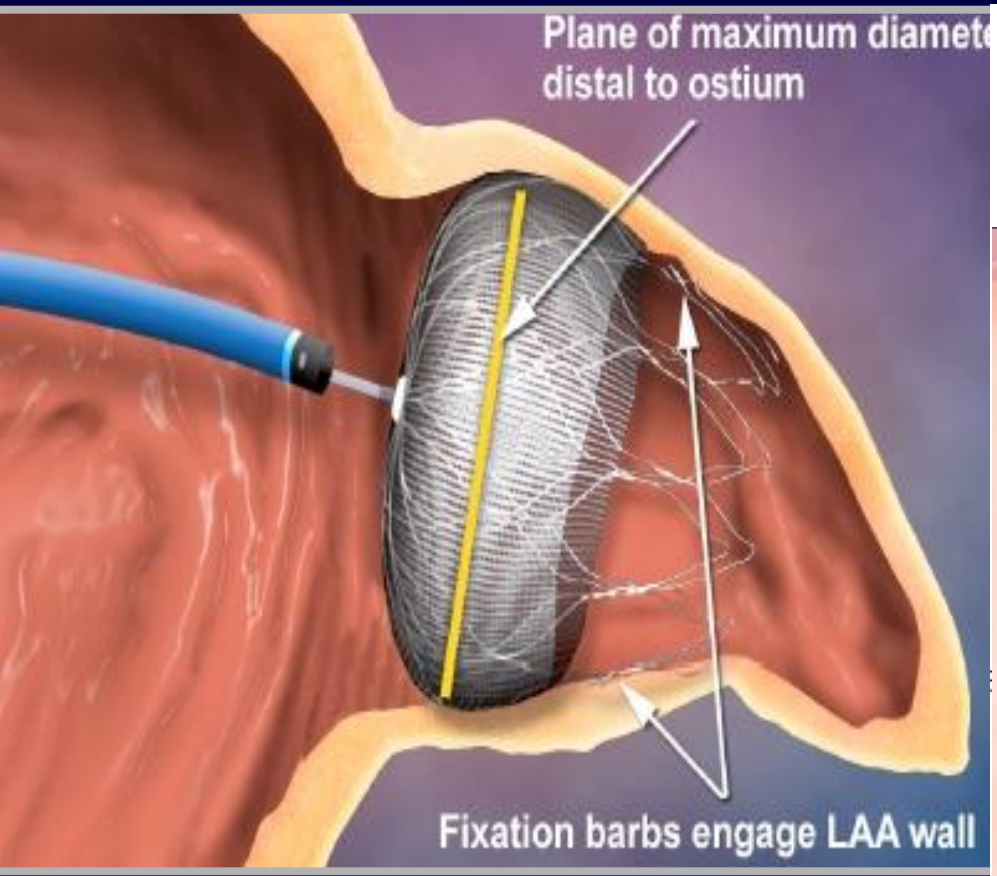
1. The patients who do not have a reasonable expectation of survival with an acceptable functional status for at least 1 year
2. Incessant VT or VF
3. Significant psychiatric illnesses
4. NYHA Class IV patients with drug-refractory congestive heart failure who are not candidates for cardiac transplantation or CRT-D

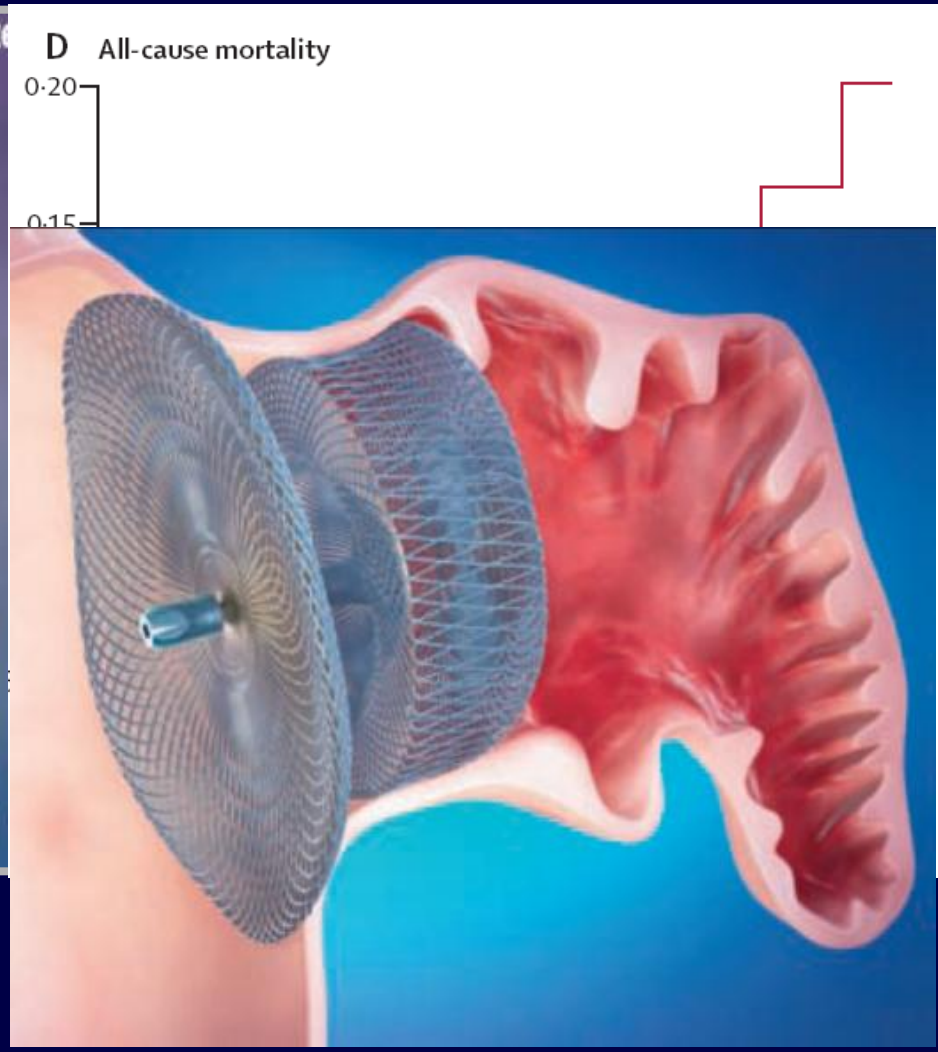
5. VF or VT is amenable to surgical or catheter ablation (e.g., AF with WPW syndrome, idiopathic VT, or fascicular VT in the absence of structural heart disease).
6. Ventricular tachyarrhythmias due to a completely reversible disorder

LA Appendage Occusion Device

Appendage Occlusion Device

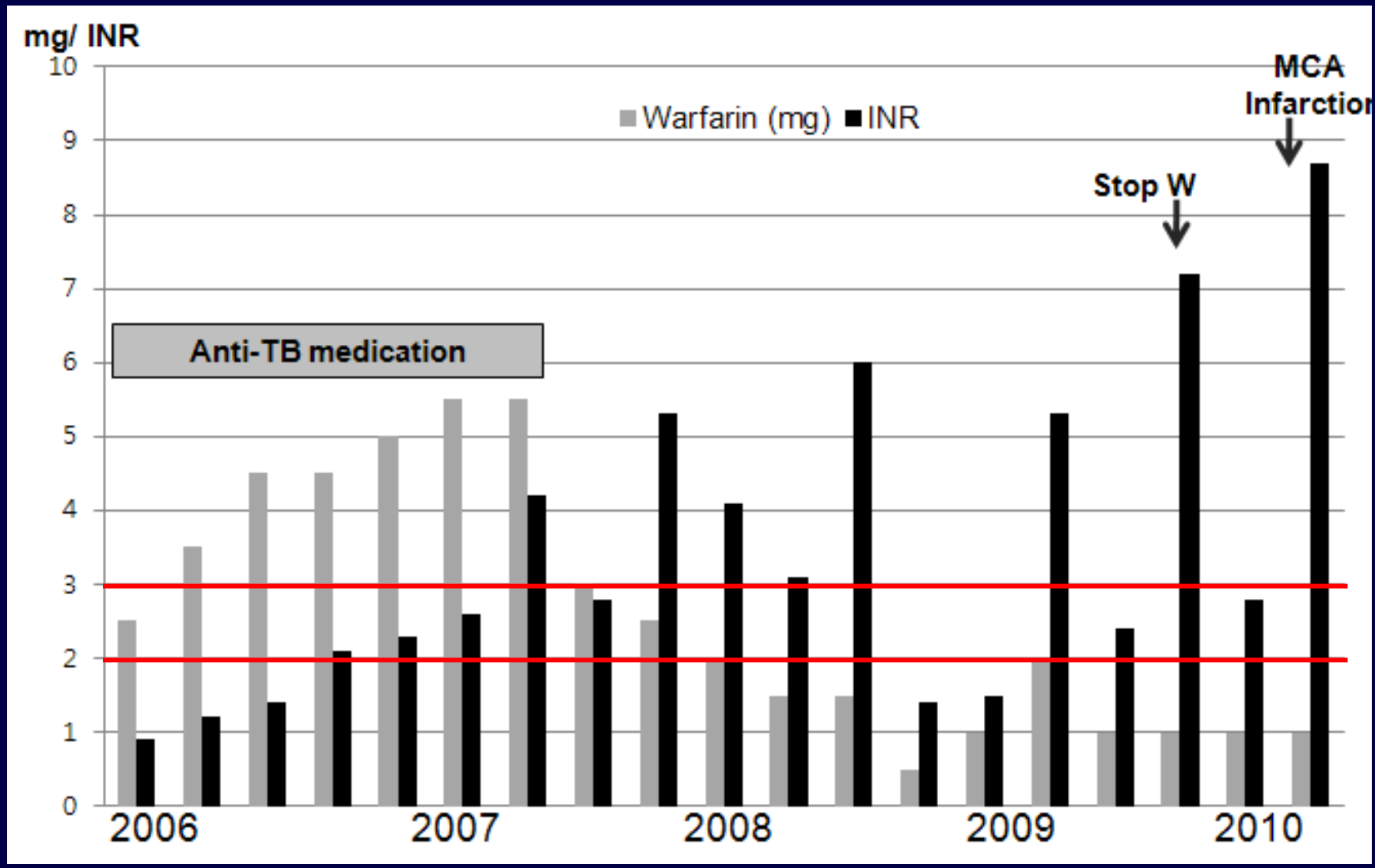
PROTECT AF Investigators. Lancet 2009; 374: 534–42

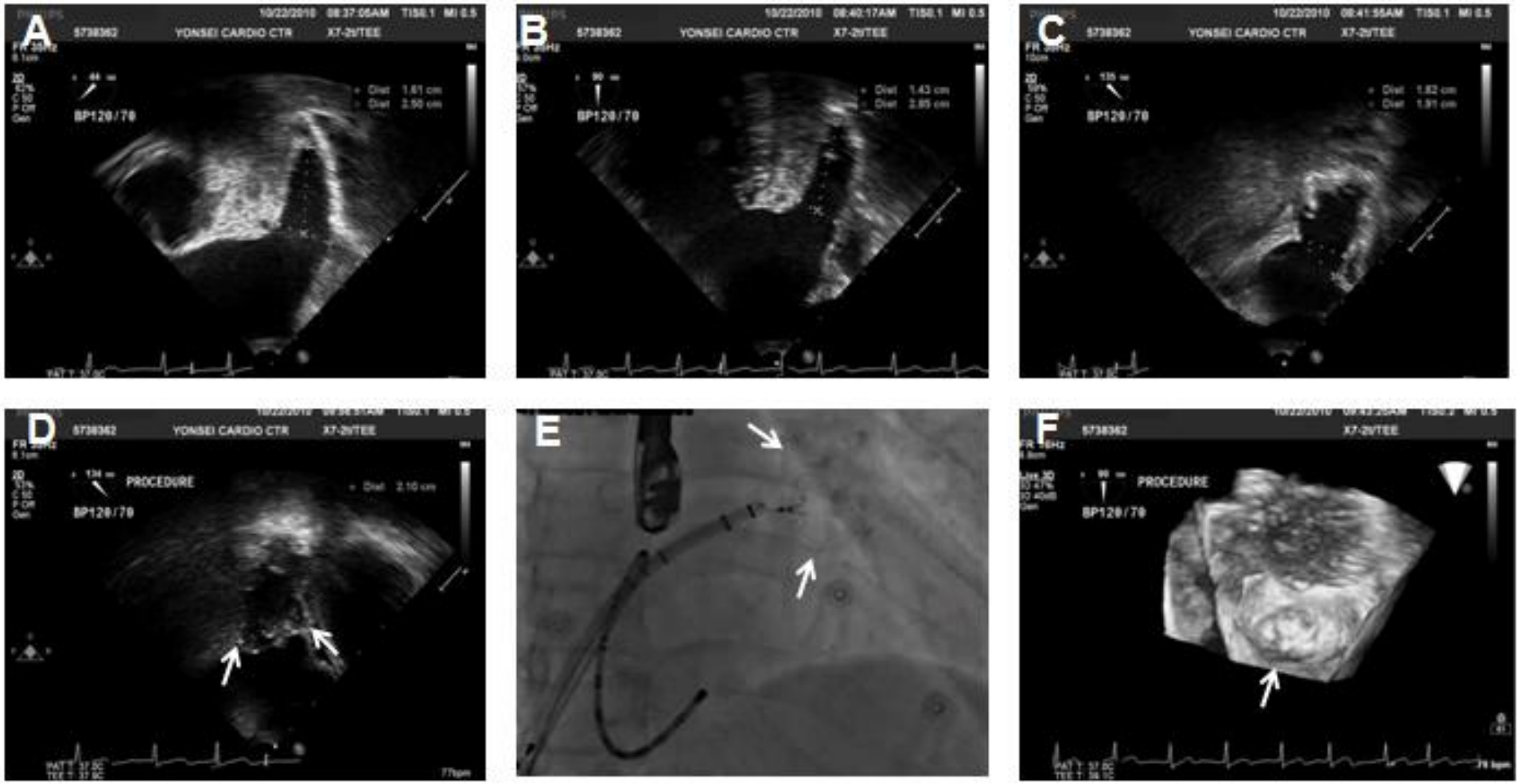




M/53. PtAF, Labile INR, Recurrent bleeding & Stroke

Kim YL & Pak HN et al. YMJ. 2011;[In press]





Kim YL & Pak HN et al. YMJ. 2011;[In press]

Appropriate Indications for LA Appendage Occlusion Devices

- Persistent or permanent AF who cannot tolerate anticoagulation despite significant risk of ischemic stroke
- Recurrent stroke and inability to maintain sinus rhythm in patients with AF

Take-Home Message

- SVT, AT, AFL, idiopathic VT, or symptomatic drug resistant AF are excellent indications for catheter ablation.
- VT ablation is recommended in patients with structural heart disease and sustained VT, VT storm, or frequent PVC with potential cause of ventricular dysfunction.
- Symptomatic bradycardia is the universal indication of pacemaker implantation.
- CRT or ICD primary prevention indications are restricted to the patients with expected survival longer than 1 yr.
- LA appendage occlusion device needs to be restricted to the patients with high risks of thromboembolism and bleeding, and unable to maintain sinus rhythm.

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