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HEART CENTER

Atrial Fibrillation

E. Kevin Heist, MD, PhD

Updates in General Internal Medicine for Specialists
January 27, 2020

Disclosures

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Self	Abbott	Honorarium, Research Grant	Medical Device
Self	Biotronik	Honorarium	Medical Device
Self	Boston Scientific	Honorarium, Research Grant	Medical Device
Self	Johnson & Johnson	Honorarium	Medical Device
Self	Medtronic	Honorarium	Medical Device
Self	Pfizer	Consulting	Pharmaceutical

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Outline

- Rate vs. Rhythm Control
- Methods of Rhythm Control
  - Pharmacologic
  - Ablation
- Stroke Prevention
  - Pharmacologic
  - Devices

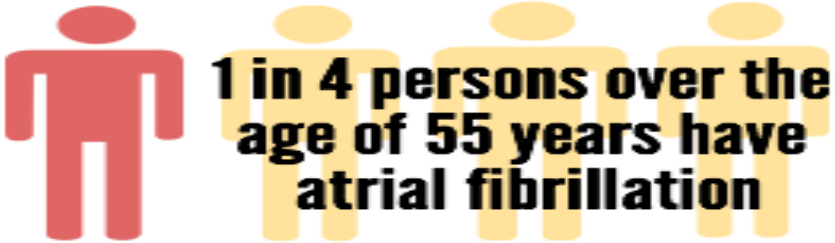
Definitions

- Atrial Fibrillation: rapid, chaotic atrial rhythm, typically with irregular and possibly rapid ventricular response.

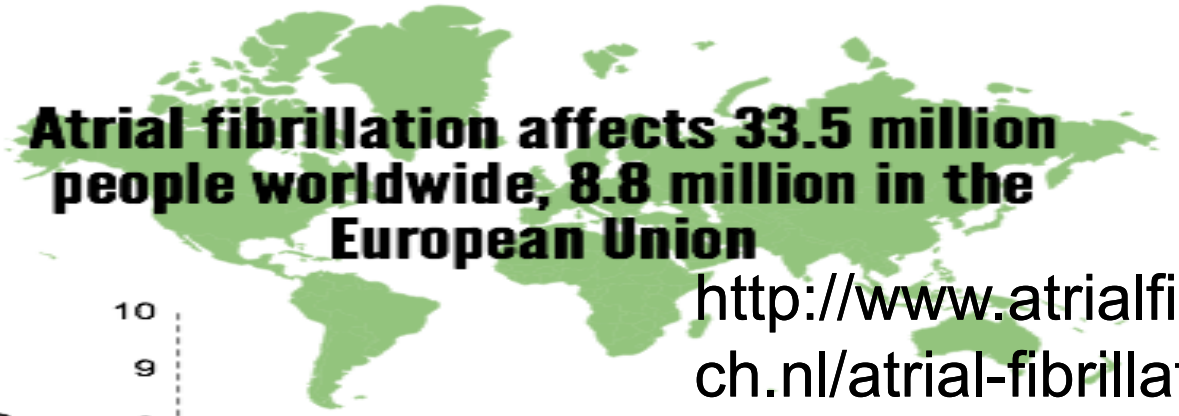
- Paroxysmal AF: AF episodes < 7 days in duration
- Persistent AF: > 7 days, < 1 year in duration
- Long-standing Persistent (Chronic) AF: AF > 1 year in duration
- Permanent AF: No plan to try to reverse AF

Atrial fibrillation - a growing epidemic

Atrial fibrillation is the most common cardiac arrhythmia causing a fast and irregular heartbeat



1 in 4 persons over the age of 55 years have atrial fibrillation

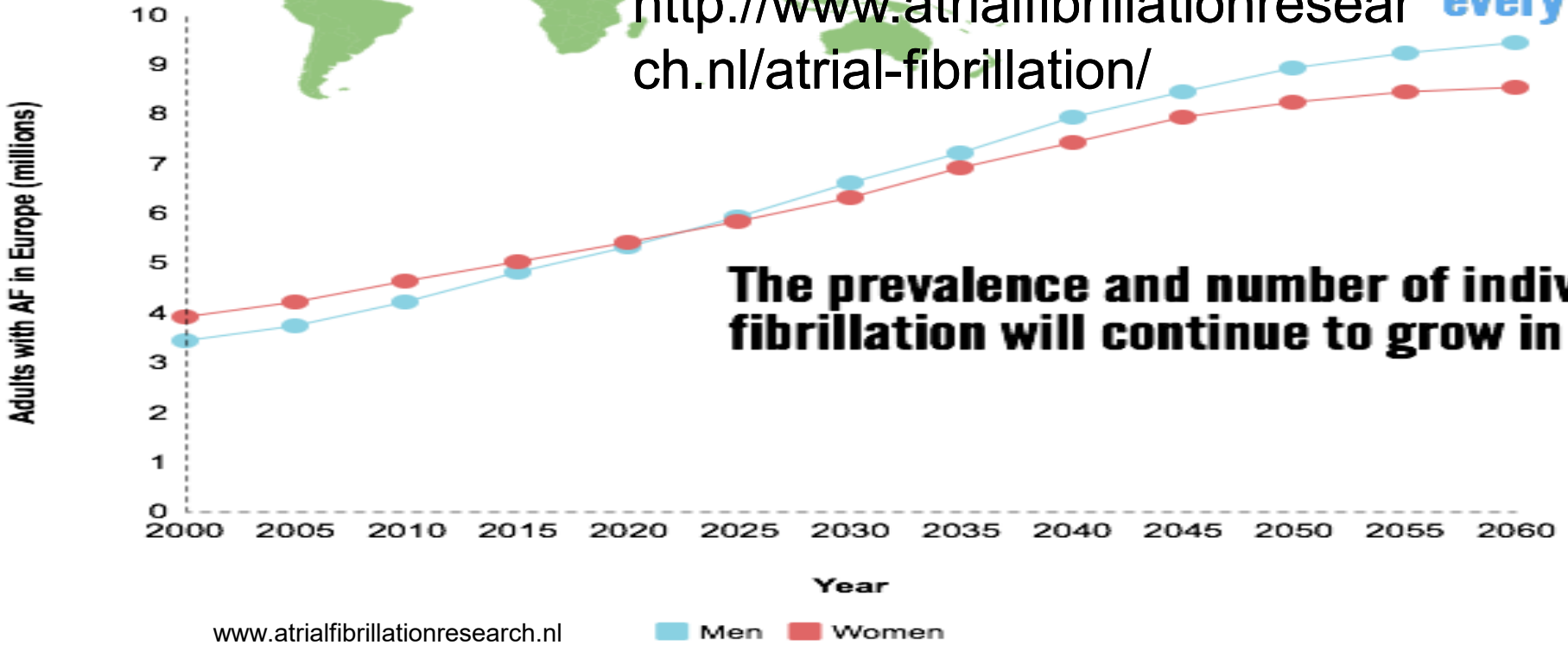


Atrial fibrillation affects 33.5 million people worldwide, 8.8 million in the European Union

Incidence increases with age, doubling each decade after 55

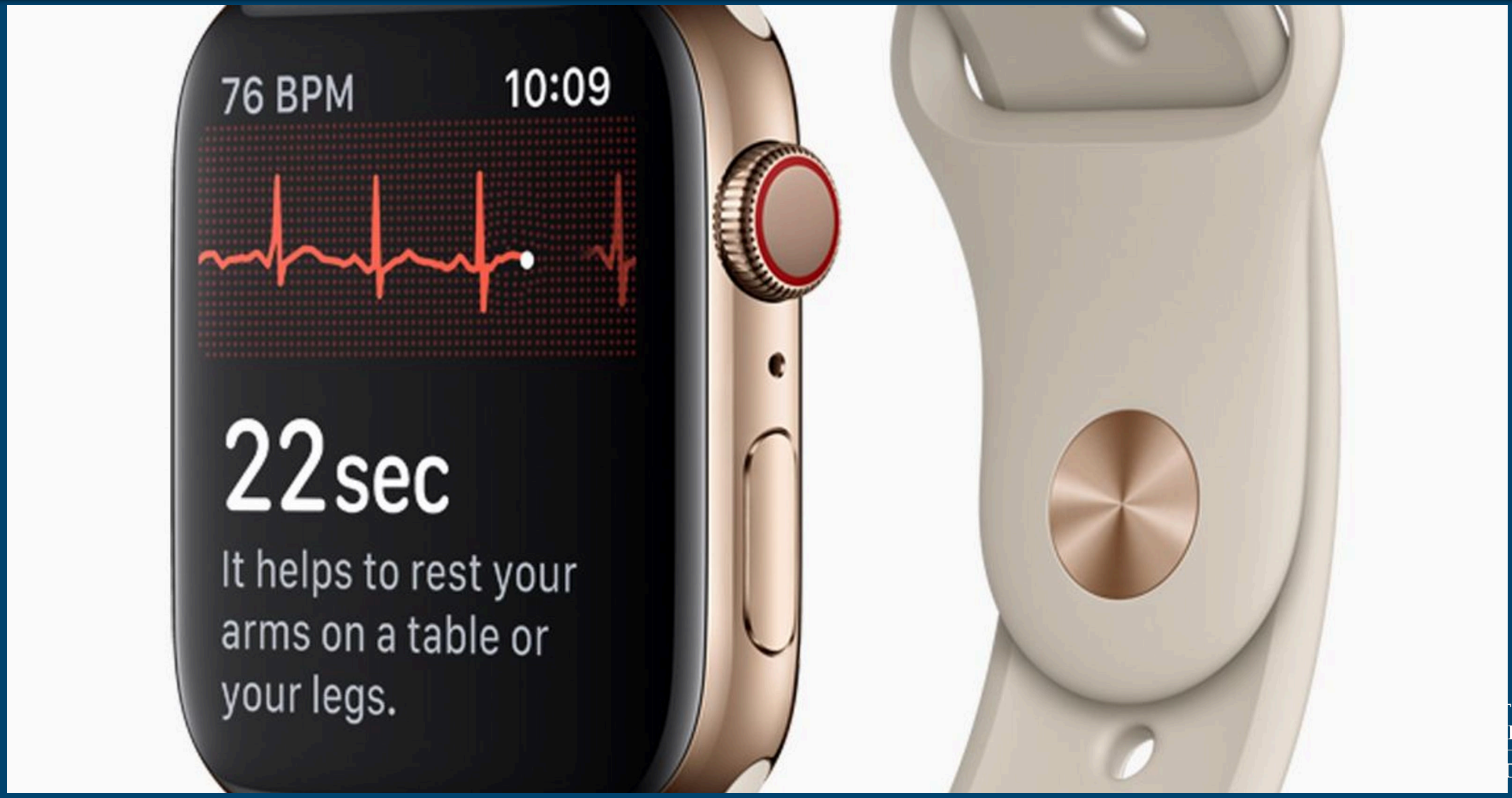
X 2 every 10 years

http://www.atrialfibrillationresearch.nl/atrial-fibrillation/



The prevalence and number of individuals with atrial fibrillation will continue to grow in the coming years

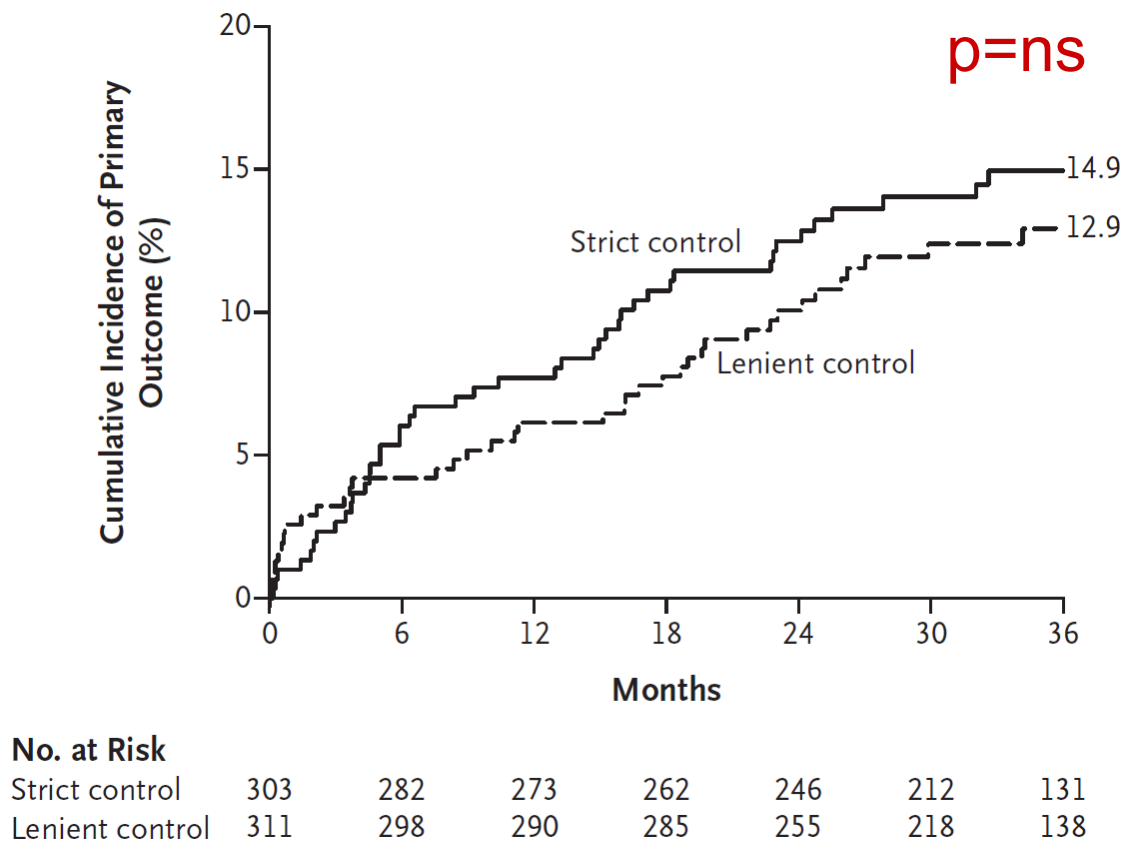
Patient Wearable Monitors to Detect Atrial Fibrillation



Drug Therapy for Rate Control in AF

- Beta Blocker Therapy
- Calcium-Channel Blocker Therapy (Diltiazem, Verapamil)
- Digoxin (increased mortality in some studies)
- Amiodarone (useful in acutely ill patients, chronic use limited by drug toxicity)

RACE II: Intensity of Rate Control



Lenient: resting hr < 110
(rest 93 ± 9 bpm achieved)

Strict: resting hr < 80
hr mod exercise < 110
(rest 76 ± 12 bpm achieved)

Primary Outcome:
-cardiovascular death
-CHF hospitalization
-stroke
-systemic embolism
-bleeding
-life threatening arrhythmia

Van Gelder et al, NEJM 2010;362:1363-73

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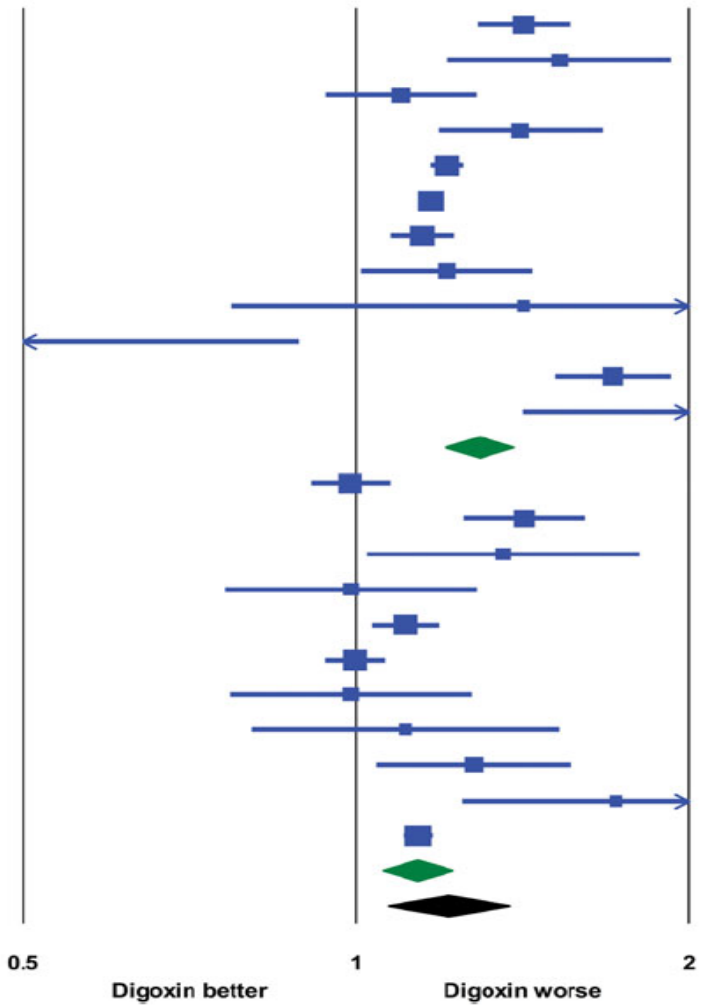
Digoxin Use and Overall Mortality

Study	Patient cohort	Statistics			
		Hazard ratio	95%	CI	p-Value
Hallberg (RIKS-HIA), 2007 - AF	AF	1,42	1,29	1,56	0,00
Gjesdal (SPORTIF III, V), 2008	AF	1,53	1,21	1,93	0,00
Friberg (SCAF), 2009	AF	1,10	0,94	1,28	0,23
Whitback (AFFIRM), 2012	AF	1,41	1,19	1,67	0,00
Turakhia (TREAT-AF), 2014	AF	1,21	1,17	1,25	0,00
Shah, 2014 - AF	AF	1,17	1,15	1,20	0,00
Gamst, 2014	AF	1,15	1,08	1,23	0,00
Chao, 2014	AF	1,21	1,01	1,44	0,04
Rodriguez-Manero (AFBAR), 2014	AF	1,42	0,77	2,61	0,26
Mulder (RACE II), 2014	AF	0,41	0,19	0,89	0,02
Freeman (ATRIA-CVRN), 2014	AF	1,71	1,52	1,93	0,00
Pastori, 2015	AF	2,22	1,42	3,48	0,00
Total	**AF**	**1,29**	**1,21**	**1,39**	**<0,01**
Garg (DIG), 1997	CHF	0,99	0,91	1,07	0,81
Domanski (SOLVD), 2005 - Men	CHF	1,42	1,26	1,61	0,00
Domanski (SOLVD), 2005 - Women	CHF	1,36	1,03	1,80	0,03
Ahmed (DIG Ancillary), 2006	CHF	0,99	0,76	1,28	0,94
Hallberg (RIKS-HIA), 2007 - CHF/SR	CHF	1,11	1,04	1,19	0,00
Hallberg (RIKS-HIA), 2007 - CHF/AF	CHF	1,00	0,94	1,06	1,00
Fauchier, 2008	CHF	0,99	0,77	1,27	0,94
Dhaliwal, 2008	CHF	1,11	0,81	1,53	0,52
Butler (Val-HeFT), 2010	CHF	1,28	1,05	1,57	0,02
Freeman, 2013	CHF	1,72	1,25	2,36	0,00
Shah, 2014 - CHF	CHF	1,14	1,11	1,17	0,00
Total	**CHF**	**1,14**	**1,06**	**1,22**	**<0,01**
Overall	**AF, CHF**	**1,21**	**1,07**	**1,38**	**<0,01**



Vamos et al, EHJ 2015;36:1831-8

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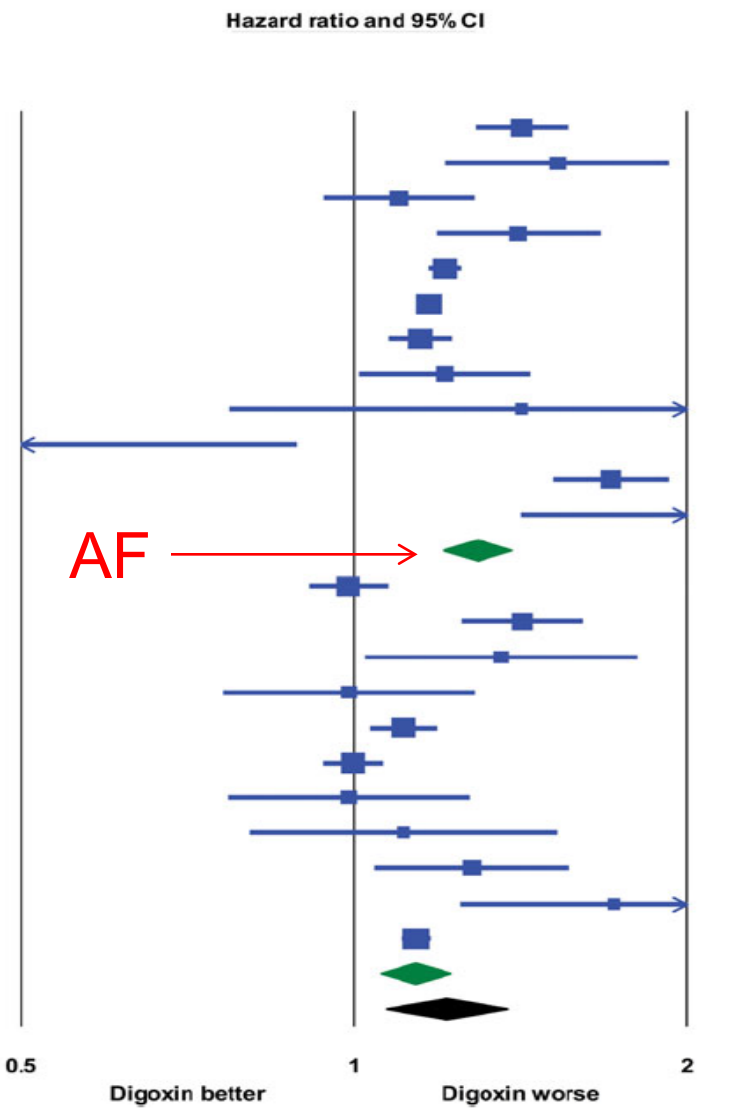

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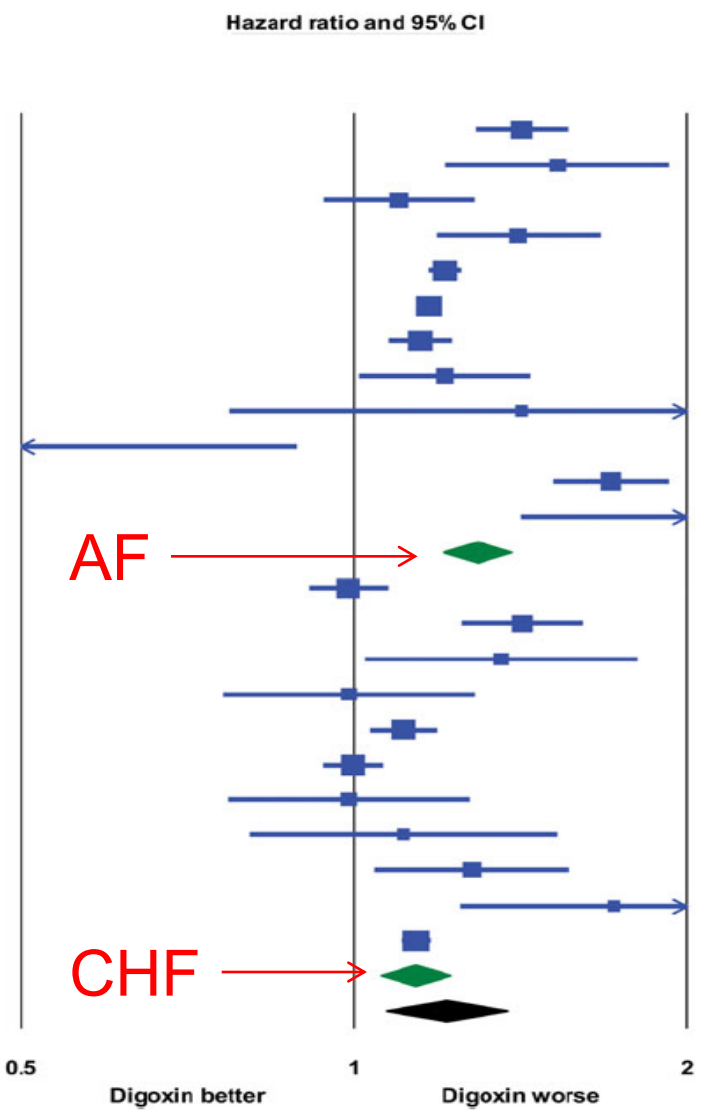
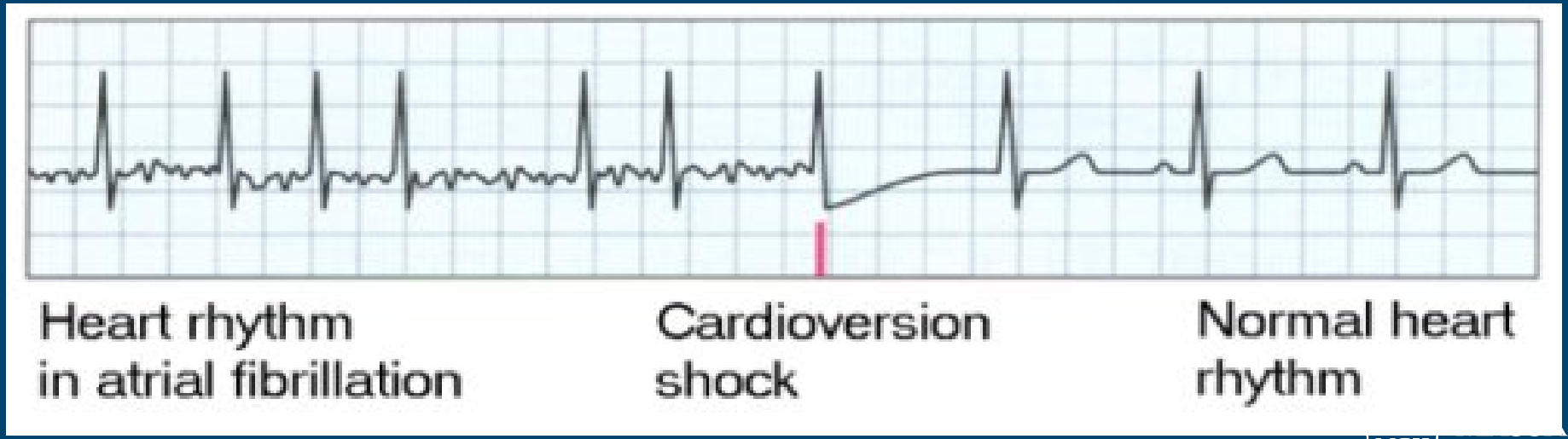


Vamos et al, EHJ 2015;36:1831-8

AV Nodal Ablation/Pacemaker: Definitive Rate Control

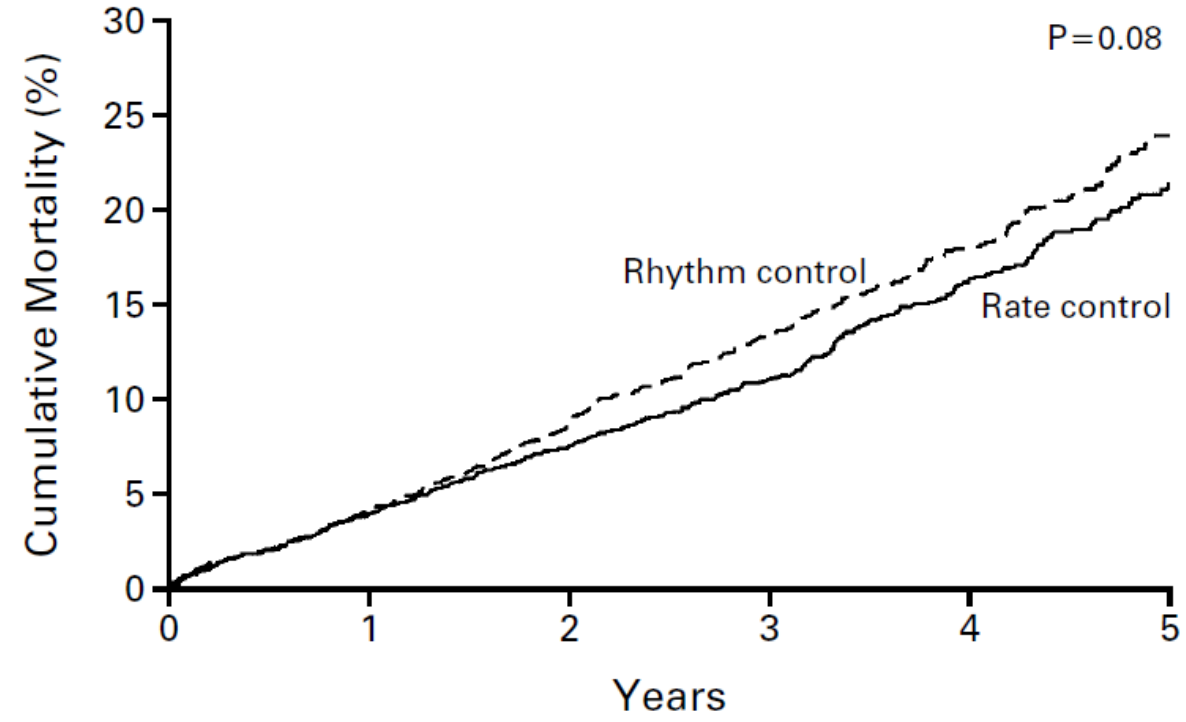
- Ablation of the AV node causes complete AV block, makes a patient "pacemaker-dependent"
- Does not prevent atrial fibrillation: the risk of stroke and need for anti-coagulation remains
- Typically reserved for elderly and/or sick patients who can't be acceptably rate controlled with tolerated medications

Electrical Cardioversion is effective, but…



…Atrial fibrillation often recurs

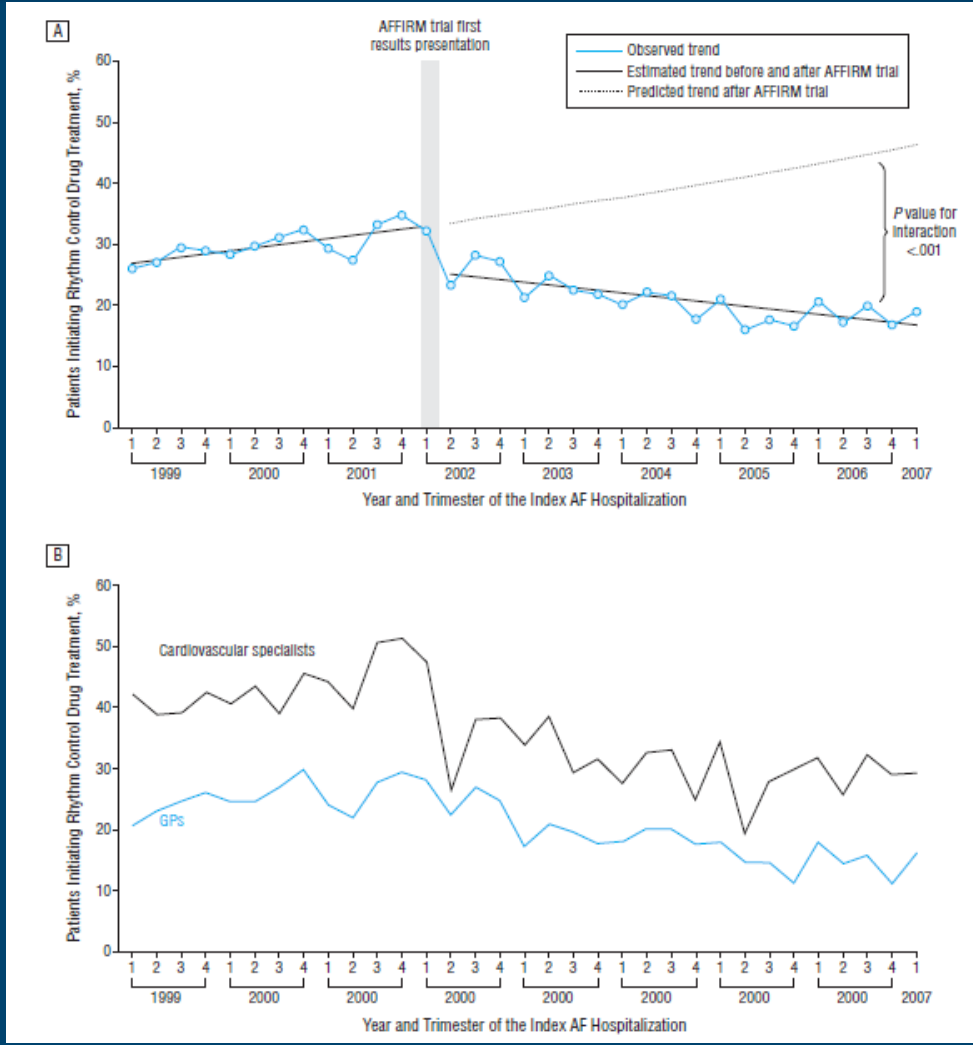
Medical Rate vs. Rhythm Control: AFFIRM

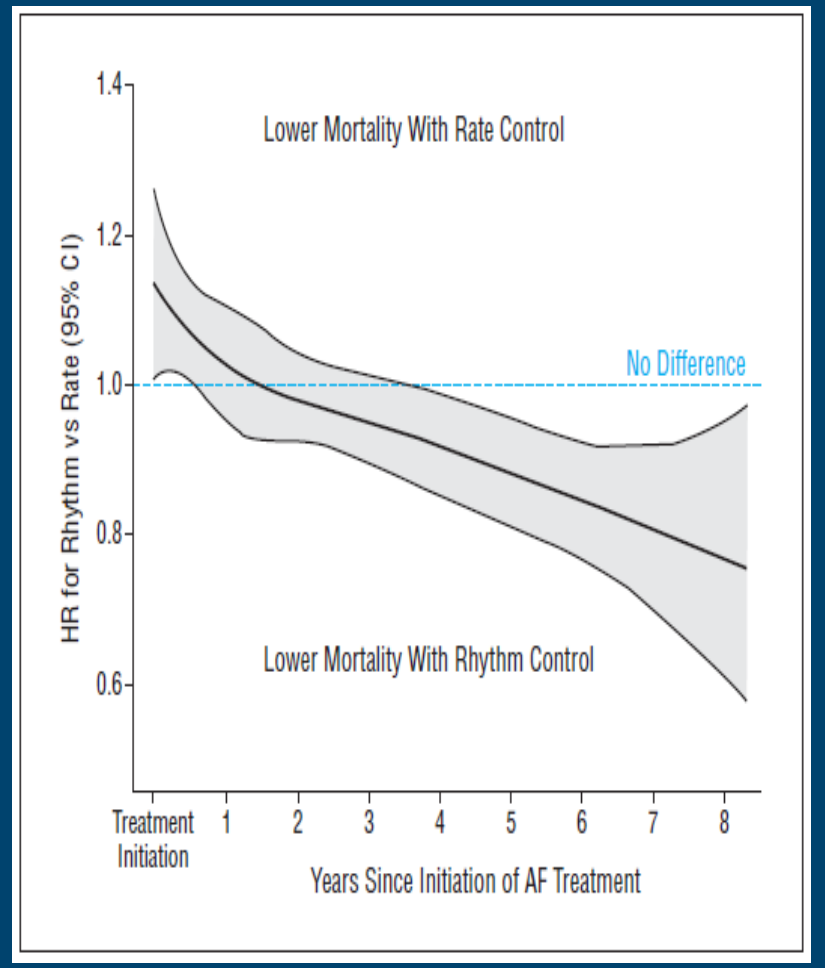


No. of Deaths		number (percent)				
Rhythm control	0	80 (4)	175 (9)	257 (13)	314 (18)	352 (24)
Rate control	0	78 (4)	148 (7)	210 (11)	275 (16)	306 (21)

Wyse et al, NEJM 2002;347:1825-33

Observational Mortality Study of Rate vs. Rhythm Control in 26,130 Canadian Patients (66+ years old)





Ionescu-Ittu et al, Arc Int Med 2012;172:997-1004

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Drug Therapy: No Magic Pill…

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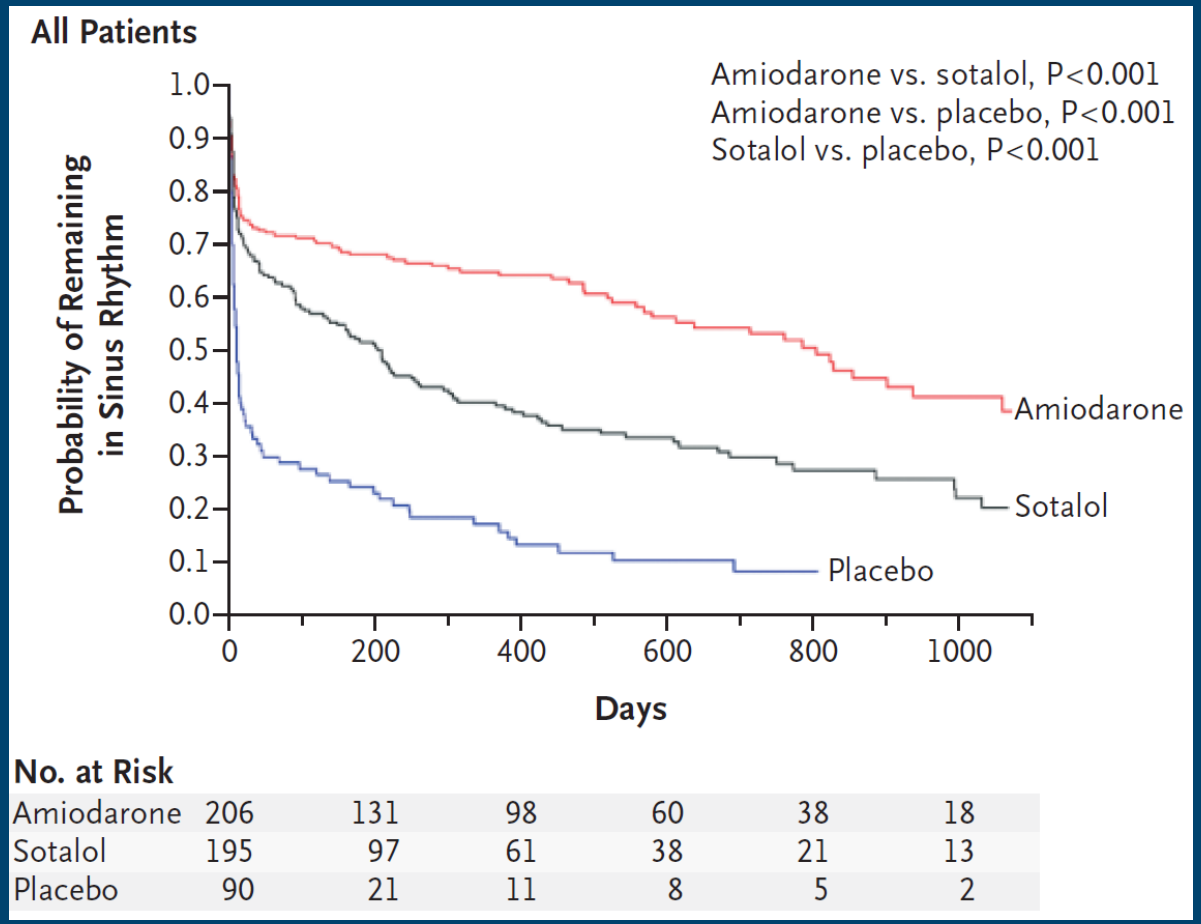
Rhythm Control: Amiodarone vs. Sotalol vs. Placebo



No. at Risk

Amiodarone	206	131	98	60	38	18
Sotalol	195	97	61	38	21	13
Placebo	90	21	11	8	5	2

Singh, BN et al, NEJM 2005;352:1861-72

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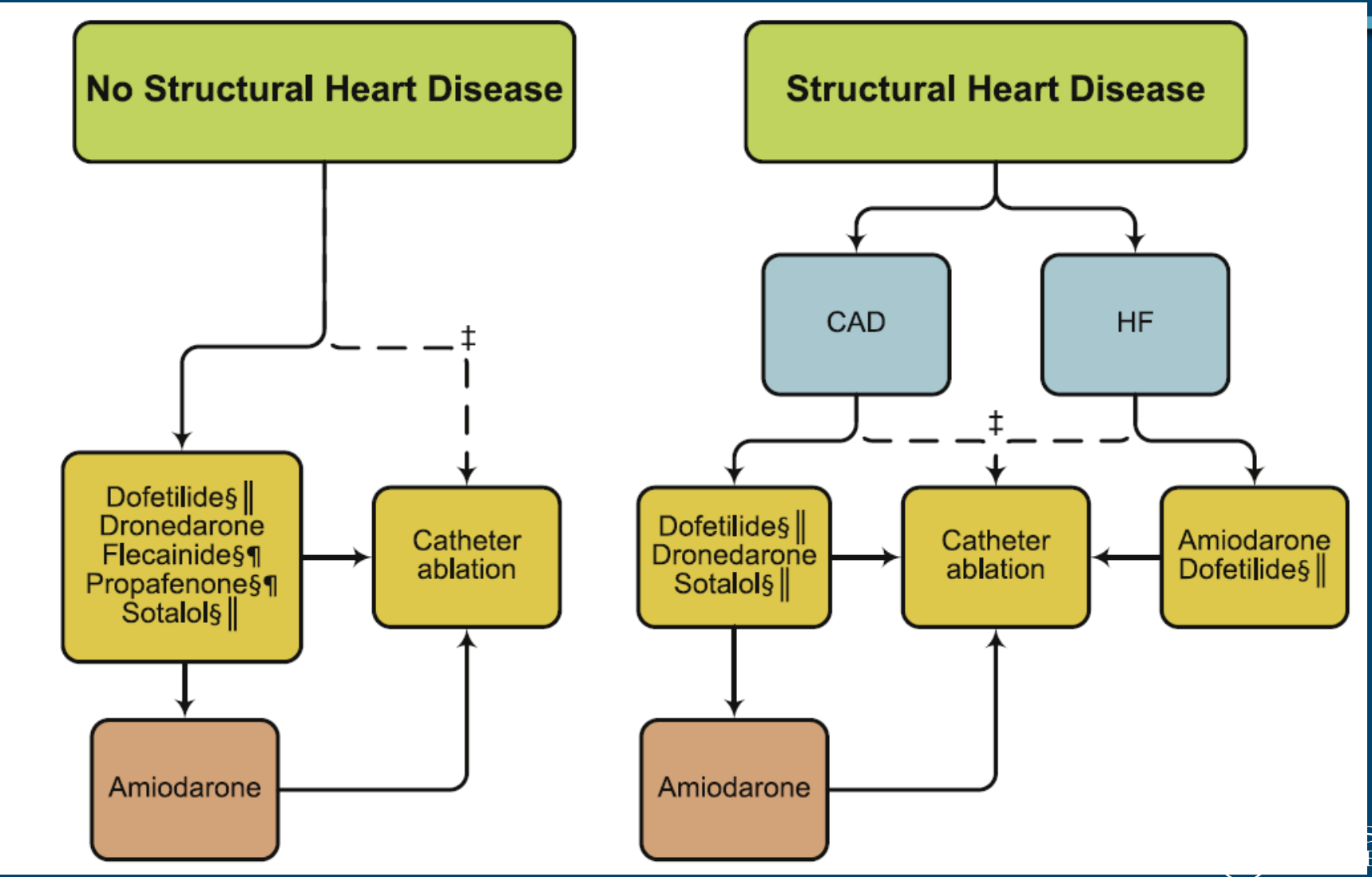
Antiarrhythmic Drug Therapy for AF



January et al, JACC 2014

Drug Therapy for AF Summary

- Hard endpoints with AF rate control are as good as rhythm control (anti-arrhythmic drugs)
- Beta blockers and calcium channel blockers are good rate control choices, digoxin may increase mortality
- Antiarrhythmic drugs for AF have moderate efficacy and potential for drug toxicity

Ablation Procedures for Atrial Fibrillation

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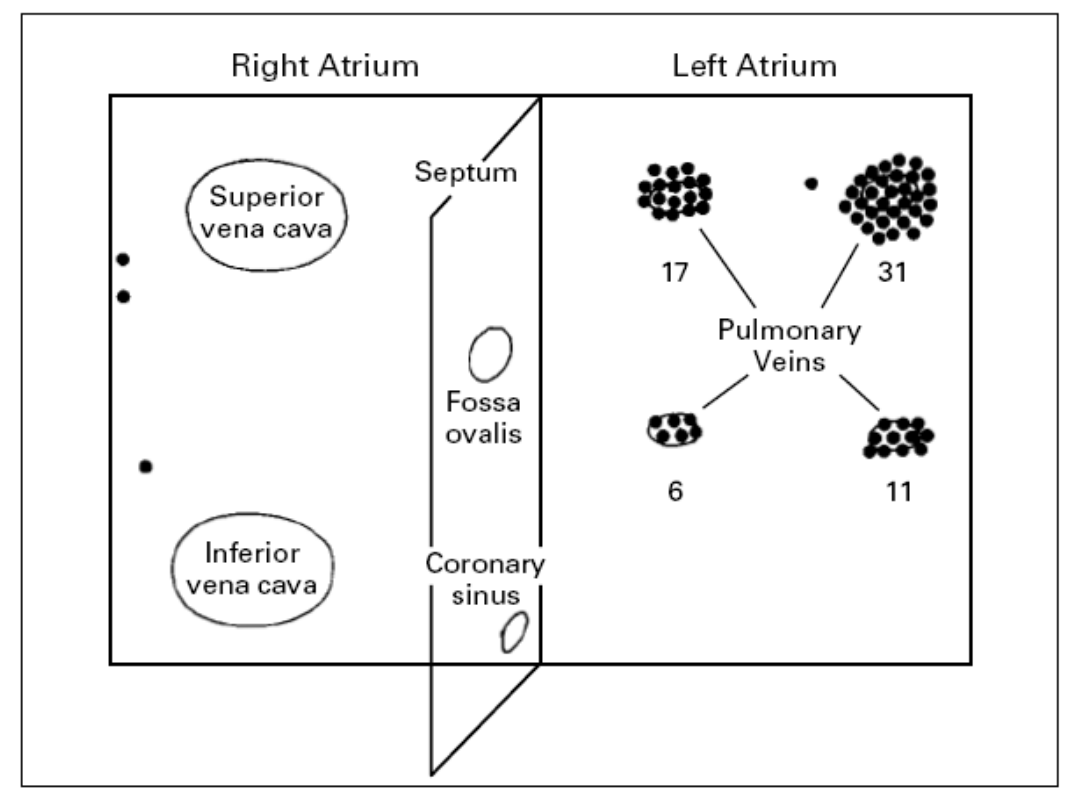
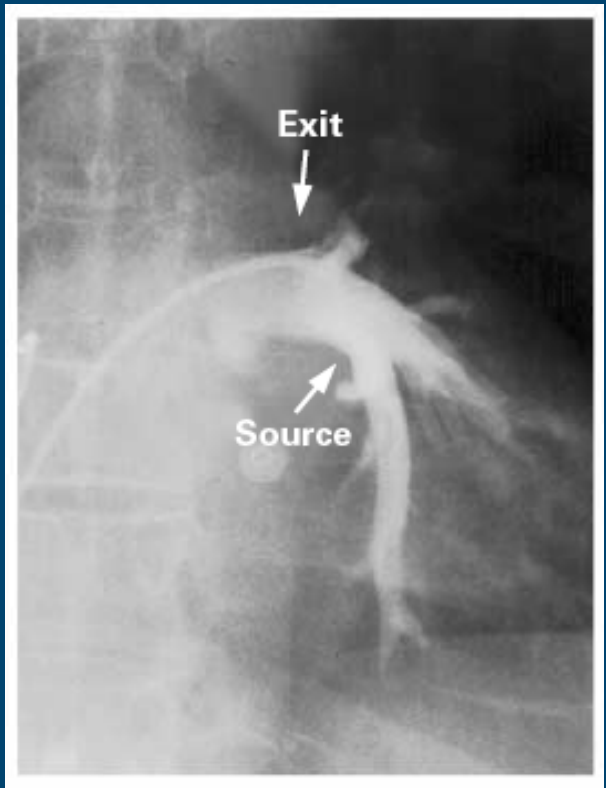
Pulmonary Veins as Triggers of Paroxysmal Atrial Fibrillation





Haissaguerre et al, NEJM 1998;339:659

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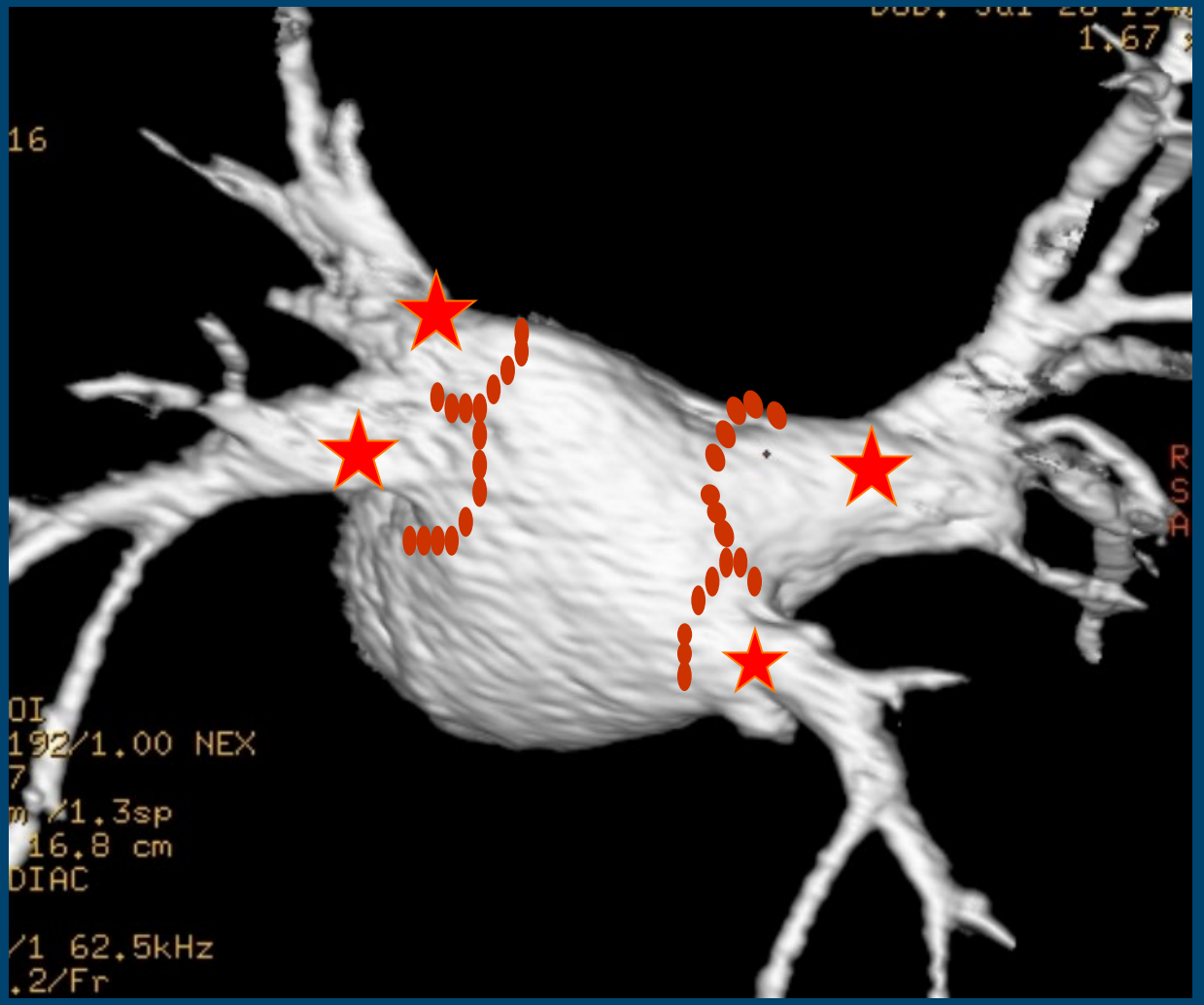
Pulmonary Vein Isolation: Ablation for Paroxysmal AF



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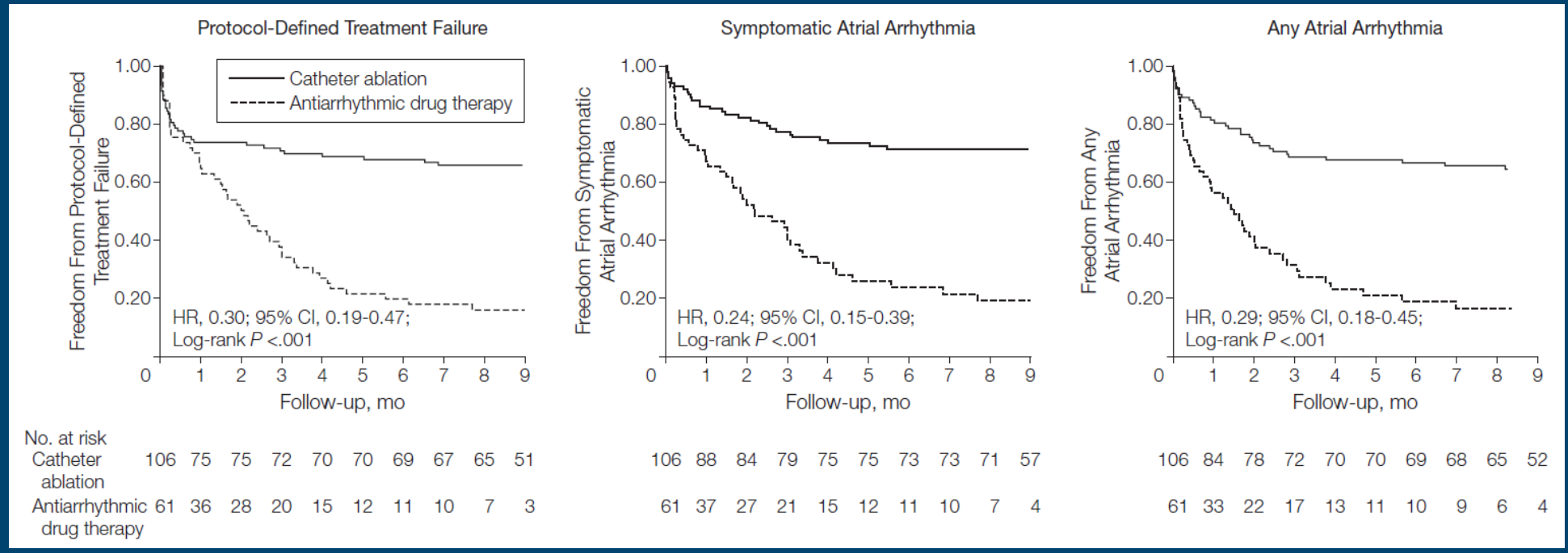
Catheter Ablation vs. Antiarrhythmic Drug Therapy for Paroxysmal AF



*Protocol-Defined Treatment Failure: documented symptomatic atrial fibrillation

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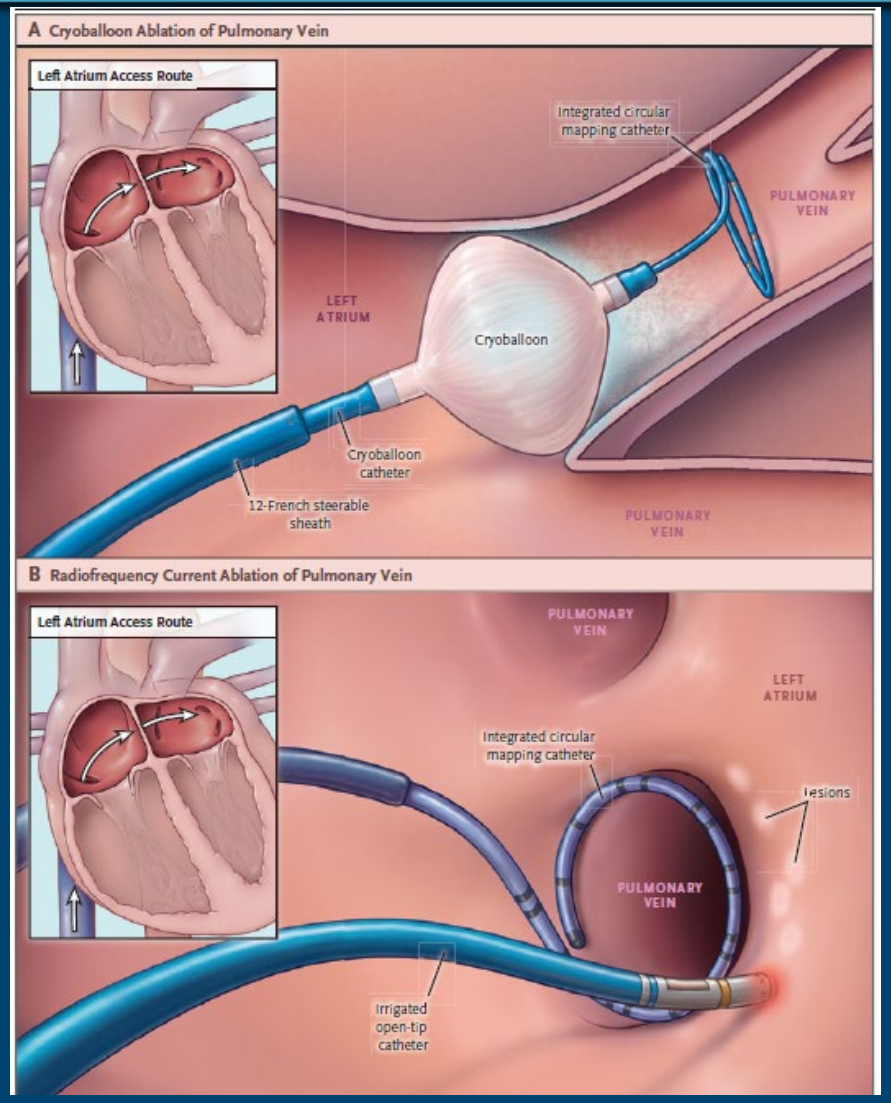
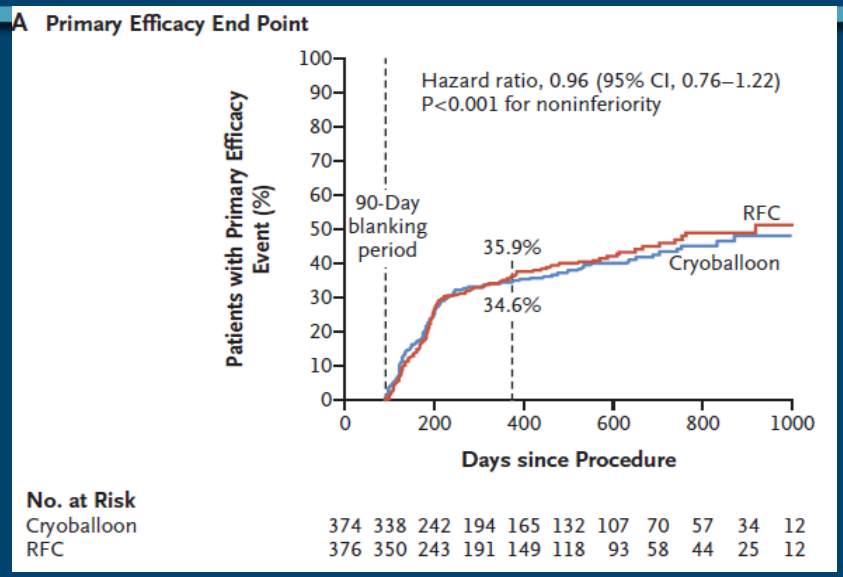
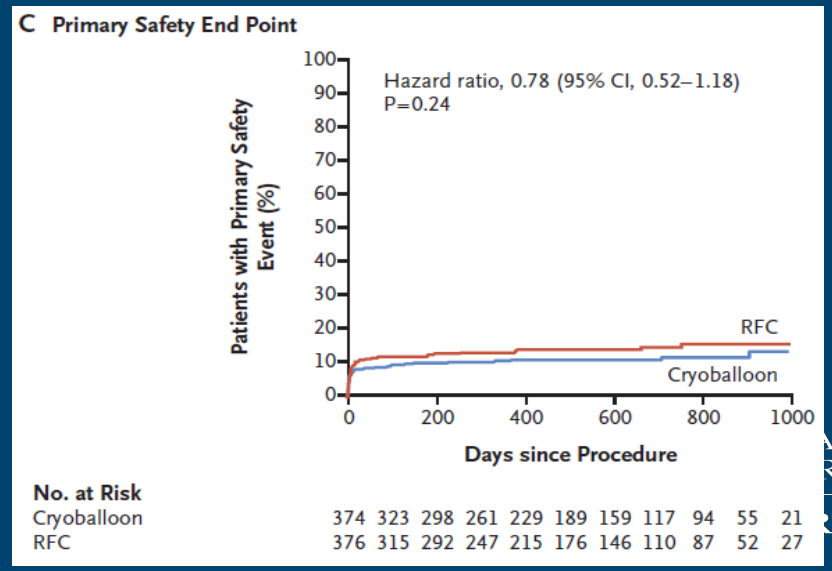
Wilber et al, JAMA 2010;303:333-40

AF Ablation Methods:
Cryoballoon vs RA Ablation: “Fire and ICE”







Kuck et al, NEJM 2106;374:2234-45

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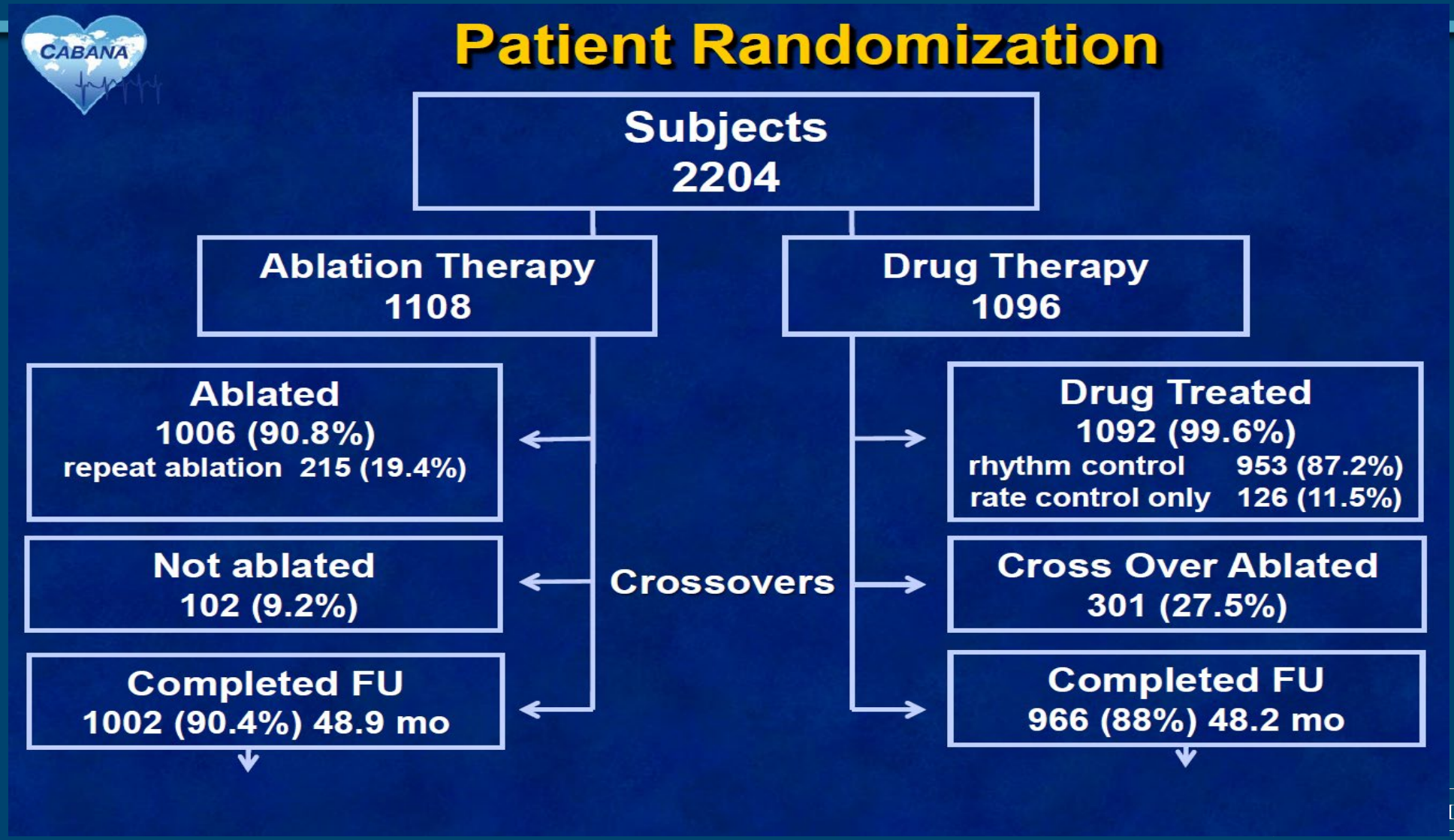
CABANA Study: AF ablation vs drug therapy



Packer et al, JAMA. 2019;321:1261-1274

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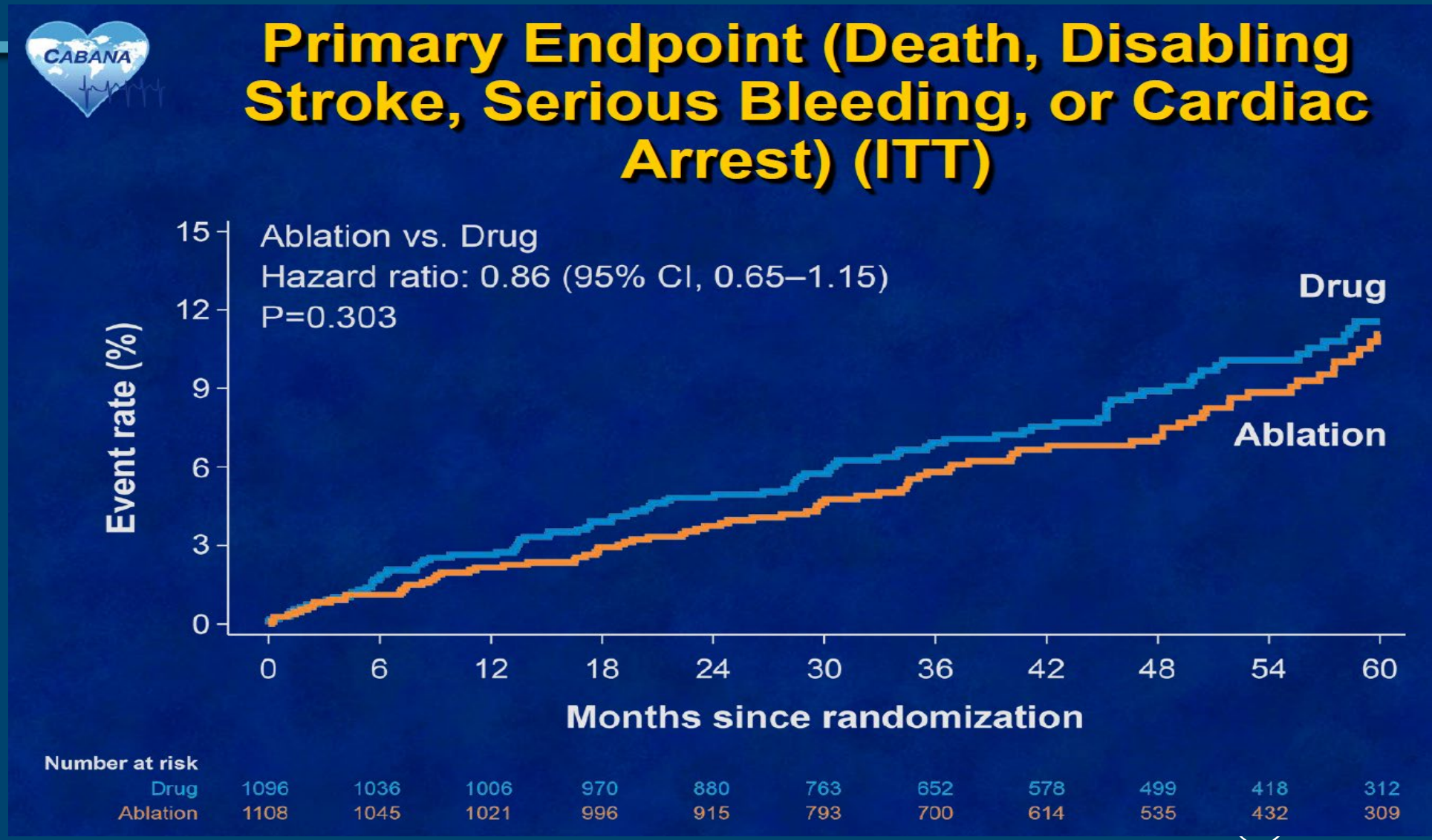

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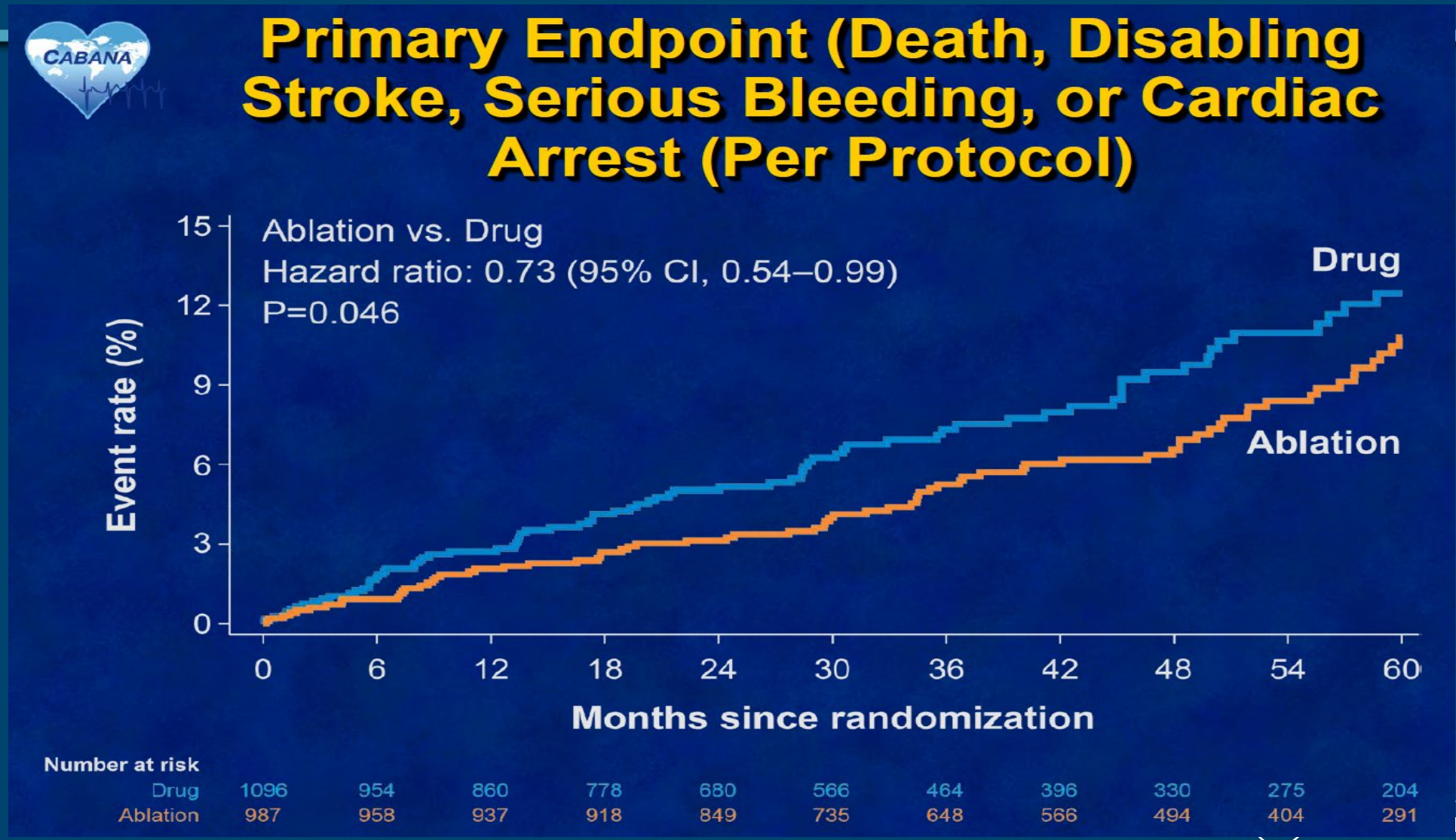

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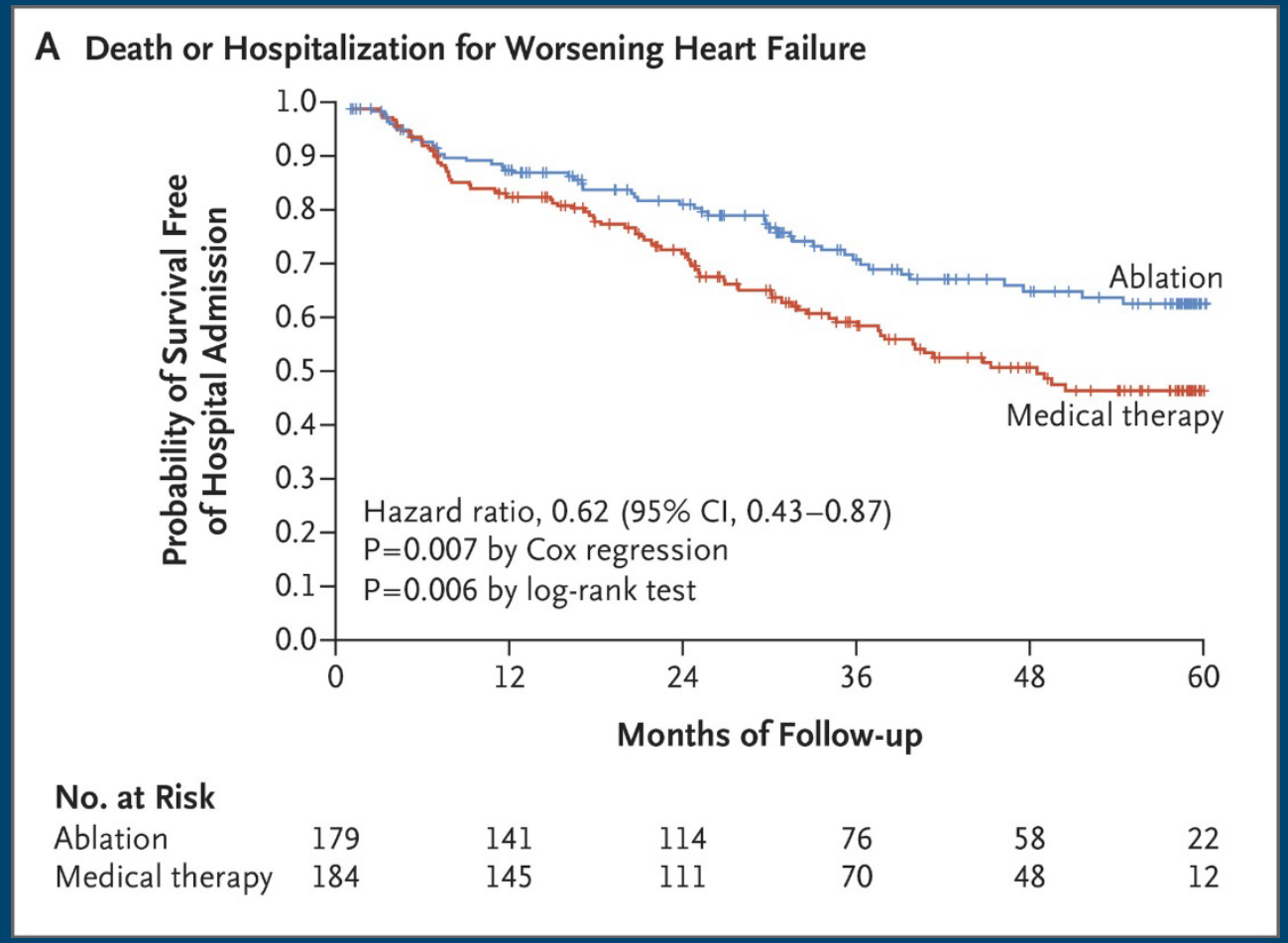
AF and CHF

Is There Benefit to AF Ablation?

CASTLE-AF

AF Ablation vs Medical Therapy in AF with CHF (EF≤35%)



Marrouche et al, NEJM 2018;378:417-27

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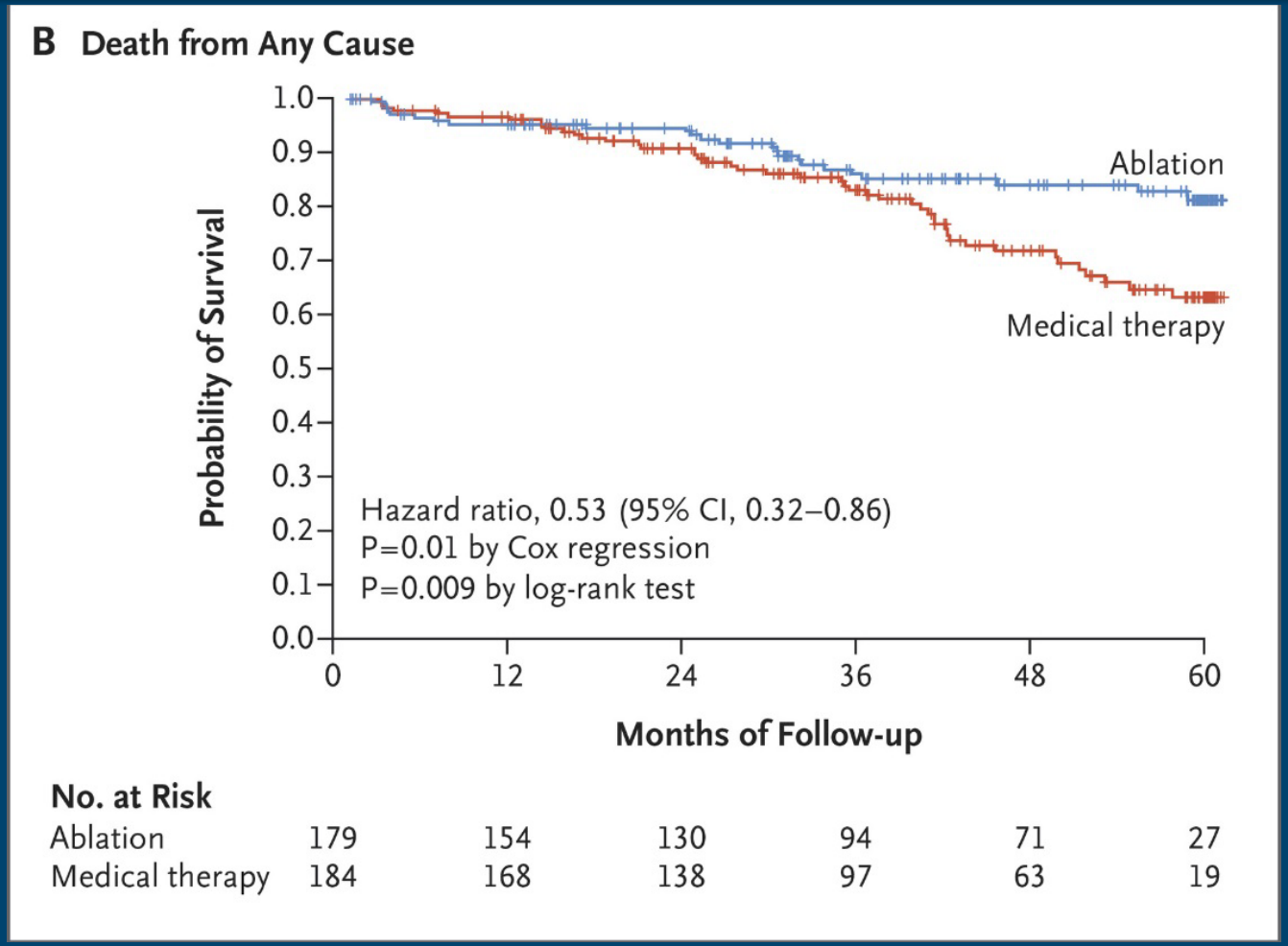
CASTLE-AF

AF Ablation vs Medical Therapy in AF with CHF (EF≤35%)



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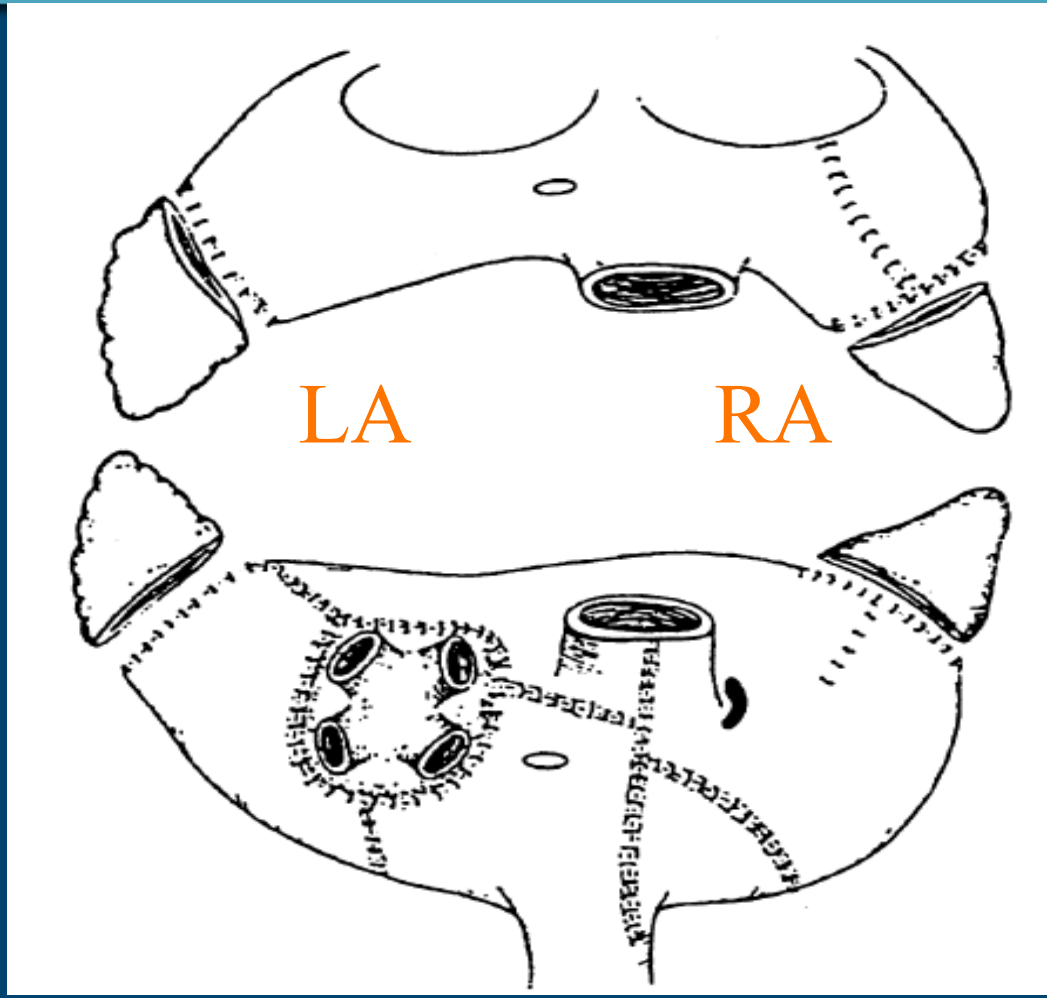
Surgical Approaches to AF



Cannom AJC 2000;85:25D

FAST Study:
Catheter or Surgical Ablation for AF

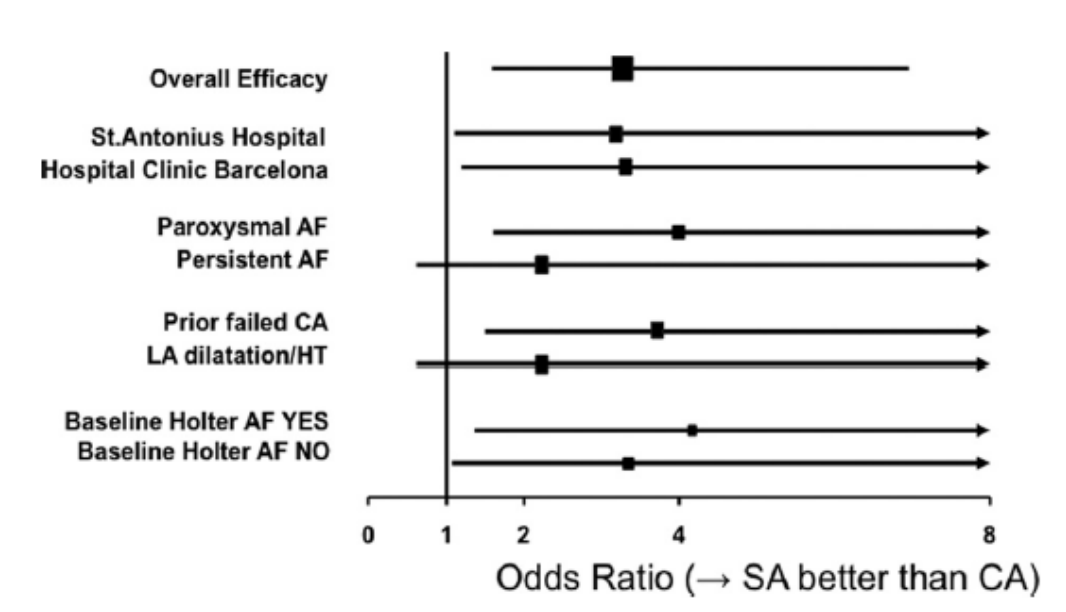


Table 4. Procedural Adverse Events of CA and SA

Adverse Events	CA N=63	SA N=61	*P*-Value
Pericardial effusion/tamponade	1	1	
TIA/Stroke	1	1	
Pneumothorax	. . .	6	
Hematothorax	. . .	1	
Rib fracture	. . .	1	
Sternotomy for bleeding	. . .	1	
Pneumonia	. . .	1	
Death	. . .	. . .	
PM implant	. . .	2	
Total	2 (3.2%)	14 (23.0%)	*P*=0.001
Minor			
Groin hematoma/bleed	4 (6.3%)	. . .	

Catheter Ablation: radiofrequency PVI (additional ablation lines at operator discretion)

Surgical Ablation: VATS approach, radiofrequency PVI + LA ganglionated plexus ablation + LAA excision (additional ablation lines at operator discretion)

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Boersma et al, Circ 2012;125:23-30

FAST Study:
Catheter or Surgical Ablation for AF

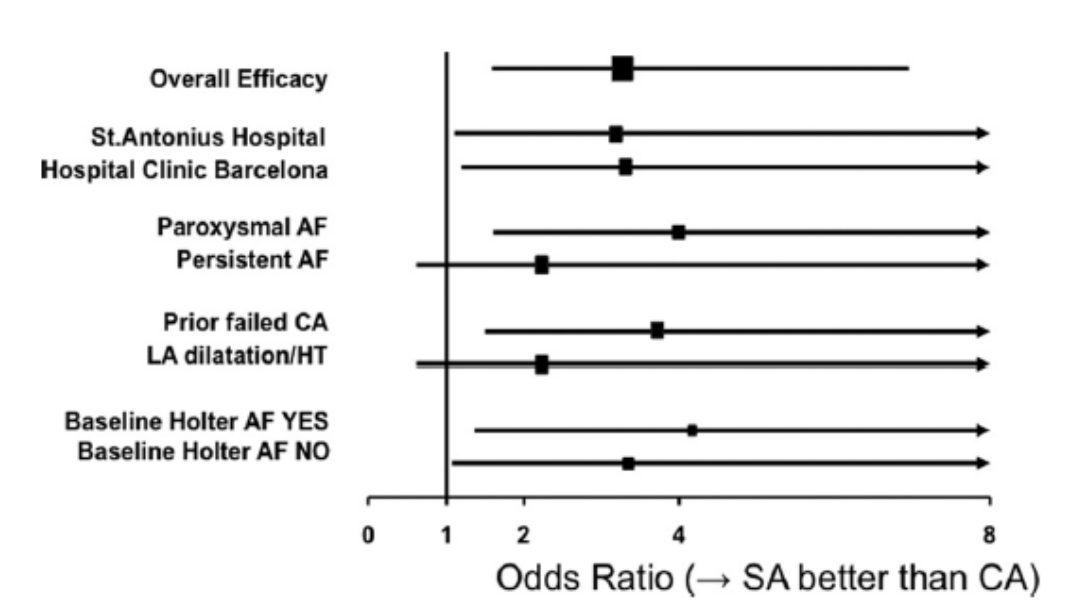

Table 4. Procedural Adverse Events of CA and SA

Adverse Events	CA N=63	SA N=61	*P*-Value
Pericardial effusion/tamponade	1	1	
TIA/Stroke	1	1	
Pneumothorax	. . .	6	
Hematothorax	. . .	1	
Rib fracture	. . .	1	
Sternotomy for bleeding	. . .	1	
Pneumonia	. . .	1	
Death	. . .	. . .	
PM implant	. . .	2	
Total	2 (3.2%)	14 (23.0%)	*P*=0.001
Minor			
Groin hematoma/bleed	4 (6.3%)	. . .	

Catheter Ablation: radiofrequency PVI (additional ablation lines at operator discretion)

Surgical Ablation: VATS approach, radiofrequency PVI + LA ganglionated plexus ablation + LAA excision (additional ablation lines at operator discretion)

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Boersma et al, Circ 2012;125:23-30

Conclusion Regarding AF Ablation

- AF catheter ablation is more effective than antiarrhythmic drugs, but is not a guarantee of no AF
- Tools and strategies for AF ablation are evolving
- AF ablation may particularly benefit CHF patients
- Surgical AF ablation (Maze) appears more effective and more risky than catheter AF ablation

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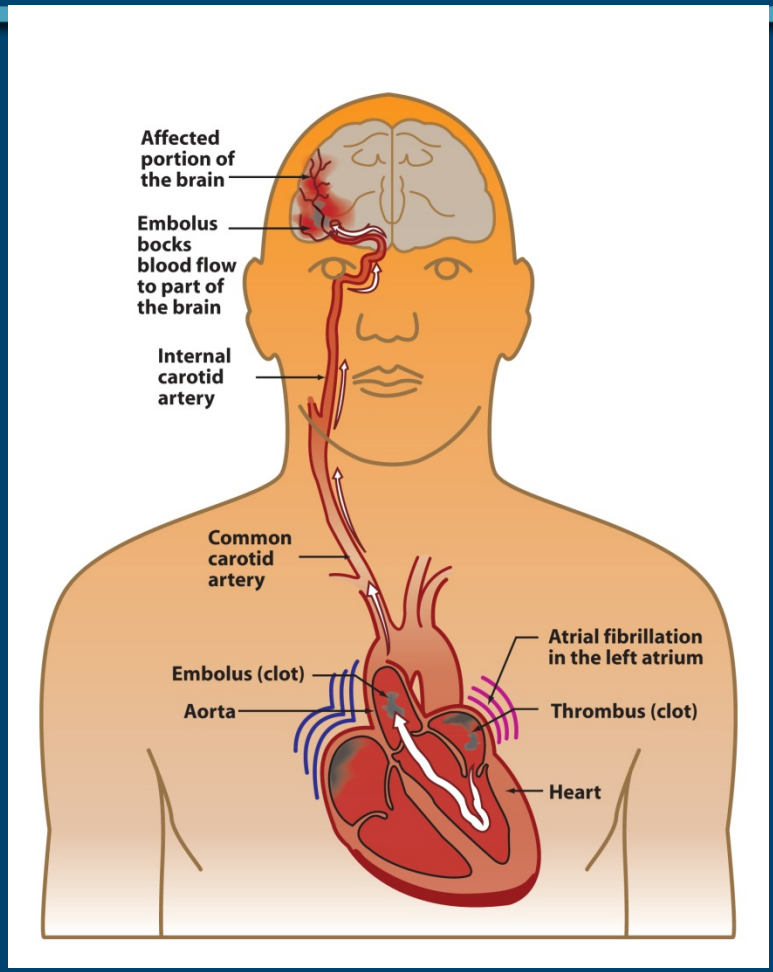
Stroke Prevention in Atrial Fibrillation

Stroke Is One of the Most Common and Devastating Complications of AF

- All-cause stroke rate with AF is 5% per year
- AF - independent risk factor for stroke
  - ~5-fold increase in stroke risk
  - ~15% of all strokes caused by AF
  - Stroke risk increases with age
- Stroke risk persists in asymptomatic AF



Fuster V, et al. *Circulation.* 2006;114:e257-e354.
Wolf PA, et al. *Stroke*. 1991;22:983-988.
Page RL, et al. *Circulation.* 2003;107:1141-1145.
Hart RG, et al. *J Am Coll Cardiol*. 2000;35:183-187.

Stroke Risk Without Anticoagulation: $CHADS_2$ and $CHADS_2$-VASc

Definition and Scores for $CHADS_2$ and CHA_2DS_2-VASc

	Score
$CHADS_2$	
Congestive HF	1
Hypertension	1
Age ≥75 y	1
Diabetes mellitus	1
Stroke/TIA/TE	2
Maximum score	6
CHA_2DS_2-VASc	
Congestive HF	1
Hypertension	1
Age ≥75 y	2
Diabetes mellitus	1
Stroke/TIA/TE	2
Vascular disease (prior MI, PAD, or aortic plaque)	1
Age 65–74 y	1
Sex category (i.e., female sex)	1
Maximum score	9

Stroke Risk Stratification With the $CHADS_2$ and CHA_2DS_2-VASc Scores

	Adjusted Stroke Rate (% per y)
$CHADS_2$*	
0	1.9
1	2.8
2	4.0
3	5.9
4	8.5
5	12.5
6	18.2
CHA_2DS_2-VASc†	
0	0
1	1.3
2	2.2
3	3.2
4	4.0
5	6.7
6	9.8
7	9.6
8	6.7
9	15.20

January et al, JACC 2014;64:e1-76.

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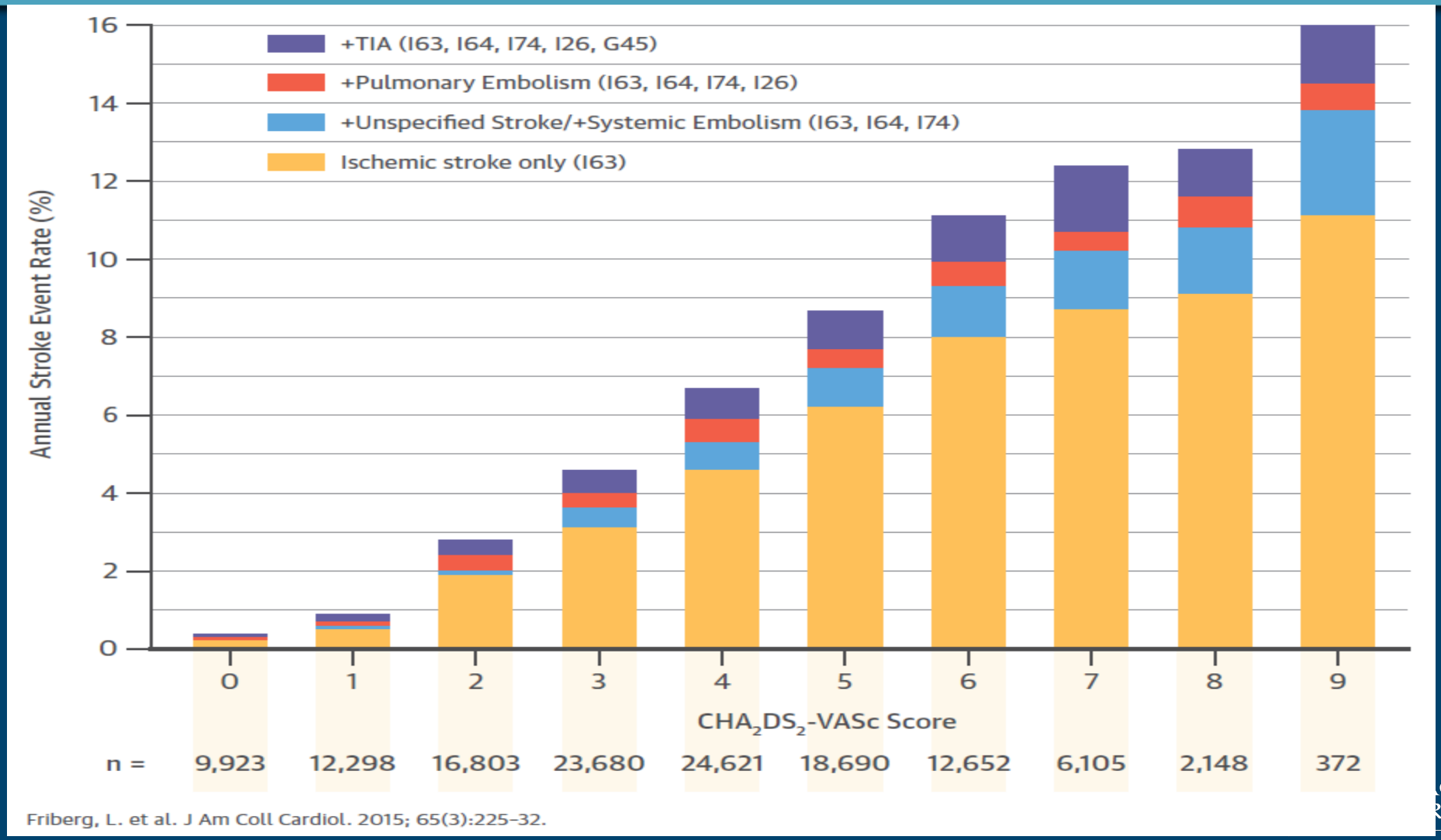
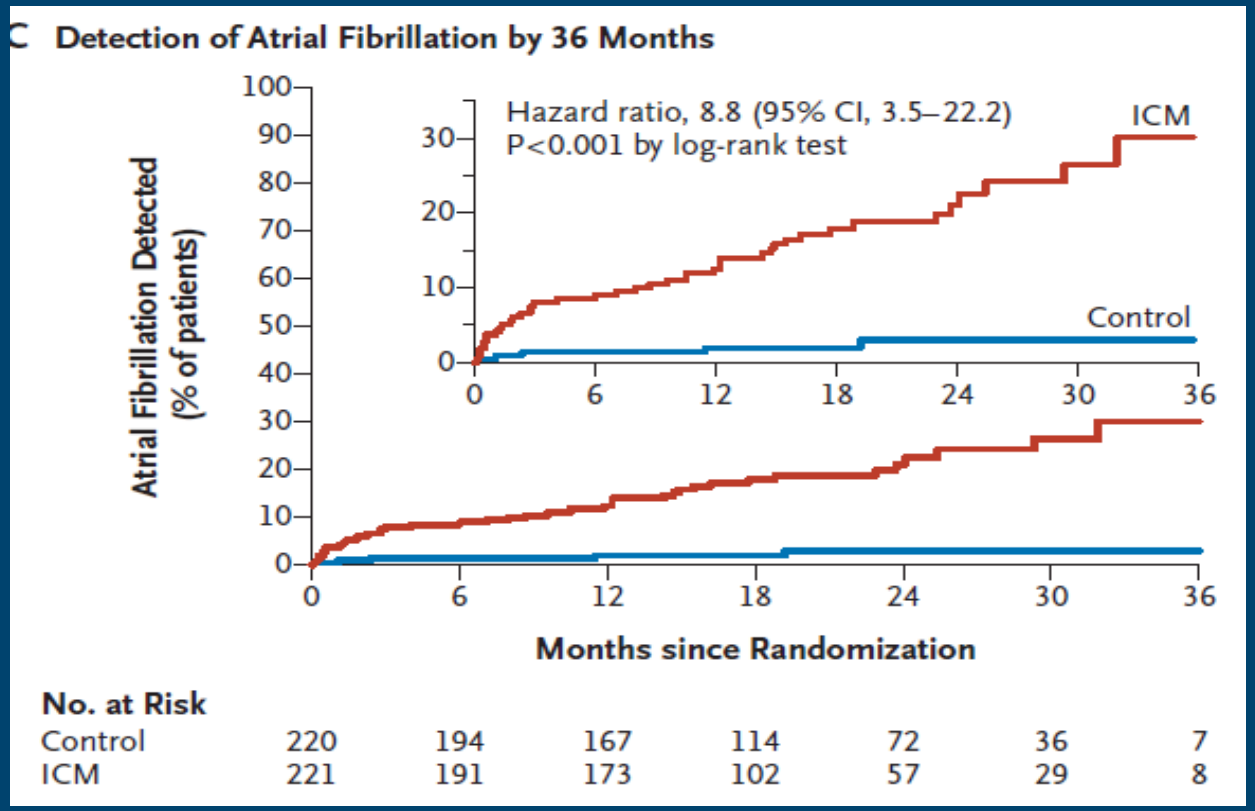
Stroke Risk Without Anticoagulation: $CHADS_2$-VASc



Friberg, L. et al. J Am Coll Cardiol. 2015; 65(3):225–32.

CRYSTAL AF Study
Detection of AF in cryptogenic stroke

- 441 patients age ≥ 40 with cryptogenic stroke
  - No h/o AF and no AF on 24+ hour EKG monitor
  - Randomized to implantable cardiac monitor or usual care



Sanna et al, NEJM 2014;370:2478-86

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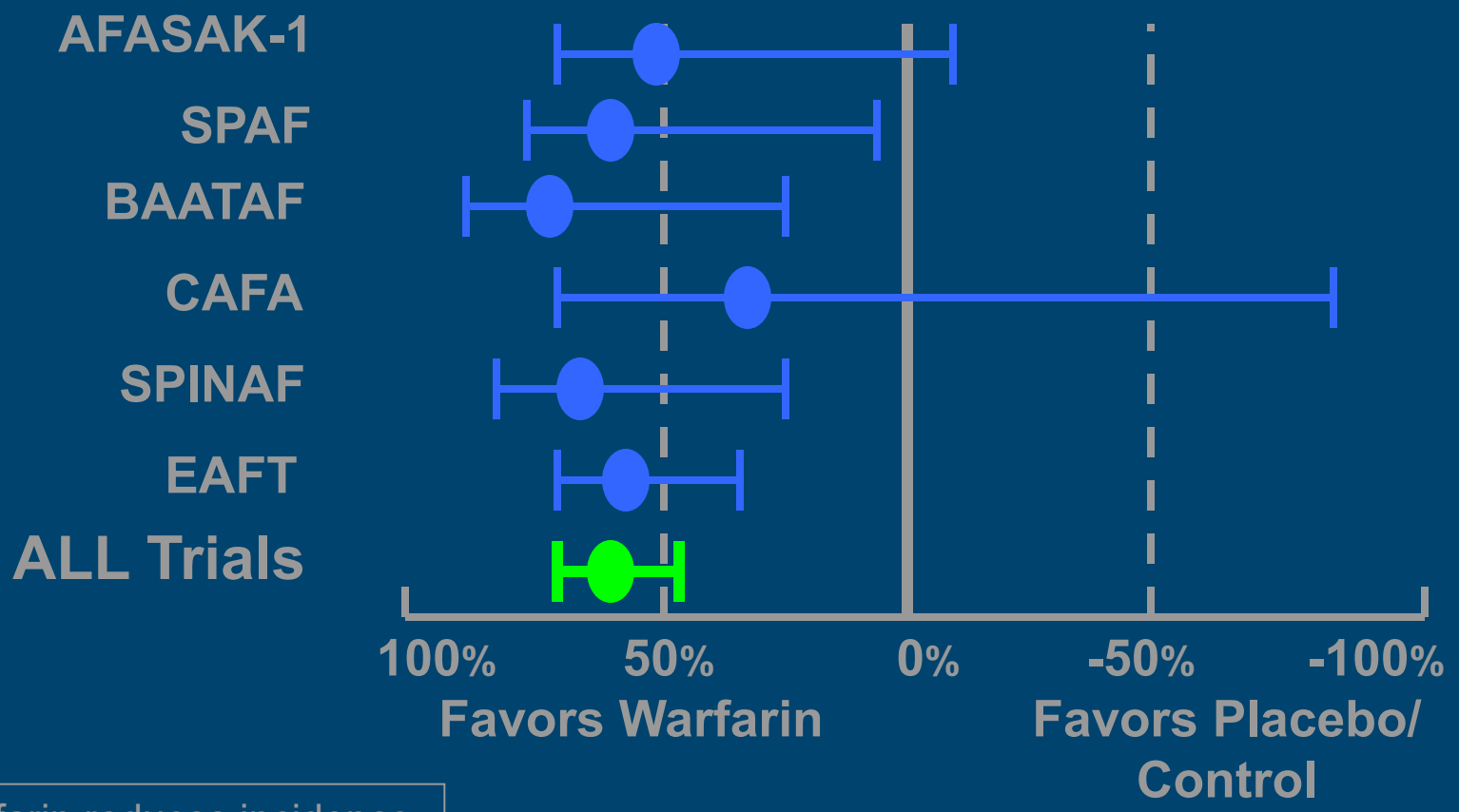
Anticoagulation and Antiplatelet Therapy

Warfarin vs Placebo in Stroke Prevention in AF



Warfarin reduces incidence of stroke by about 64%

Hart R, et al. *Ann Intern Med*. 2007;146:857-867.

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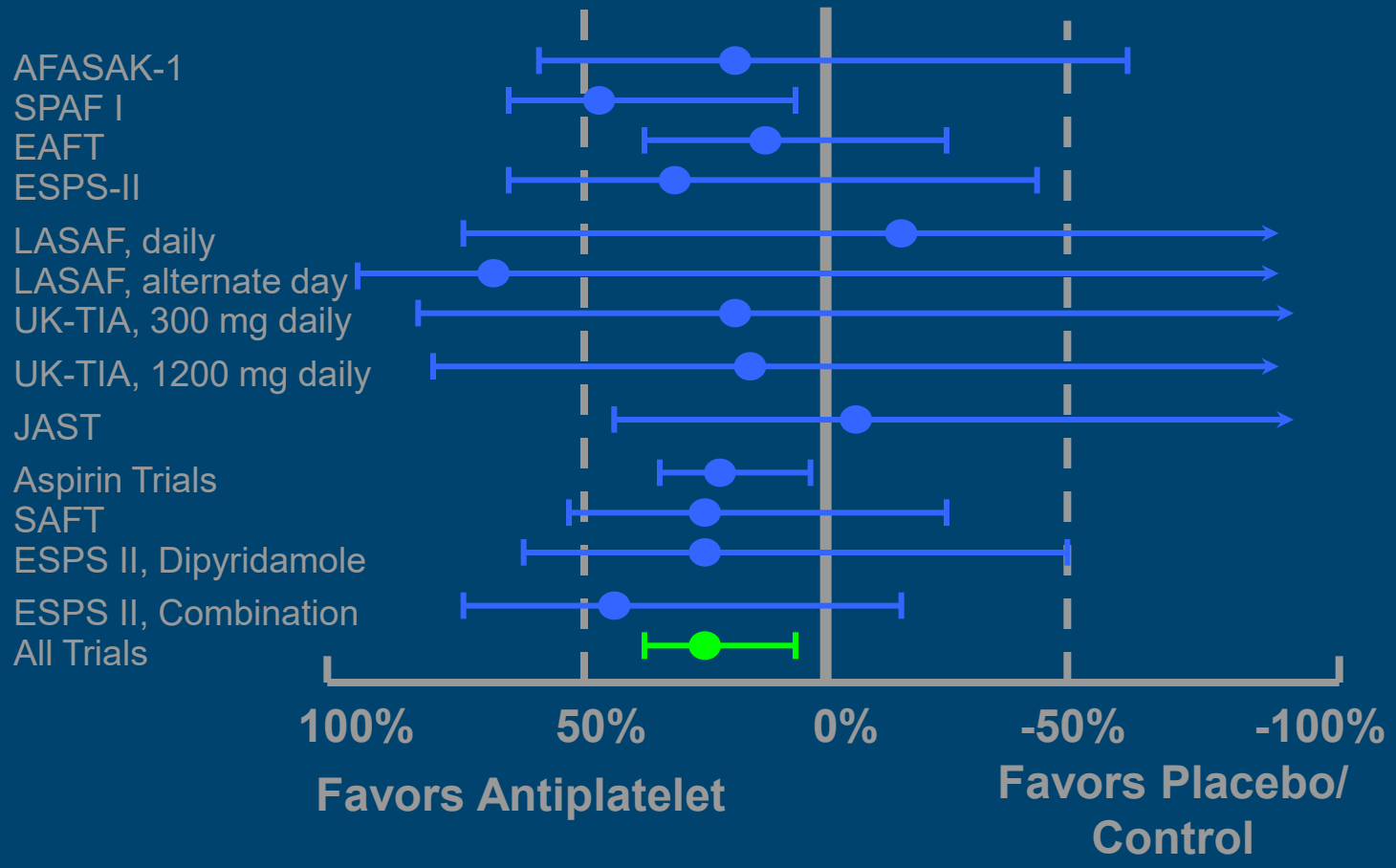
Aspirin vs Placebo in Stroke Prevention in AF



Antiplatelet therapy reduces incidence of stroke by about 22%

Hart R, et al. *Ann Intern Med*. 2007;146:857-867.

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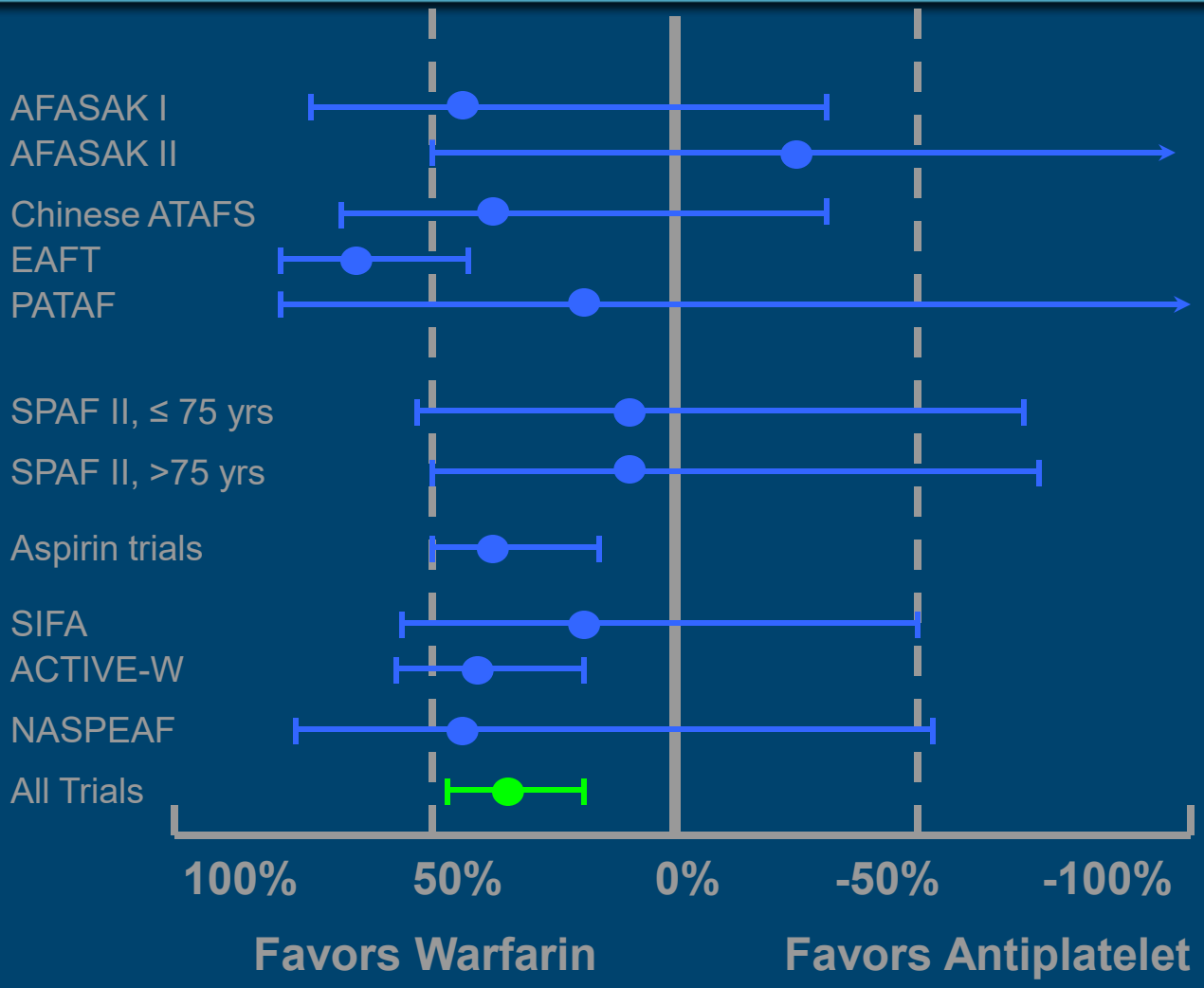
Warfarin vs Antiplatelet Therapy in Stroke Prevention in AF



Hart R, et al. *Ann Intern Med*. 2007;146:857-867.

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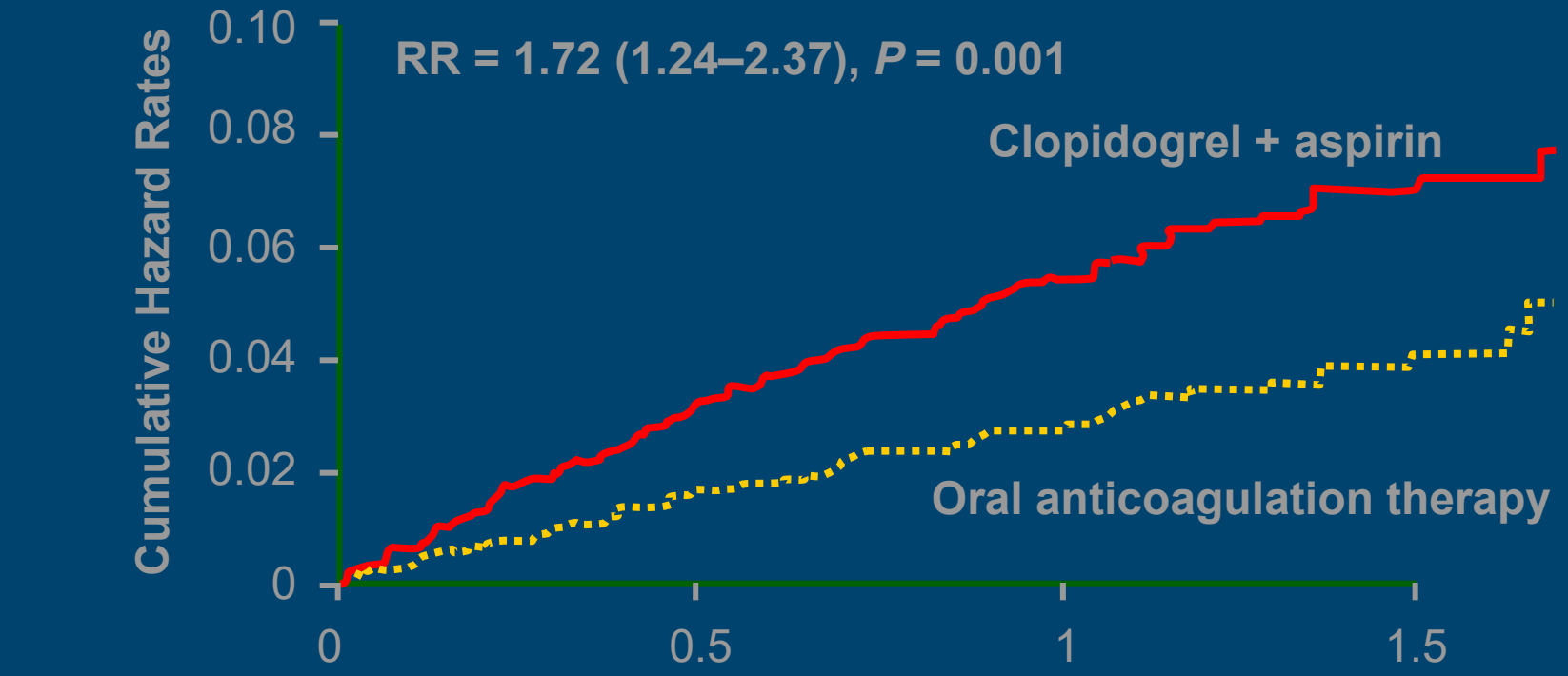
ACTIVE* W: Cumulative Risk of Stroke



Number at risk

Clopidogrel + aspirin	3335	3168	2419	941
Oral anti-coagulation therapy	3371	3232	2466	930

Primary outcome: stroke, systemic embolus, MI, vascular death.

Connolly et al. *Lancet*. 2006;367:1903-1912.

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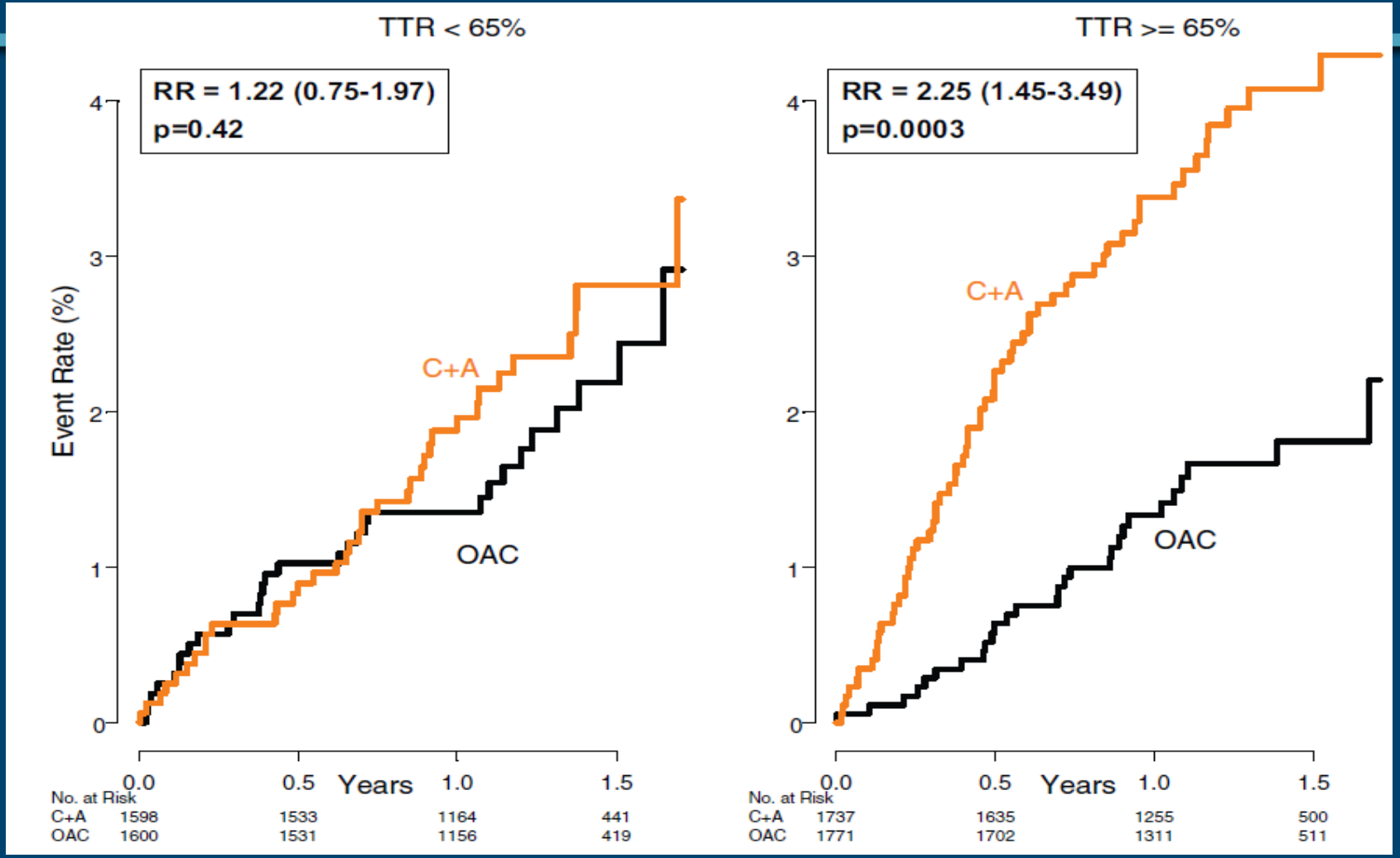
Importance of Time within Therapeutic Range

Patients Treated at Centers with TTR Below or Above 65%



C+A: clopidogrel plus aspirin; OAC: oral anticoagulation therapy
RR: relative risk of stroke C+A vs OAC

Connolly S, et al. *Circulation*. 2008;118:2029-2037.

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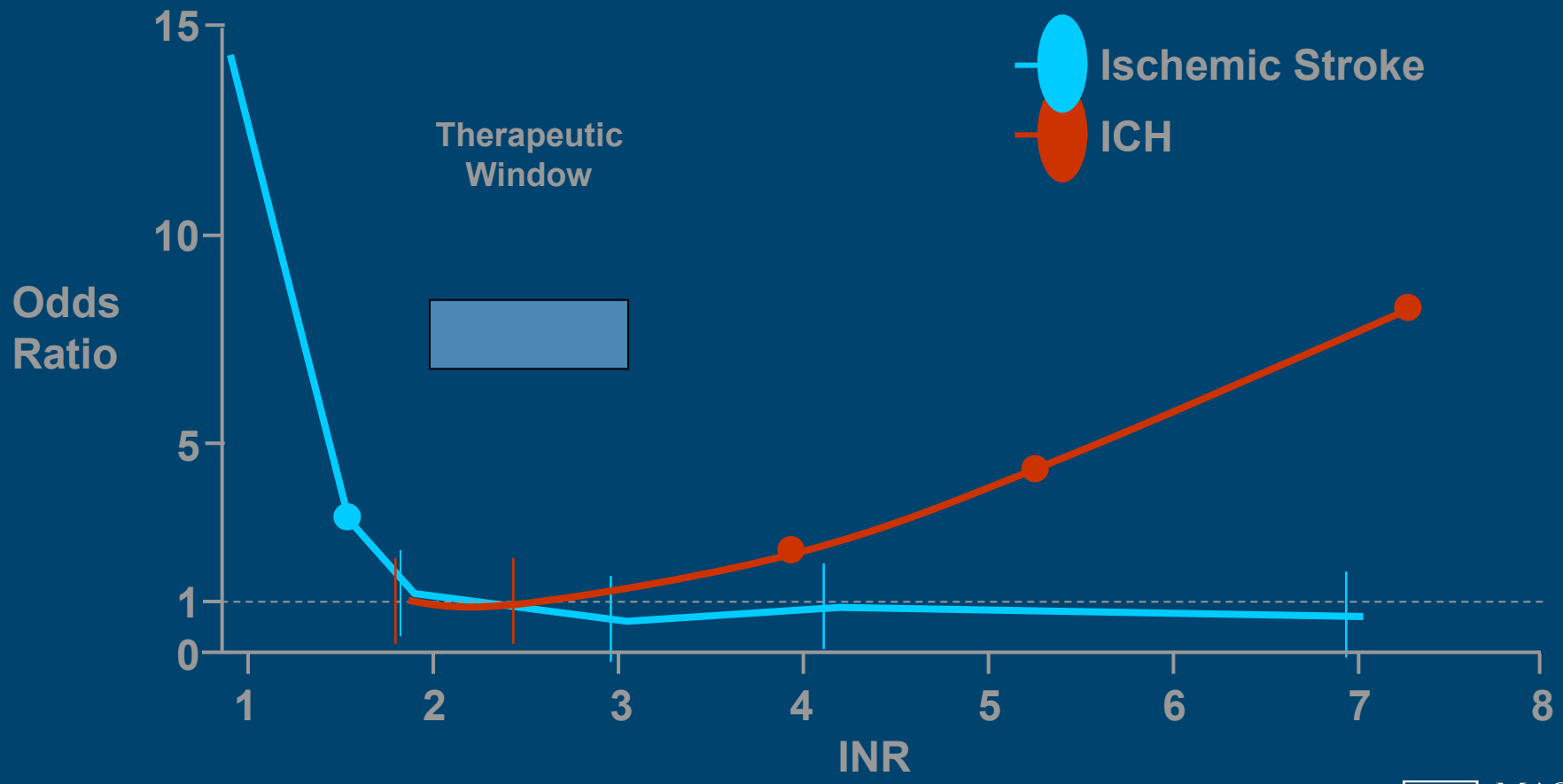
Warfarin Has a Narrow Therapeutic Window

Relationship Between Clinical Events and INR Intensity in Patients with Atrial Fibrillation



Hylek EM, et al. *Ann Intern Med.* 1994;120:897-902.

Hylek EM, et al. *N Engl J Med.* 1996;335:540-546.

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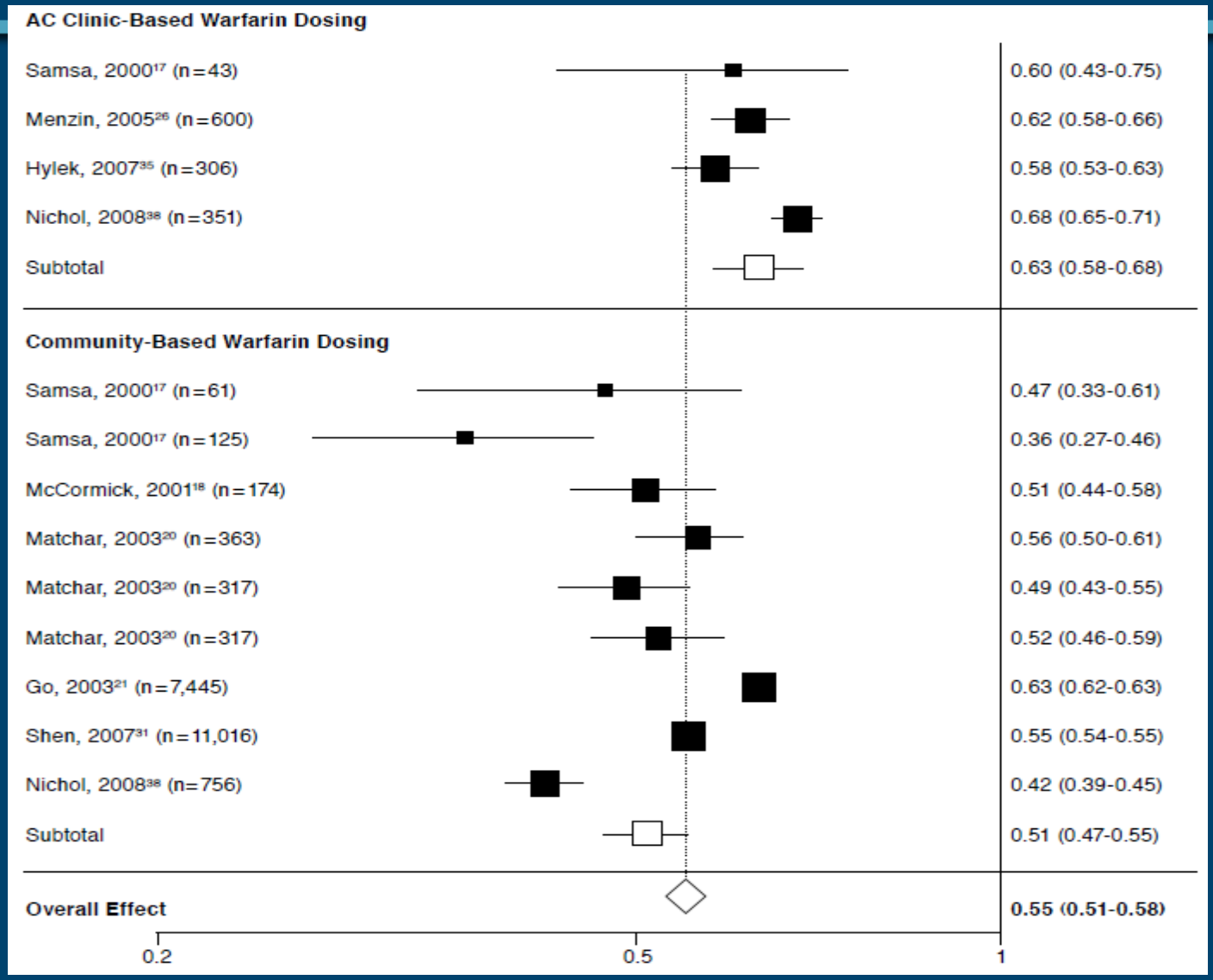
Atrial Fibrillation Patients – 55%-63% of Their Time in Therapeutic INR Range



Baker W, et al. *J Manag Care Pharm*. 2009;15:244-252.

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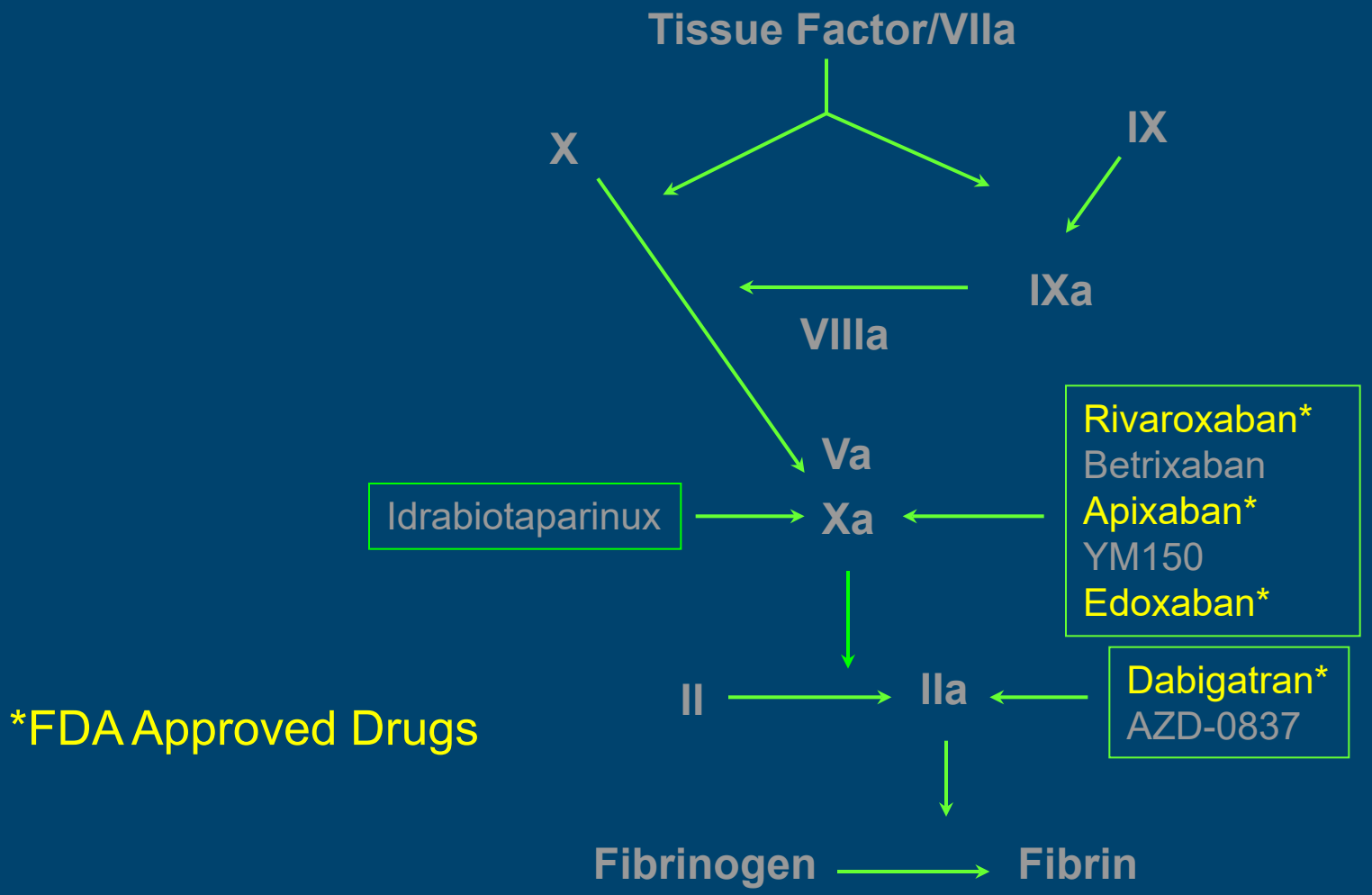
An Ideal Anticoagulant

Desired Characteristic	Practical Advantage
Rapid onset of action	No need for overlap with heparin
Wide therapeutic index	Increased safety
Minimal side effects	Improved compliance; less monitoring
Oral formulation	Convenient administration
Predictable anticoagulant response	Fixed-dose unmonitored treatment
No food or drug interaction	No need for monitoring
Availability of antidote	Able to reverse in case of bleeding or urgent surgery
Cost effective	Accessibility

Sobieraj-Teague M, et al. *Semin Thromb Hemost*. 2009;35:515-524.

Emerging Therapies

Factor Xa Inhibitors and Direct Thrombin Inhibitors



*FDA Approved Drugs

Harenberg J. *Semin Thromb Hemost*. 2009;35:574-586.

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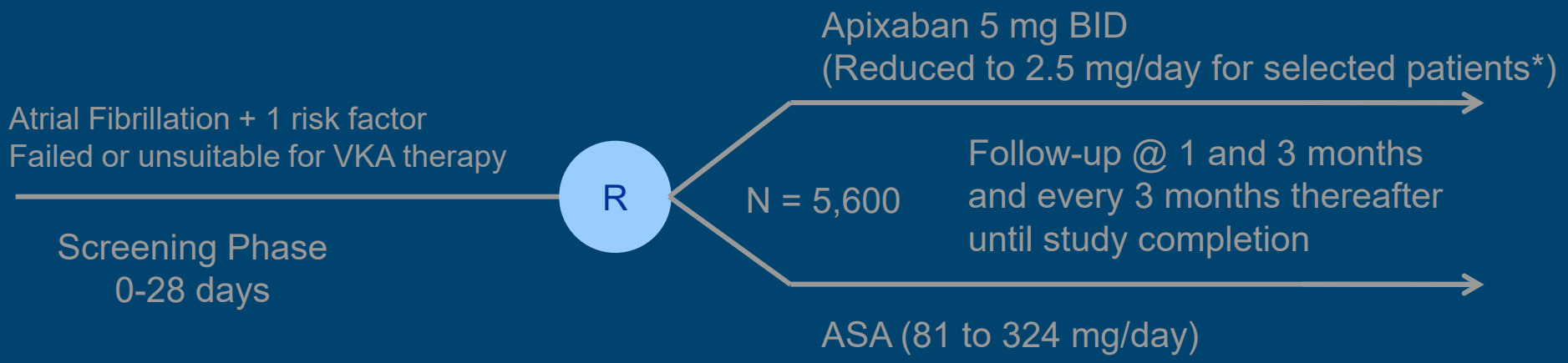
Apixaban vs Aspirin– AVERROES



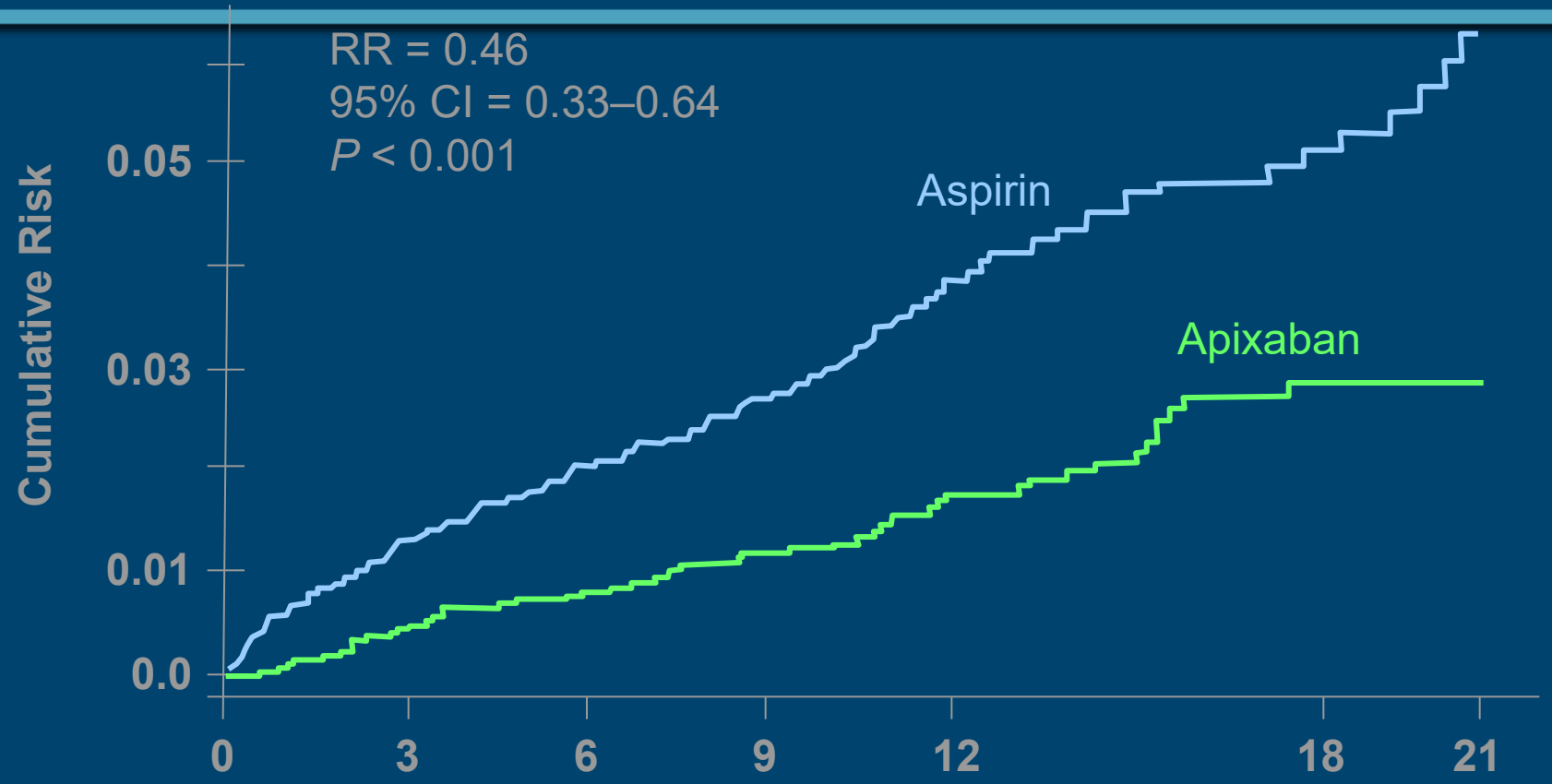
*Patients with ≥ 2 of the following:

- Age ≥ 80 yrs
- Body weight ≤ 60 kg
- Serum creatinine ≥ 1.5 mg/dL or 133 µmol/L

Primary efficacy outcome: stroke or systemic embolism
Primary safety outcome: major bleeds
Other outcomes: myocardial infarction, vascular death, all-cause death

NCT00496769. http://www.clinicaltrials.gov/ct2/show/NCT00496769. Accessed Sept 2010.

Apixaban – AVERROES
Stroke or Systemic Embolic Event



No. at Risk							
ASA	2791	2720	2541	2124	1541	626	329
Apix	2809	2761	2567	2127	1523	617	353

Connolly S, et al. http://www.escardio.org/congresses/esc-2010/congress-reports/Pages/708-3-AVERROES.aspx. Accessed Sept 2010.

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Apixaban – AVERROES

Outcome	Apixaban (n = 2809)	Aspirin (n = 2791)	Relative Risk (95% CI)	*P* value
Stroke or systemic embolic event	1.6	3.6	0.46 (0.33-0.64)	< 0.001
Stroke, embolic event, MI, or vascular death	4.1	6.2	0.66 (0.53-0.83)	< 0.001
Major bleeding	1.4	1.2	1.14 (0.74-1.75)	0.56
Fatal bleeding	0.1	0.1	0.84 (0.26-2.75)	0.77
Intracranial bleeding	0.4	0.3	1.09 (0.50-2.39)	0.83

Connolly S, et al. http://www.escardio.org/congresses/esc-2010/congress-reports/Pages/708-3-AVERROES.aspx. Accessed Sept 2010.

Apixaban – AVERROES

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Fatal bleeding	0.1	0.1	0.84 (0.26-2.75)	0.77
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Efficacy (stroke prevention): Eliquis superior to Aspirin

Connolly S, et al. http://www.escardio.org/congresses/esc-2010/congress-reports/Pages/708-3-AVERROES.aspx. Accessed Sept 2010.

Apixaban – AVERROES

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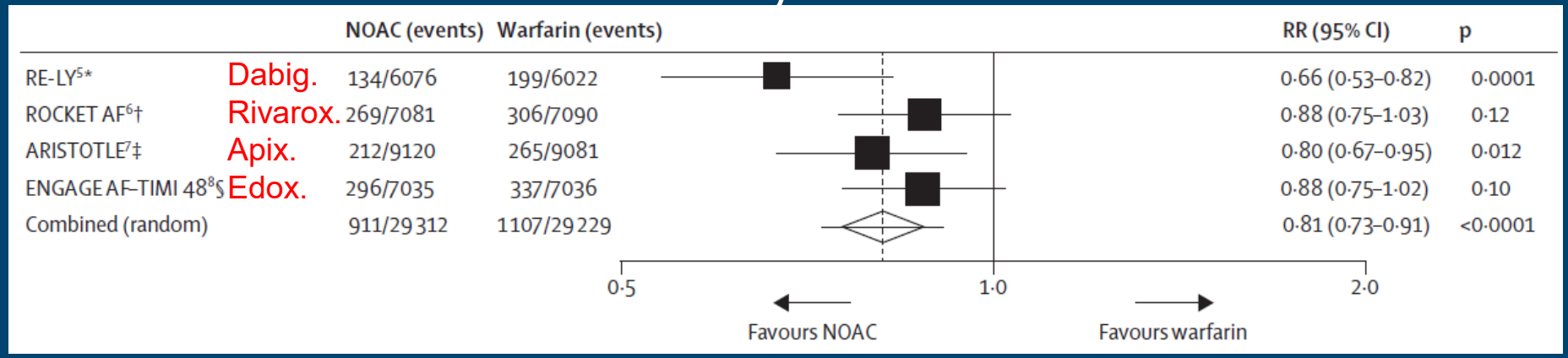
Fatal bleeding	0.1	0.1	0.84 (0.26-2.75)	0.77
Intracranial bleeding	0.4	0.3	1.09 (0.50-2.39)	0.83

Safety (bleeding): Eliquis similar to Aspirin

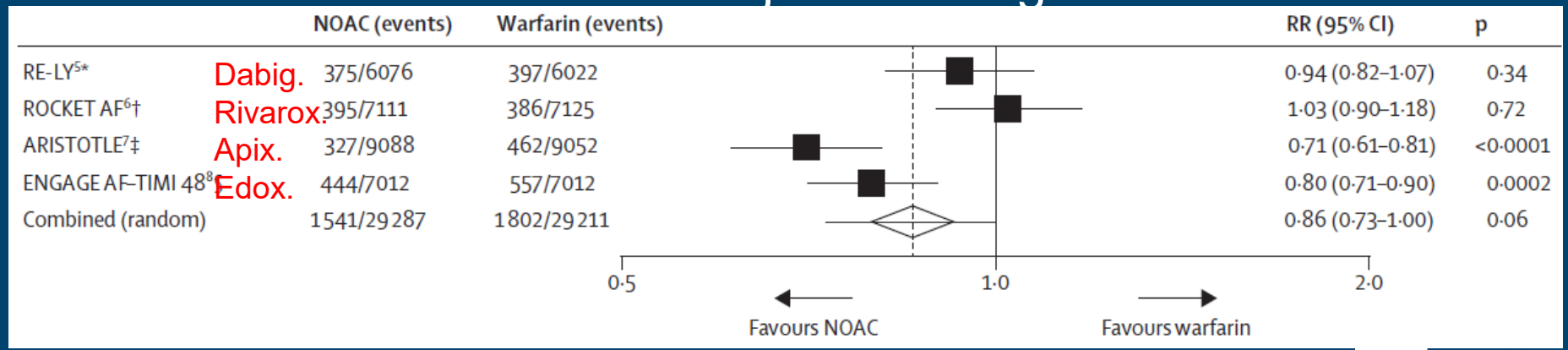
Connolly S, et al. http://www.escardio.org/congresses/esc-2010/congress-reports/Pages/708-3-AVERROES.aspx. Accessed Sept 2010.

Meta-Analysis: DOACs vs. Warfarin

Stroke or Systemic Embolism



Major Bleeding



Ruff et al, Lancet 2014;383:955-62

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DOACs vs Warfarin and All Cause Mortality

Drug	Dose	Hazard Ratio (all cause death)	P value (vs. warfarin)
Dabigatran*	High Dose (150 mg bid)	0.88	0.051
	Low Dose* (110 mg bid)	0.91	0.13
Rivaroxaban	20 or 15 mg daily	0.92	0.15
Apixaban	5 or 2.5 mg bid	0.89	0.047
Edoxaban	High Dose (60 or 30 mg daily)	0.92	0.08
	Low Dose (30 or 15 mg daily)	0.87	0.006

*Dabigatran 110 mg is not an FDA approved dose for stroke prevention in AF

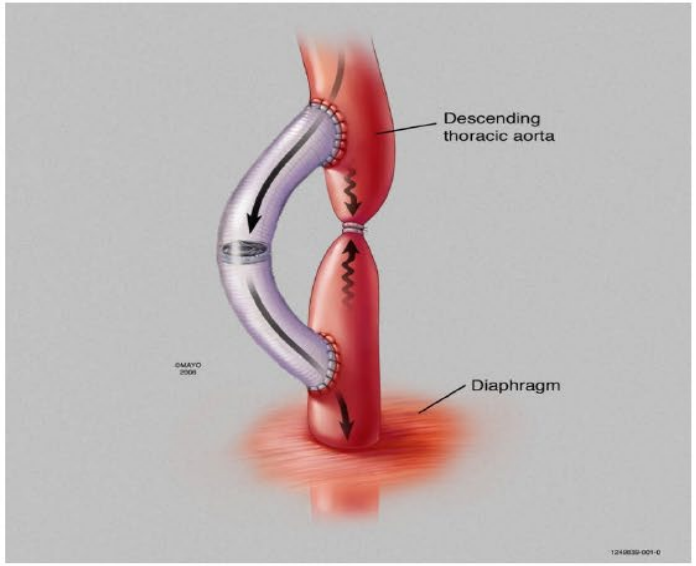
Approval for DOACs for Atrial Fibrillation

- To reduce risk of stroke for patients with non-valvular* atrial fibrillation
  - *Valvular atrial fibrillation: mechanical heart valve or moderate/severe mitral stenosis (biologic valve or any other valve problem = non-valvular AF)

Dabigatran for Mechanical Heart Valves

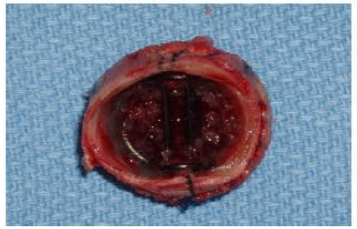
Preclinical studies with Dabigatran etexilate

Dabigatran is as effective as low-molecular weight heparin for mechanical valve thromboprophylaxis using a heterotopic aortic valve model in swine

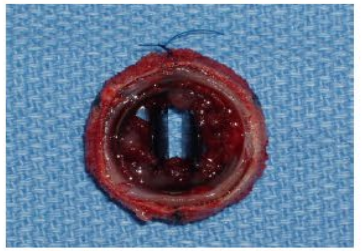


Heterotopic valve implantation in swine

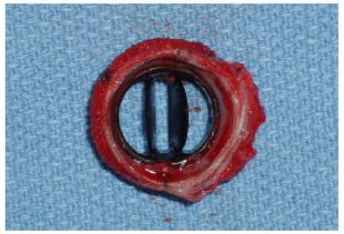
Representative valves



No therapy



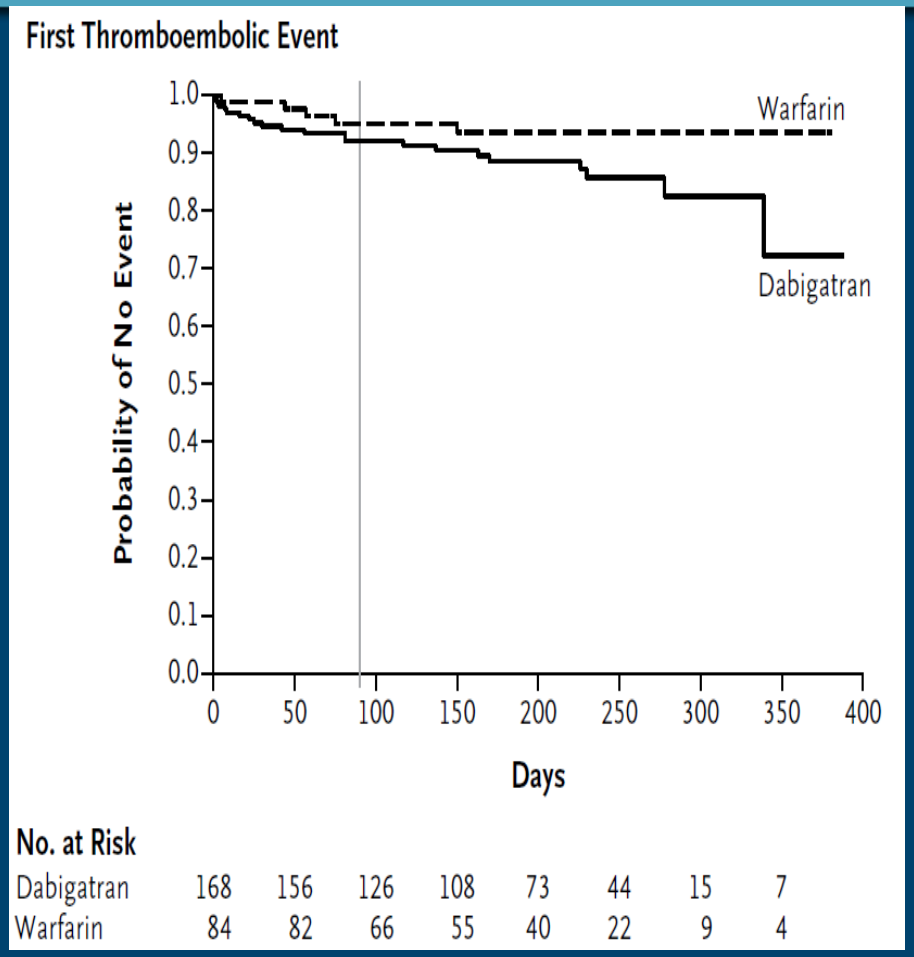
LMWH

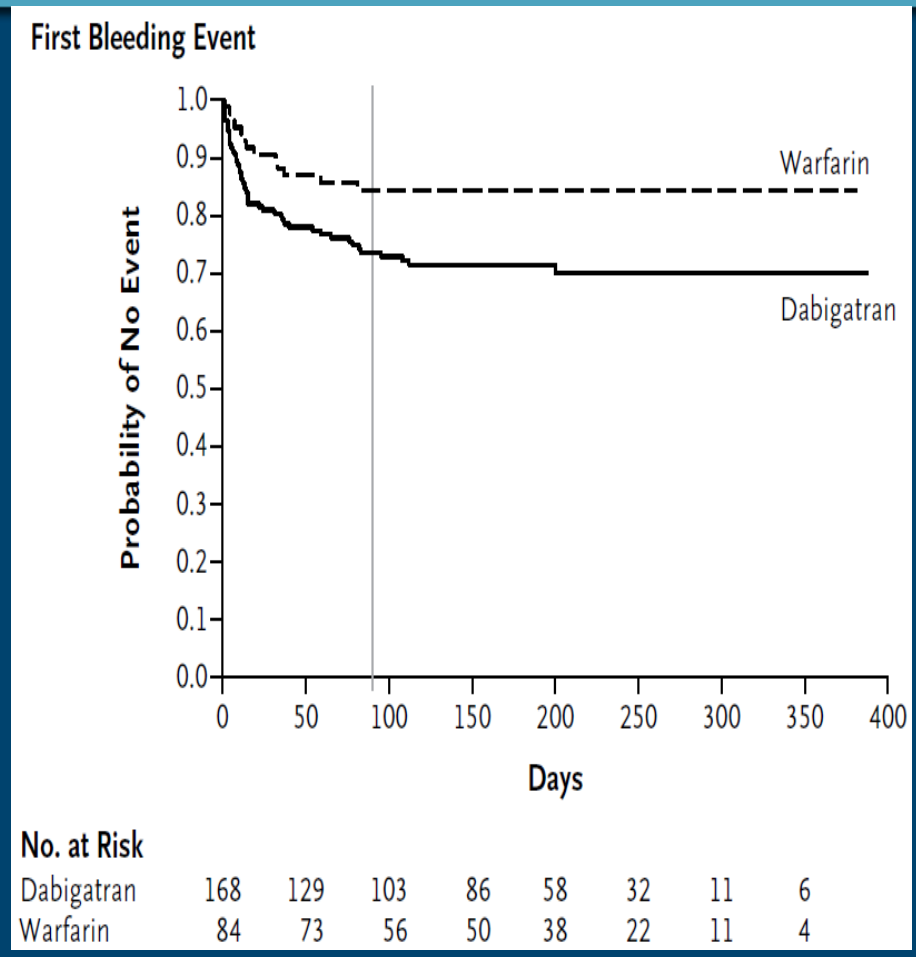


Dabigatran

McKellar et al. J Thorac Cardiovasc Surg 2011;141:1410-1416

Dabigatran for Mechanical Heart Valves: RE-ALIGN





Dabigatran for mechanical valve: more clots and more bleeding than warfarin

Eikelboom et al, NEJM 2013;369:1206-14

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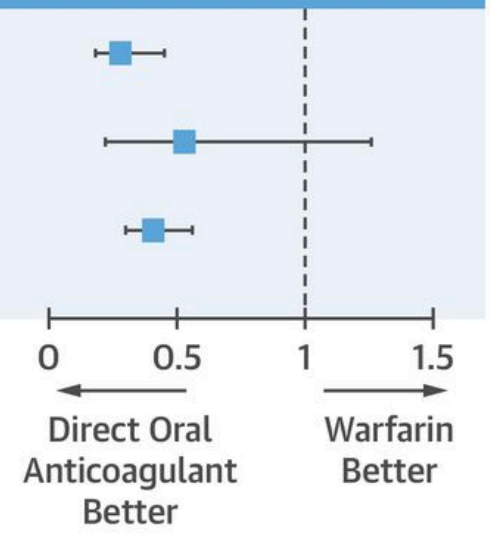
Outcomes of DOACs vs Warfarin for AF Patients with Mitral Stenosis (off-label use)

CENTRAL ILLUSTRATION: Mitral Stenosis and Atrial Fibrillation for Direct Oral Anticoagulant Versus Warfarin: Hazard Ratios

Direct Oral Anticoagulant Versus Warfarin	HR (95% CI)
Ischemic Stroke and Systemic Embolism	0.28 (0.18-0.45)
Intracranial Hemorrhage	0.53 (0.22-1.26)
All-Cause Death	0.41 (0.30-0.56)



Kim, J.Y. et al. J Am Coll Cardiol. 2019;73(10):1123-31.

-2230 propensity matched patients in Korea with AF and any degree of mitral stenosis (without MV surgery)
-Comparison of patients treated with warfarin vs DOAC

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Holding/Reversal of anticoagulation

-Holding anticoagulation for planned procedures

-Reversal of anticoagulation for emergent bleeding or procedures

Holding anticoagulation for planned procedures

- Does anticoagulation need to be held for the procedure?
  - Catheter ablation of AF and pacemaker/ICD implants can be safely performed with uninterrupted warfarin or DOAC
- How long should anticoagulation be held?
  - Warfarin: 5-7 days
  - DOACs: 2-3 days (possibly 4 days if renal impairment)
- Is “bridging” anticoagulation required?

Should we “bridge” anti-coagulation before surgery?

- Randomized 1884 patients holding warfarin for 5 days before surgery to dalteparin bridge or control

- Stroke/Embolism/TIA:
  - Dalteparin: 0.3%
  - Control: 0.4% (p=NS)

- Major Bleeding
  - Dalteparin: 3.2%
  - Control: 1.3% (p=0.005)

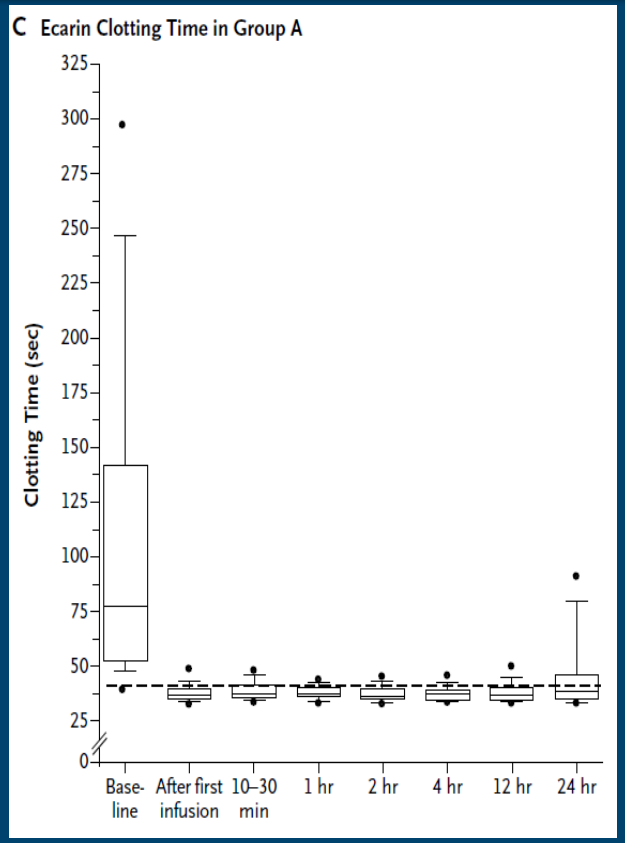
Douketis et al, NEJM: 2015;373:823-33

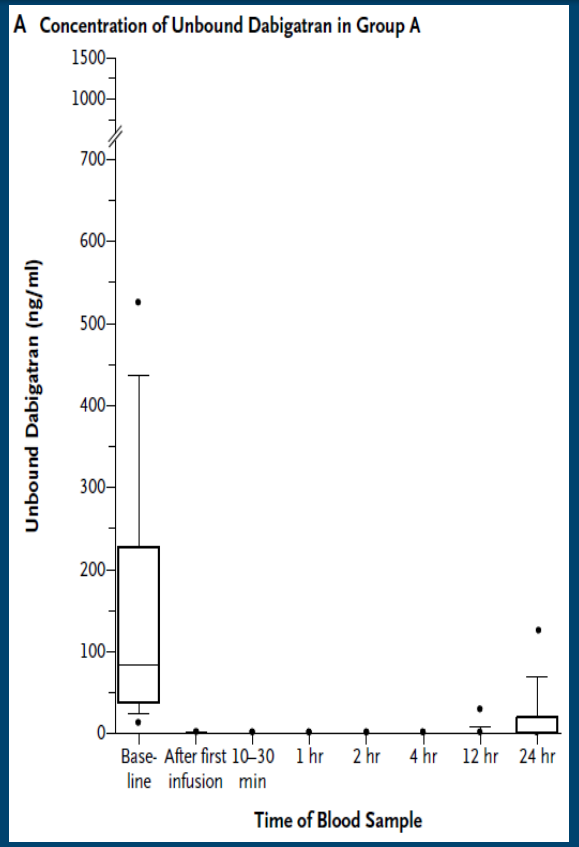
Reversal of warfarin

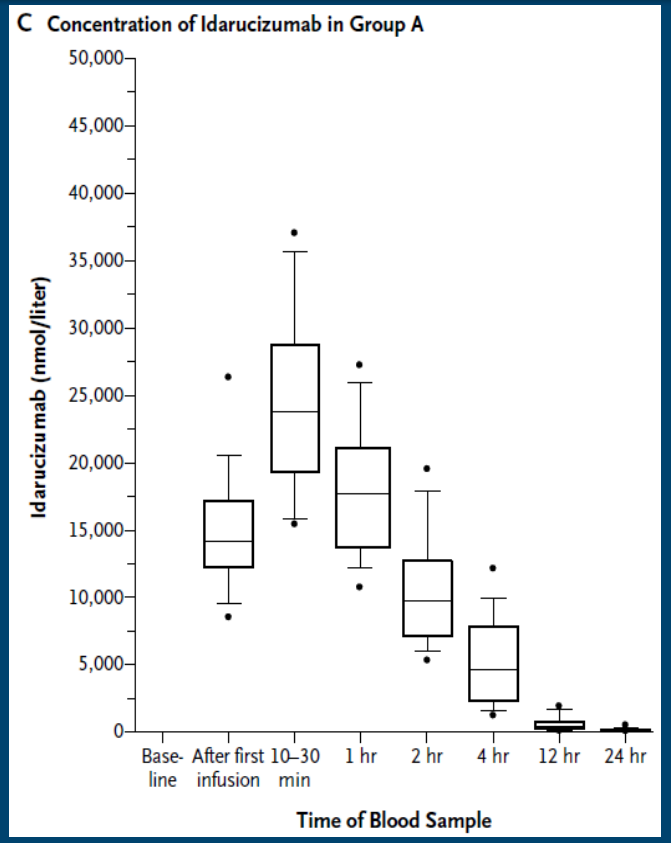
- Vitamin K (IV, SQ or PO): slow anticoagulation reversal (0.5-2 days)
  - Allows the body to synthesize clotting factors

- FFP (Fresh Frozen Plasma) or PCC (Prothrombin Complex Concentrate: Kcentra): rapid but temporary anticoagulation reversal
  - Repletes clotting factors

Idarucizumab (Praxbind) for reversal of dabigatran in patients with bleeding/urgent surgery on dabigatran







Dose: 5gm IV x1

FDA Approved: 10/16/2015

Pollack et al, NEJM 2015;373:511-20.

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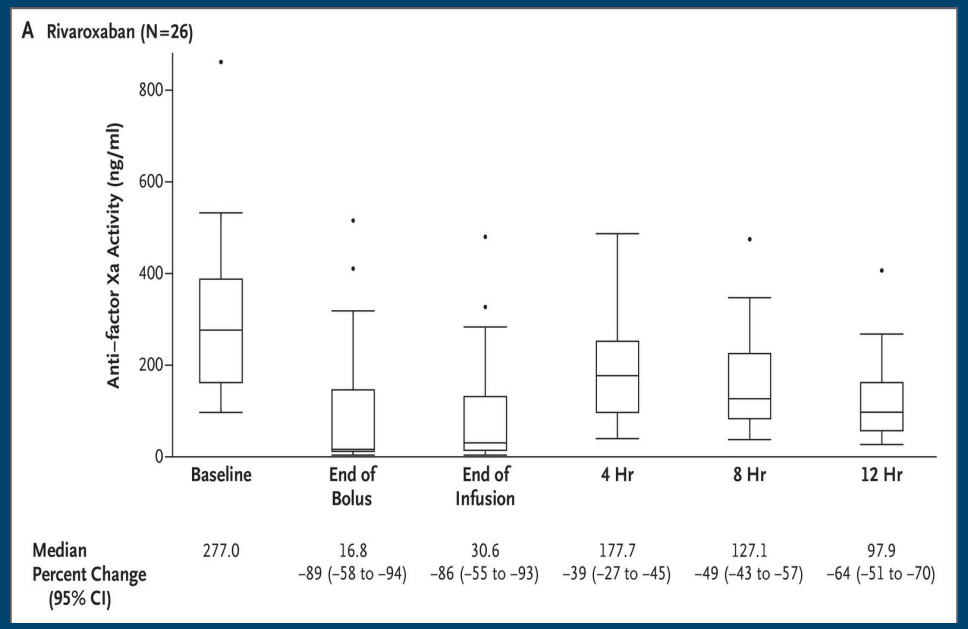
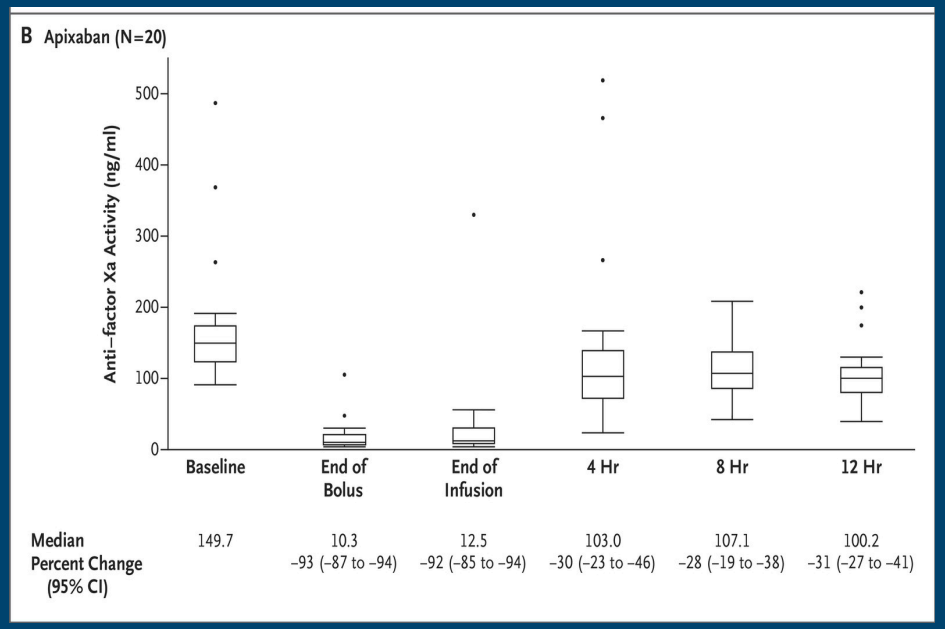
ANNEXA-4: Andexanet Alfa for reversal of Rivaroxaban and Apixaban in patients with bleeding within 18 hours of DOAC

Rivaroxaban Reversal



Apixaban Reversal



Dose: Bolus + 2 hour infusion for patients with bleeding within 18 hours of DOAC

FDA Approved: May 4, 2018

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Connolly SJ et al. N Engl J Med 2016;375:1131-1141

DOAC Reversal Agent in Development

- Ciraparantag* (PER977):
  - (small molecule, binds to anticoagulants)
  - Reversal agent for Direct Thrombin Inhibitors, Factor Xa inhibitors and LMWH

*Investigational agent, not FDA approved for clinical use

Clinical Challenges With New Anticoagulants

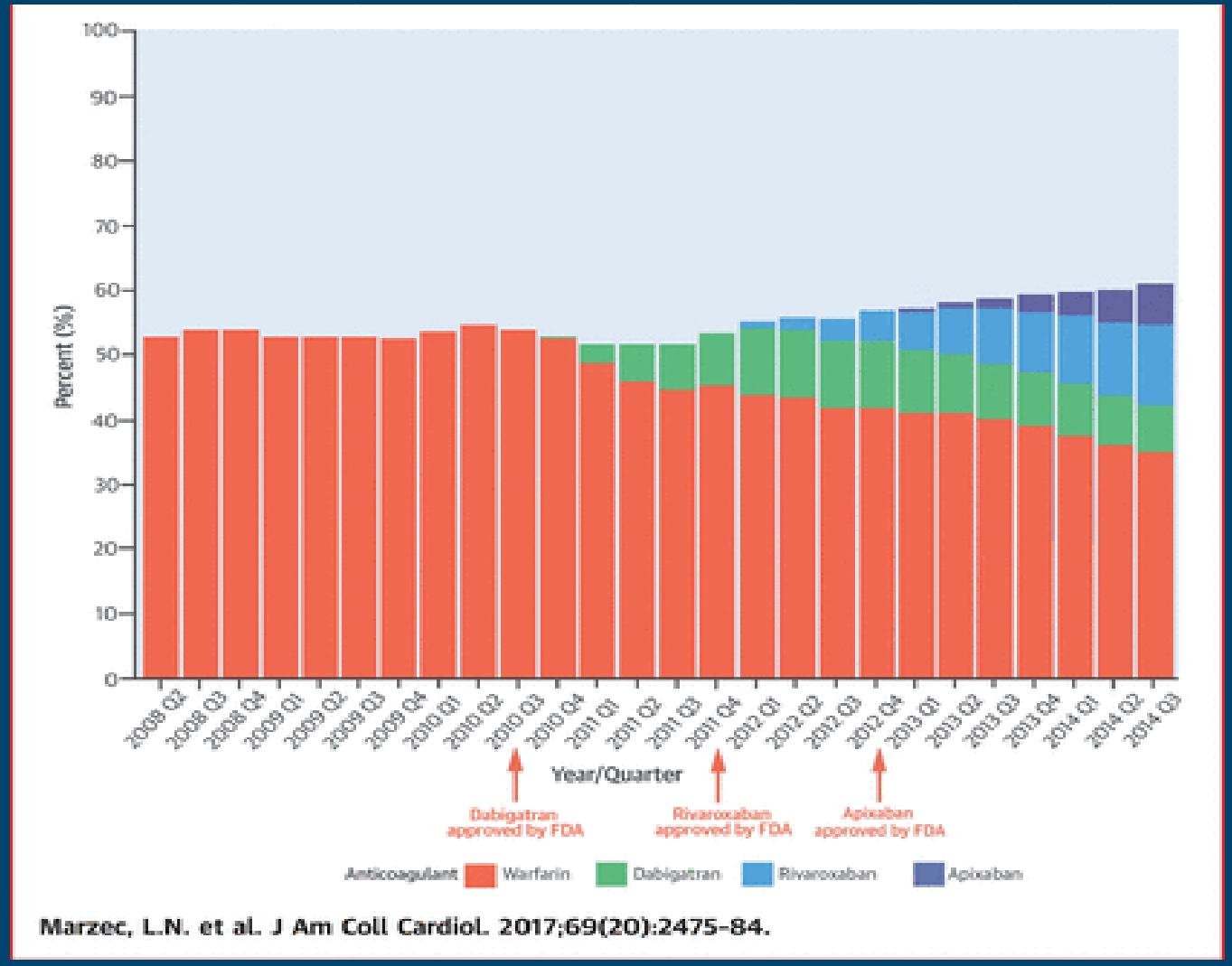
- No validated tests to measure anticoagulation effect
- No established therapeutic range
- Antidotes in various stages of development
- Assessment of compliance more difficult than with vitamin K antagonists
- Potential for unknown long-term adverse events
- Balancing cost against efficacy
- Lack of head-to-head studies comparing new agents
- Paucity of data on special populations (ESRD, prior major bleeds, extreme elderly, etc)

Cost Effectiveness of DOACs vs Warfarin for AF

- Large meta-analysis of 23 trials, over 94,000 patients
- On balance, DOACs were more effective at stroke prevention vs. warfarin
- DOACs had lower intracranial bleeding than warfarin
- DOACs were generally cost effective vs. warfarin (accounting for all health care costs)

Lopez-Lopez et al, BMJ 2017;359:j5058

Trends in Anticoagulation Use for Atrial Fibrillation



Marzec, L.N. et al. J Am Coll Cardiol. 2017;69(20):2475-84.

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Mechanical Approaches to Stroke Prevention:

LAA Occlusion and Ligation

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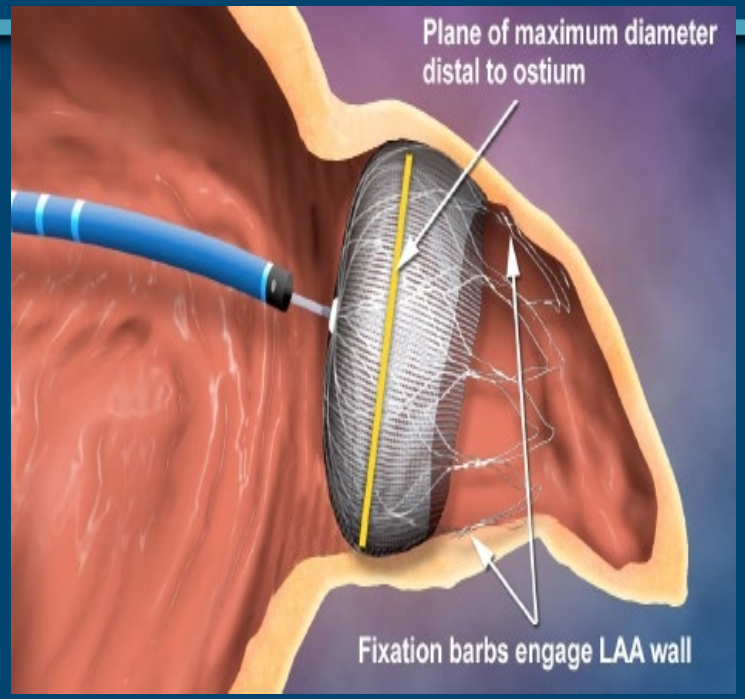
Left Atrial Appendage (LAA) Closure vs Warfarin for Prevention of Stroke in Patients with AF



Control: warfarin INR 2.0-3.0
Intervention: percutaneous closure of LAA

4 Year Efficacy

Composite endpoint of stroke, cardiovascular death, and systemic embolism

- LAA Closure: 2.3%/year
- Warfarin: 3.8%/year

4 Year All Cause Mortality

- LAA Closure: 3.2%/year
- Warfarin: 4.8%/year
- Hazard Ratio 0.66, p=0.04

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Reddy et al, Heart Rhythm Society Late Breaking Trials 2013

Key Points

- Rate control is non-inferior to rhythm control for asymptomatic patients
- Antiarrhythmic drugs have moderate efficacy with risks/side effects
- Ablation is more effective than drug therapy for maintenance of sinus rhythm
- Anticoagulation is useful for stroke prevention in AF
- New anticoagulants have an expanding role in stroke prevention
- Left atrial appendage occlusion is an emeriging alternative to anticoagulation

Next Best Steps

- A patient shows up to my clinic with new AF…
  - Generally not a medical emergency, rarely requires transfer to the ER (*if clinically stable)
  - Basic laboratory testing (chemistry panel, thyroid) and structural heart assessment by echocardiography
  - Initial goals are anti-coagulation for stroke prevention and rate control
  - Cardioversion as an initial attempt at rhythm control is reasonable, especially for younger and/or symptomatic patients
  - Patients with recurrent symptomatic AF after cardioversion can consider anti-arrhythmic drug therapy or AF ablation

My patient has AF and needs surgery…

- Continue rate control and/or antiarrhythmic medicine

- The anticoagulated patient:
  - Low risk of bleeding: continue anticoagulant
  - High risk of bleeding: hold anticoagulant
    - Warfarin: 5 days
    - DOAC: 2-3 days
    - “Bridging” with heparin for AF patients: generally should not be done

Questions?