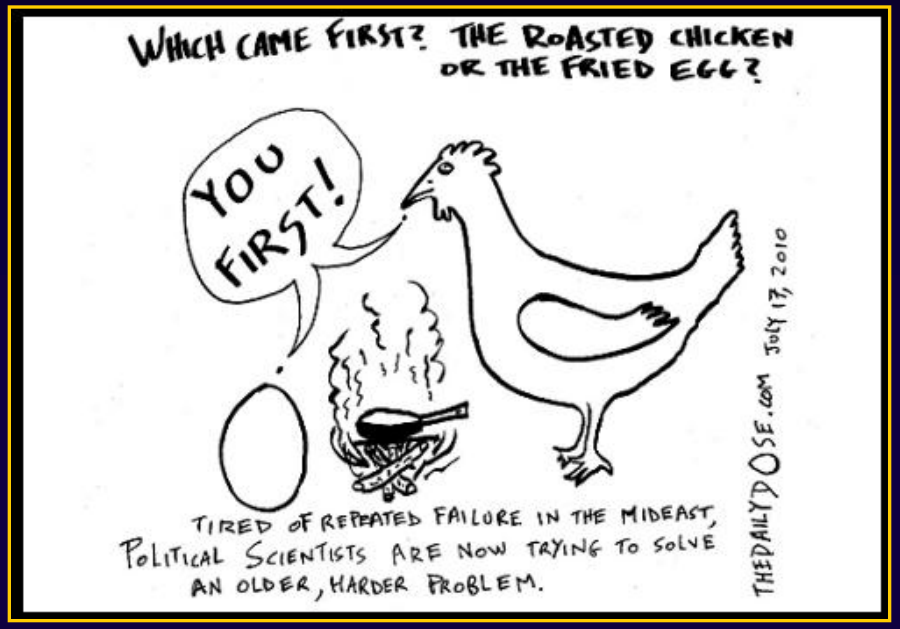
Atrial Fibrillation and Heart failure



and a bit about anticoagulation

Tim Sutton, Consultant Cardiologist

Middlemore Hospital, Manukau City

and Auckland Heart Group

Why Does AF Cause Heart Failure

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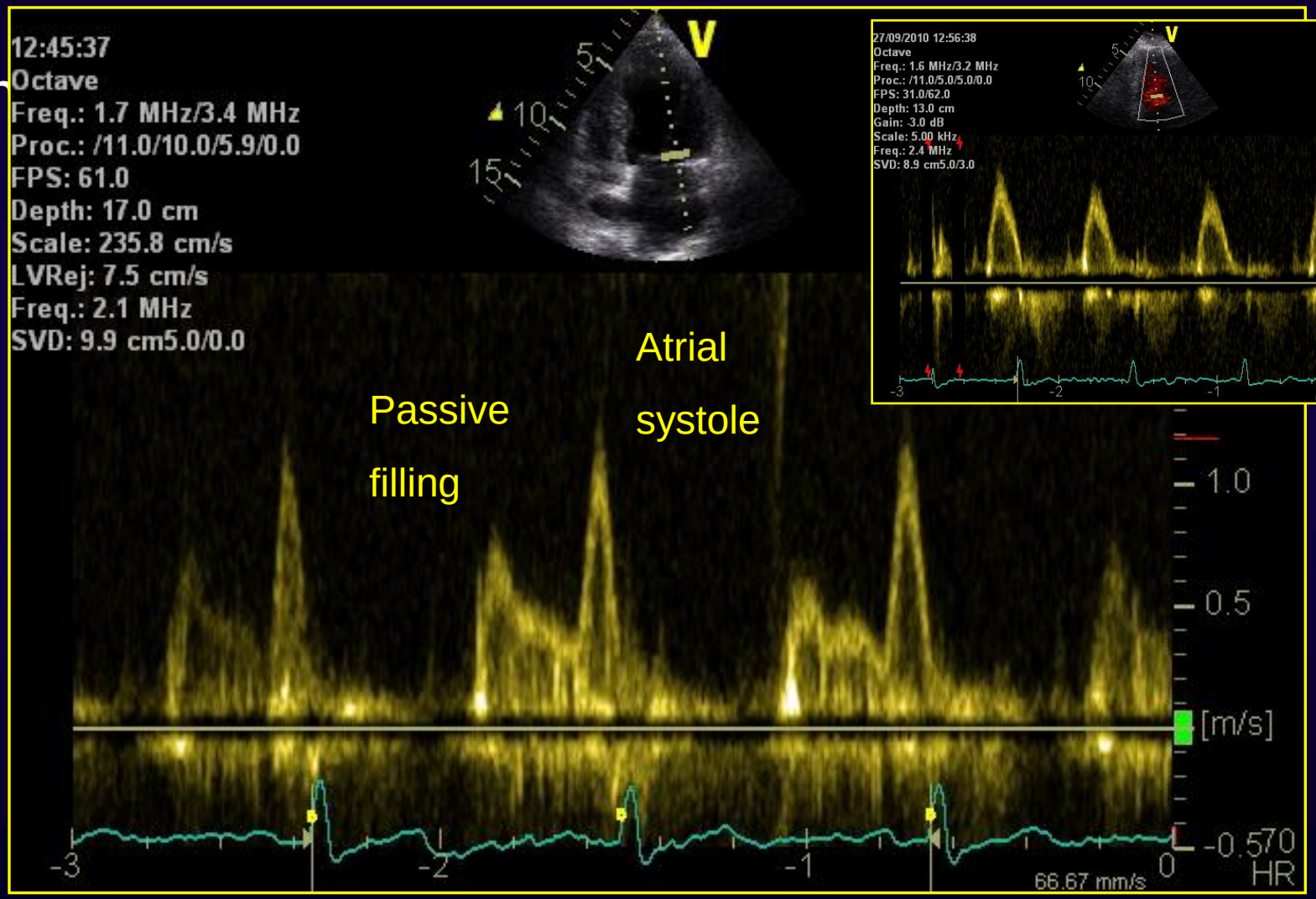


What has been the trigger?

- Reversible
  - Infection esp pneumonia
  - Post operative
  - PE
  - Alcohol
  - Metabolic disturbance
- "Irreversible"
  - Lone AF
  - Underlying heart disease

So what causes this?

Toxic / metabolic stimulus

(reversible)

Increased afterload

Aortic stenosis

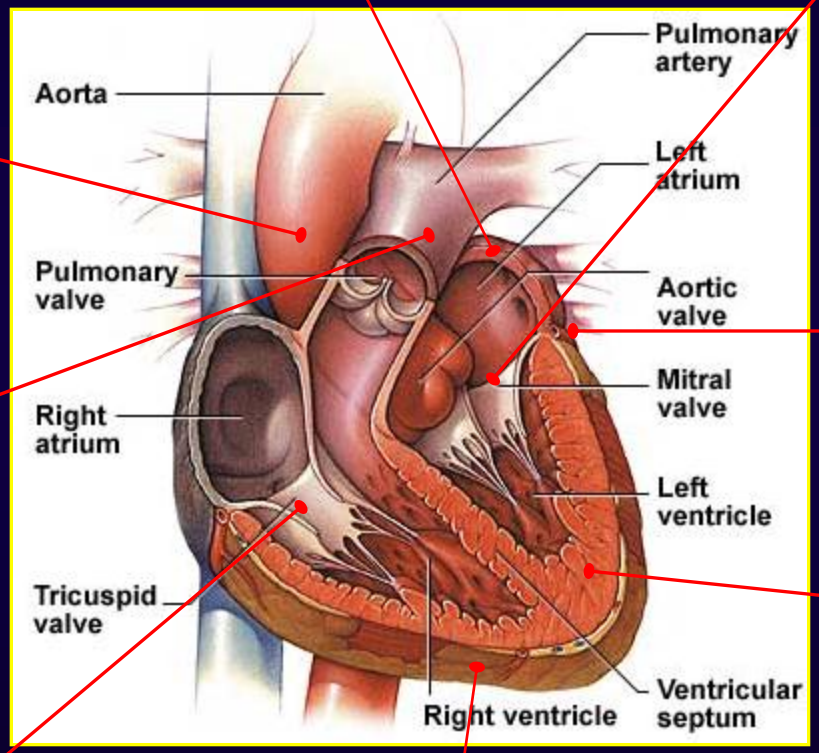
Hypertension

Obstruction

Mitral Valve disease

Mitral stenosis

Mitral regurgitation



Coronary artery disease

Pulmonary hypertension

Remember obesity

Myocardial disease

Systolic impairment

Hypertrophy

Tricuspid valve disease

Pericardial disease

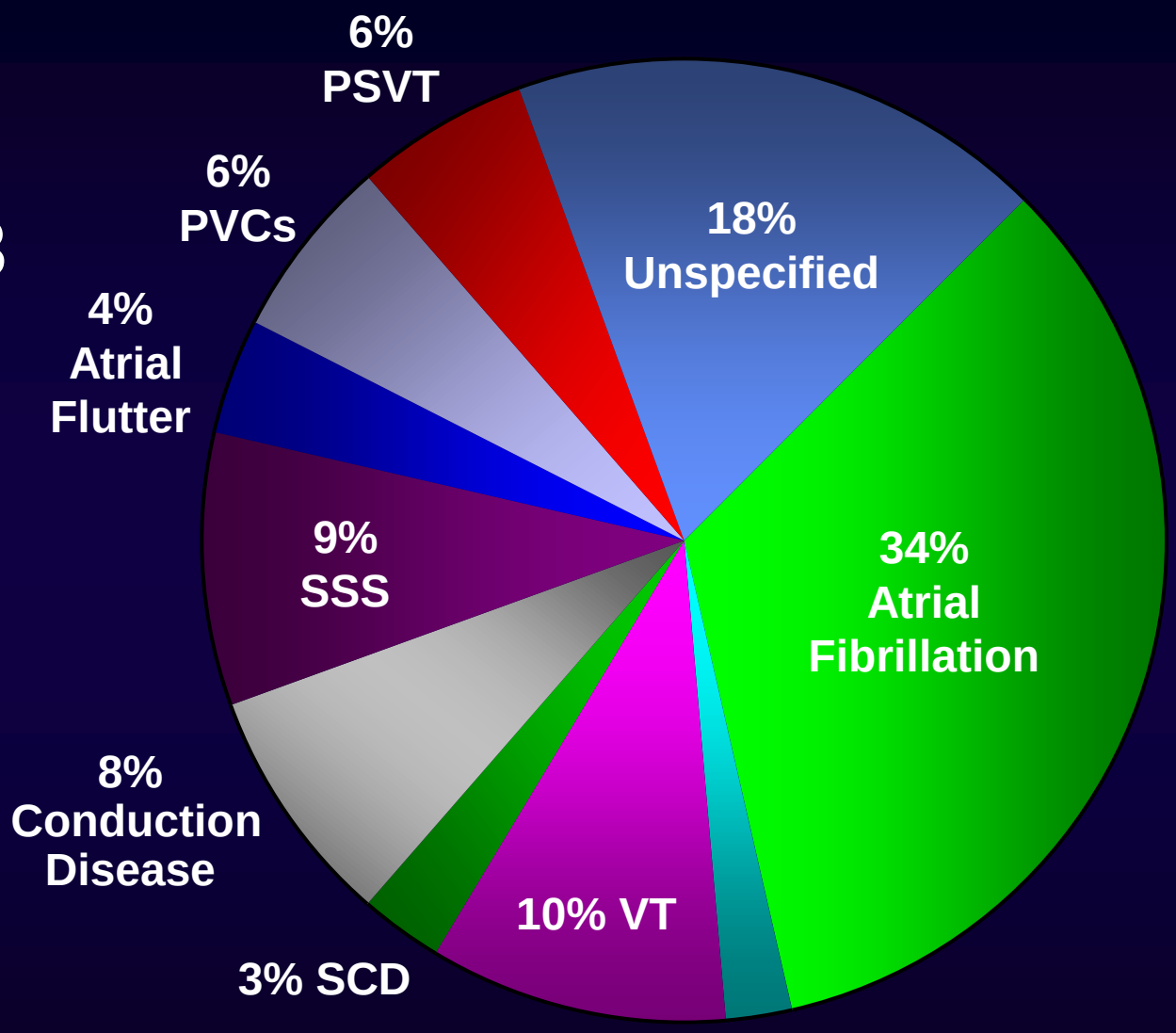
Pericarditis

Constriction

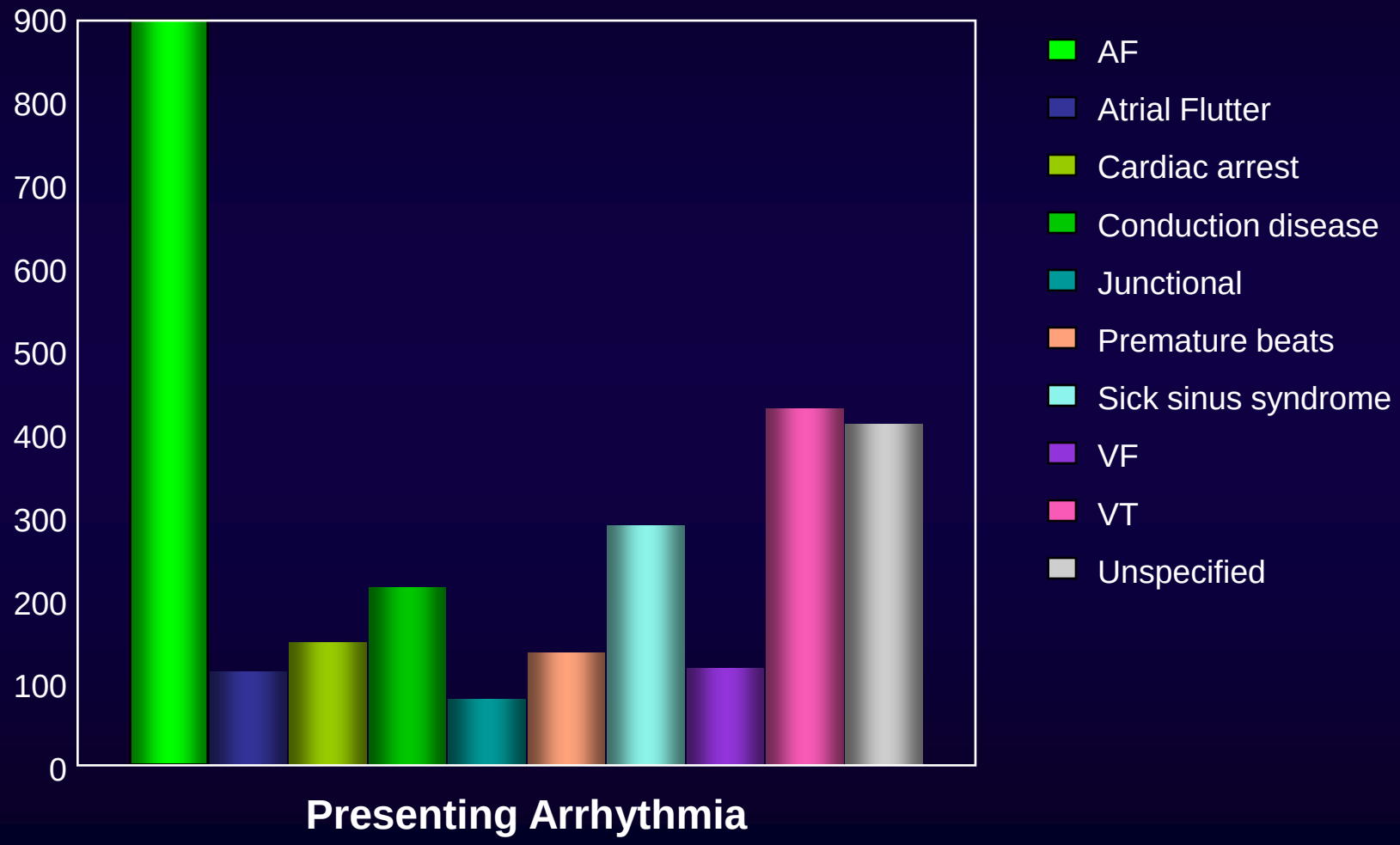
Obesity, AF and Heart Failure

- Incidence of AF is increased in obese patients
- Presence of comorbidities is higher
  - Hypertension, sleep apnoea, abnormal glucose metabolism
- Obesity induced cardiomyopathy
  - Diastolic > systolic

Atrial fibrillation accounts for 1/3 of all patient discharges with arrhythmia as principal diagnosis.



Total Hospitalization Days Based on Presenting Arrhythmia

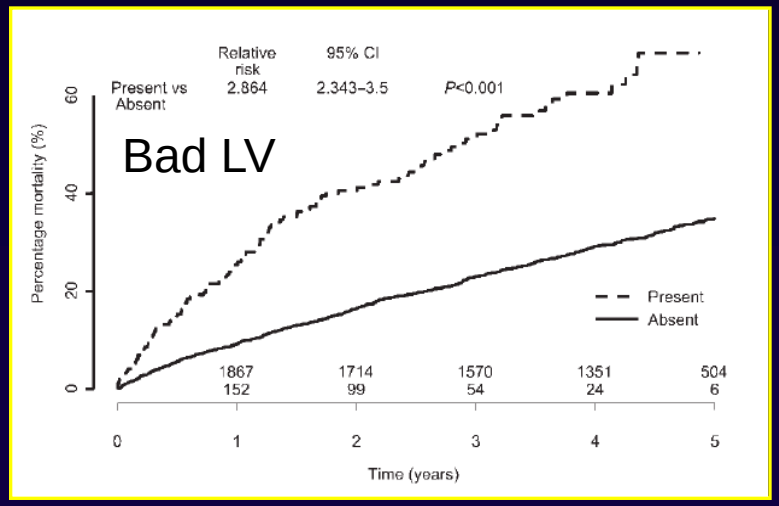


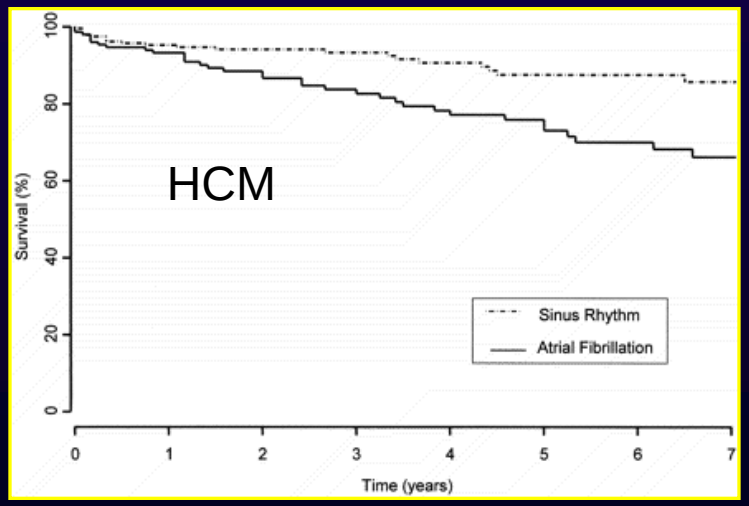
Who Should Be Referred to Hospital - Clinical

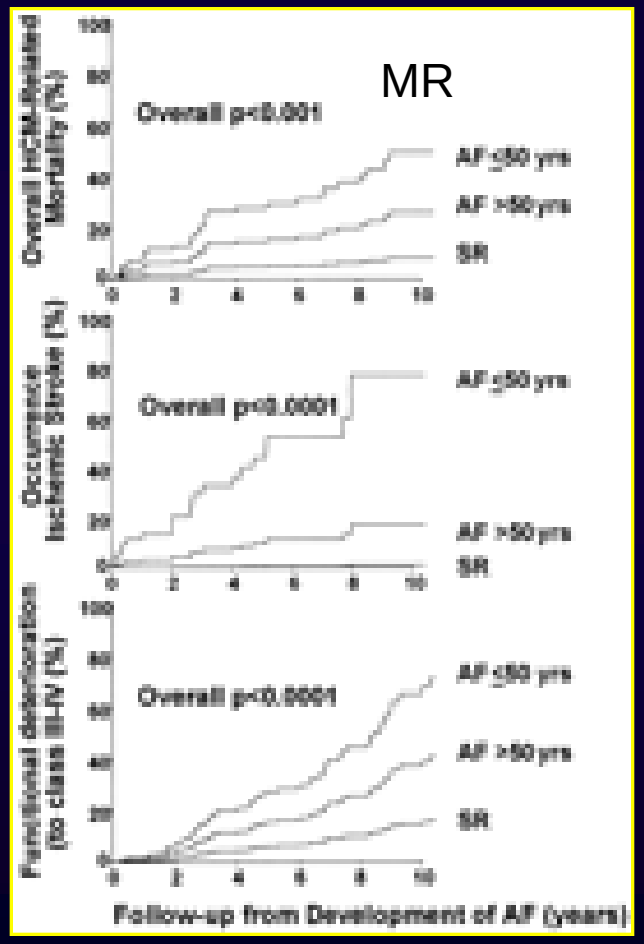
- Severely symptomatic patients
  - NYHA III-IV
  - Anything more than mild right heart failure

- Patients with known pre-existent structural heart disease (more than mild)

Does the Type Of Stuctural Heart Disease Matter?







Who Should Be Referred to Hospital - Clinical

- Severely symptomatic patients
  - NYHA III-IV
  - Anything more than mild right heart failure
- Patients with known pre-existent structural heart disease (more than mild)
- Anyone that you are worried about
- Those who you judge will not adhere to medication / close follow up

Who Should Be Referred to Hospital – After Investigations

- Those with reversible trigger not treatable in the community
- Significantly elevated troponin I / T and / or BNP
- ECG: Atrial flutter. Ischaemic changes / new abnormality vs previously
- CXR: Overt Radiological heart failure (not just pulmonary venous hypertension though)

Treatment

- Treat any identified underlying trigger
- Reduce volume overload
- Control heart rate
- Consider ACE inhibitor / ARB +/- spironolactone

Reduce volume overload

- Limit salt intake
- Thiazide
- Loop diuretic (oral / IV)
  - Frusemide
  - Bumetanide

What Heart Rate to Aim For?

- Where the patient feels well?
- Can we accept “lenient” control (HR <110bpm) rather than “strict” (HR <80 and <110bpm with moderate exercise)
- Where LV function has recovered?

Control heart rate

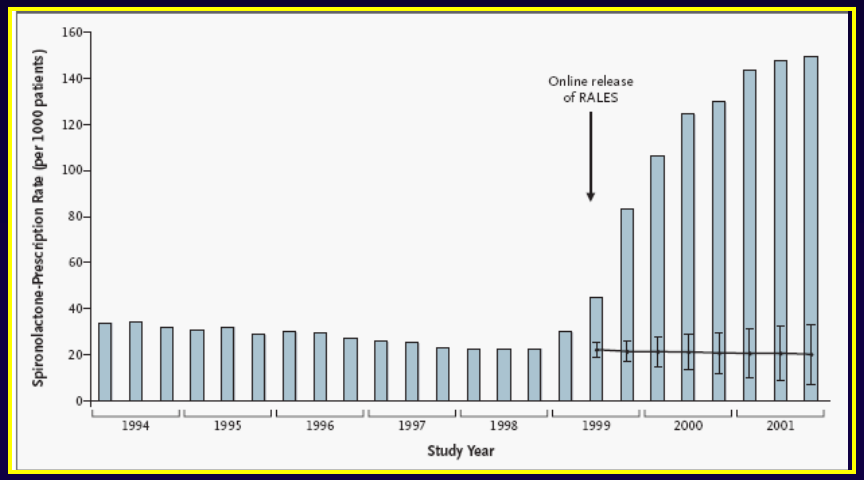
- Beta blocker
- Digoxin
  - Aim level around 1.0
- Calcium channel blocker
- Amiodarone
  - Ensure monitor TFTs every 4 months

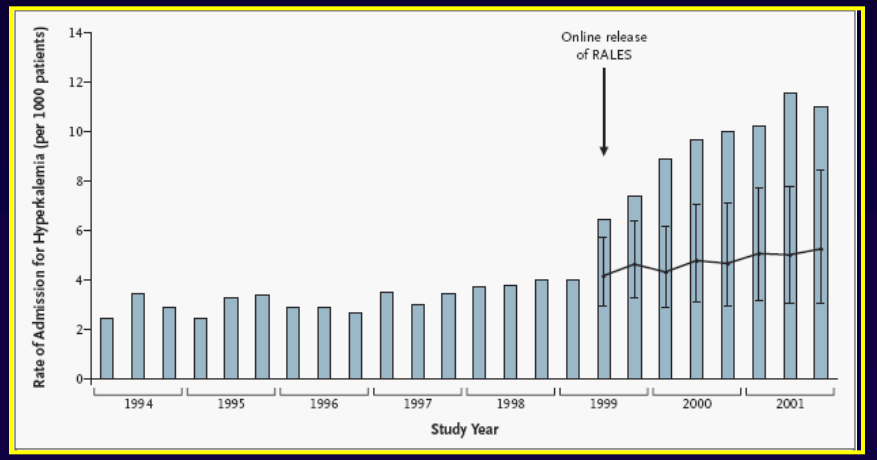
Consider ACE inhibitor / ARB +/- spironolactone

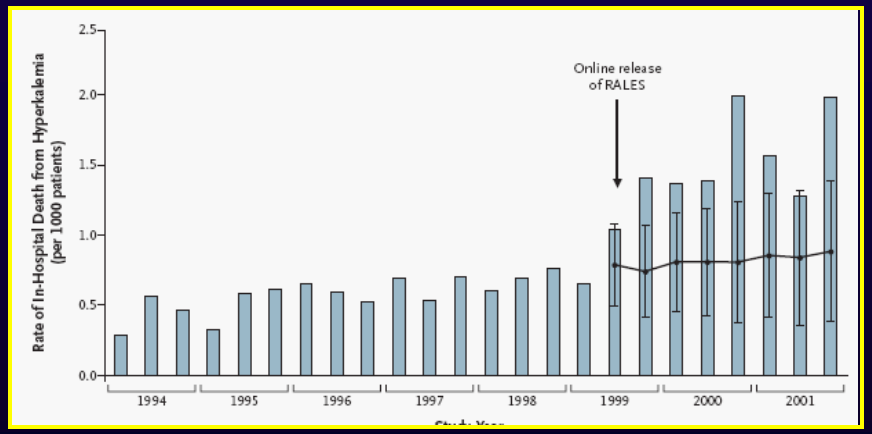
- Diabetic
- Hypetensive
- Proteinuria
- Renal dysfunction
- LV dysfunction

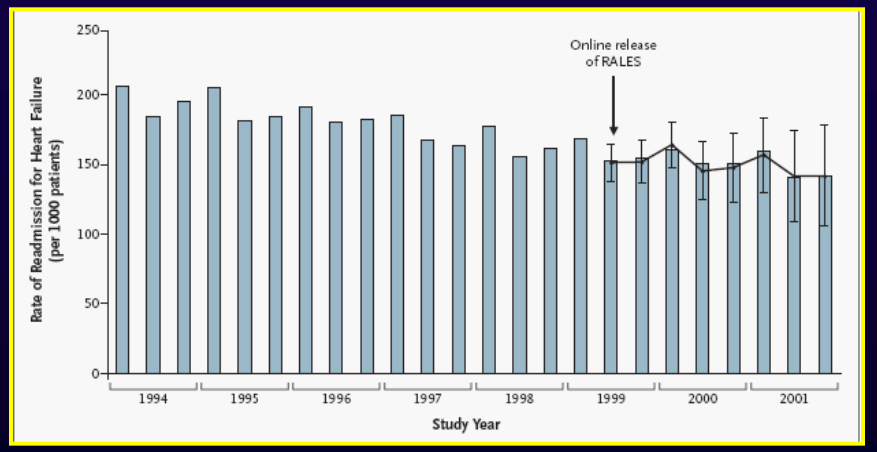
- Spironolactone

Spironolactone Unleashed in the Real World (Canada) - 2004

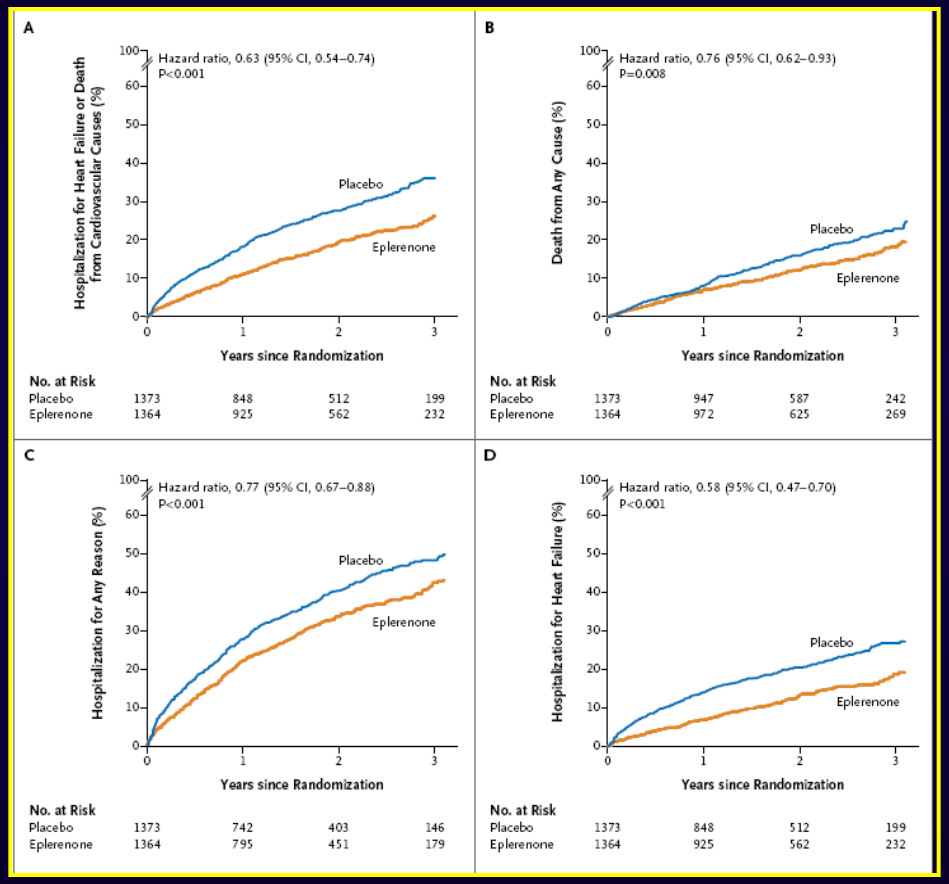


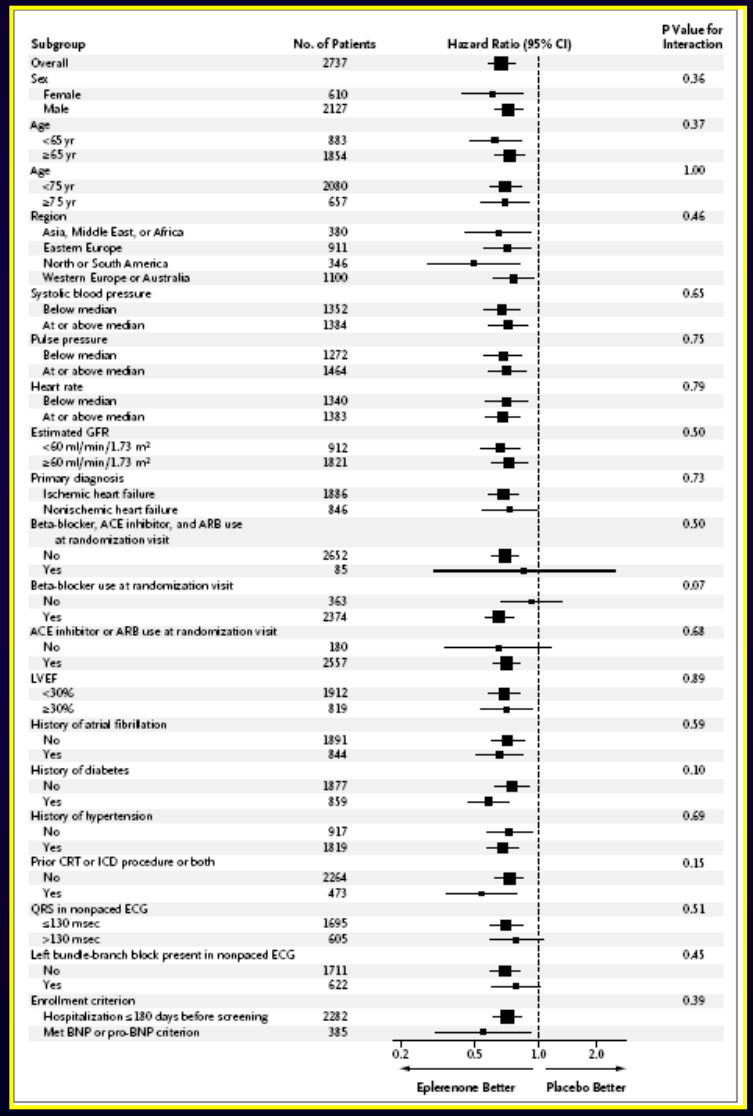






EMPHASIS-HF trial - 2011





Spironolactone – expanding its uses

Patients with BP not controlled on 3 agents (mean BP 157/85) had spironolactone (median dose 25 mg/daily) added as a fourth drug . This was associated with

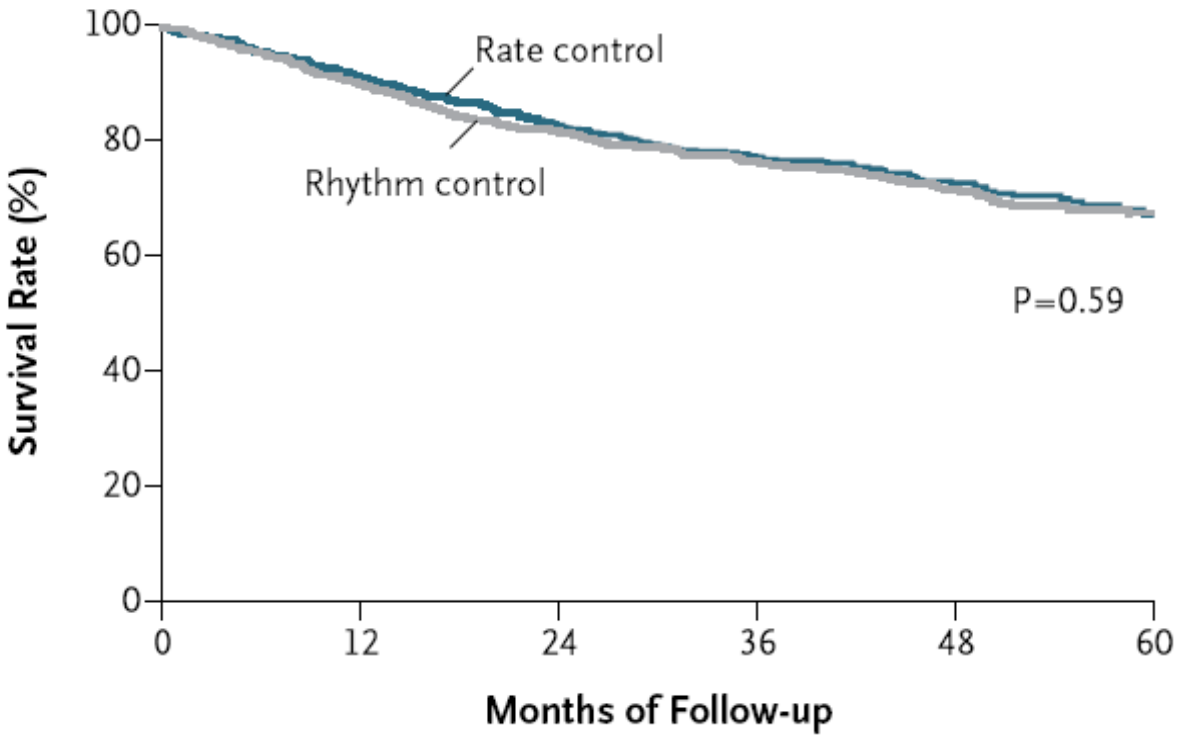
a) 22/10 mmHg reduction in blood pressure at one-year follow-up.

b) mean rise in K was 0.4 meq/L, with hyperkalemia (K >5.5 meq/L) occurring in 4%

In a smaller unblinded crossover trial in 42 overweight or obese patients who were treated with an average of 4 antihypertensive medications had either ARB / ACEi added. Then after washout Rx spironolactone.

Compared to baseline, spironolactone therapy was associated with a significantly greater fall in 24 hour ambulatory blood pressure (21/15 versus 7/3 mmHg) and a significantly higher rate of attaining an office blood pressure less than 140/90 mmHg (54 versus 26%).

Should We Try and Restore Sinus Rhythm?



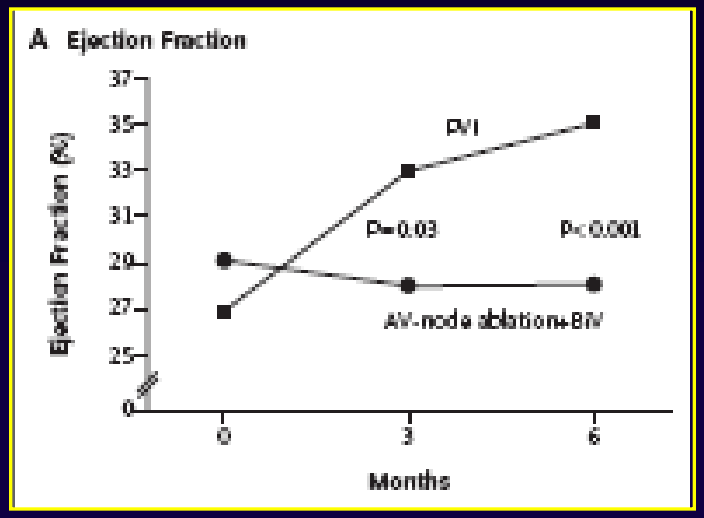
No. at Risk

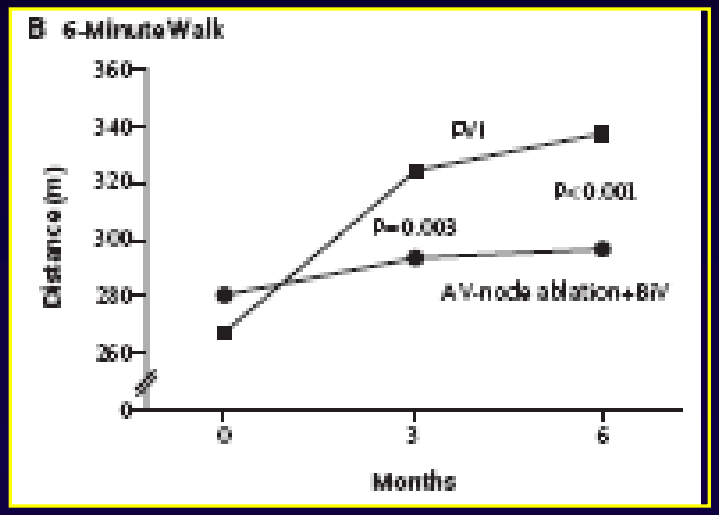
Rhythm control	593	514	378	228	82
Rate control	604	521	381	219	69

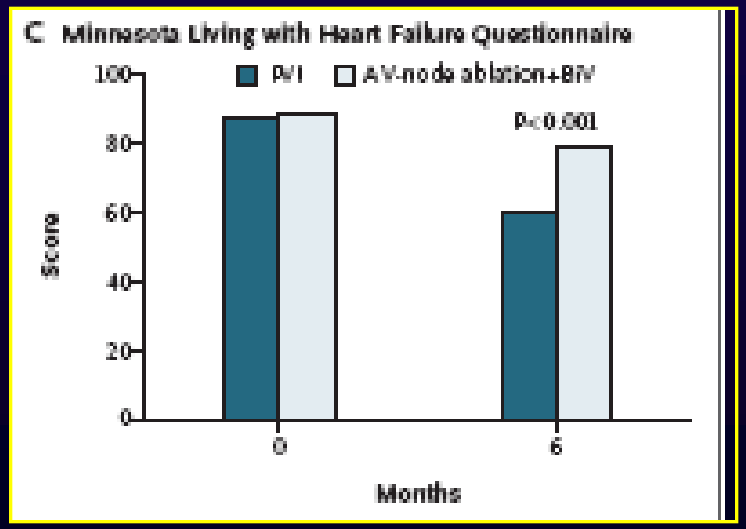
In Whom Do I Consider Trying to Restore Sinus Rhythm?

- Younger patients
- 1st presentation with AF with LV impairment
- Those who are hard to rate control / who are not symptomatically better when in controlled AF

Is There a Role for AF Ablation







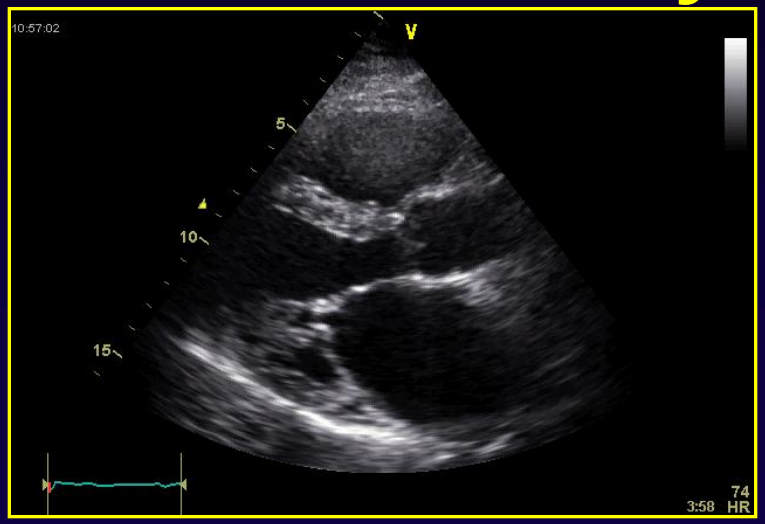
Further Assessment

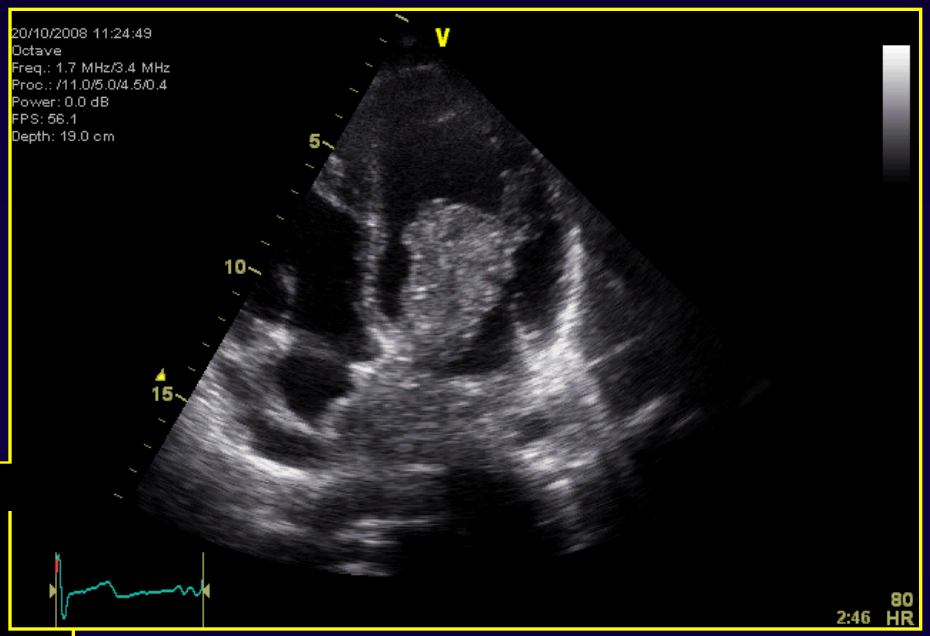
- Follow up in 2-3 days
  - Improving with better rate control – uptitrate rate control agent
  - No change symptomatically
    - Increase rate control agents + follow up
    - Refer for inpatient assessment
- Refer for outpatient medical / cardiology review
- The patient needs an ECHO

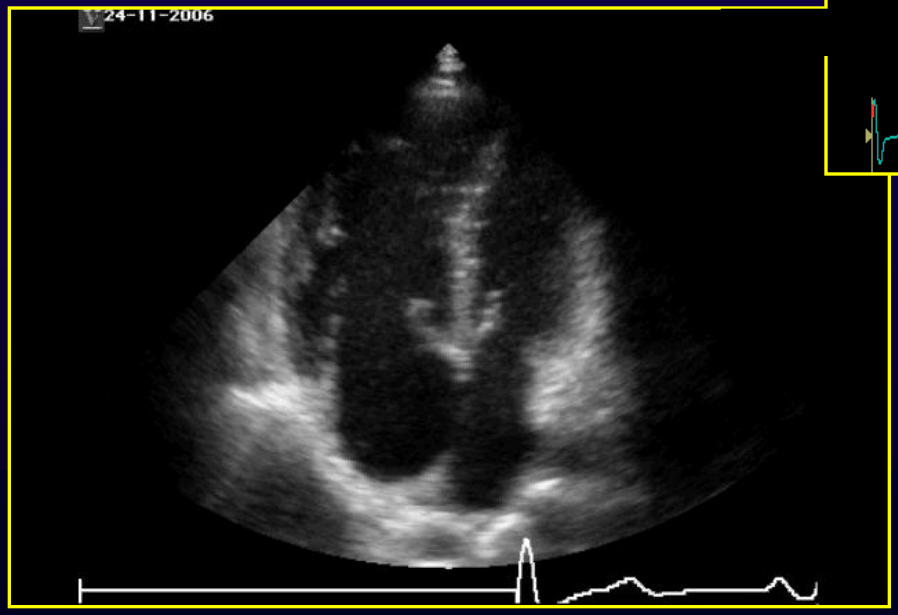
Why Patient Needs an ECHO

- To assess left ventricular function
  - Systolic (LVEF <45%)
  - Diastolic (Heart Failure with Preserved EF HeFPeF)
- Exclude clinically silent problems
  - Valve disease
  - Ischaemic heart disease
  - Miscellaneous structural disease
- Assess left / right atrial size (and contents)
- Part of assessment of thromboembolic risk

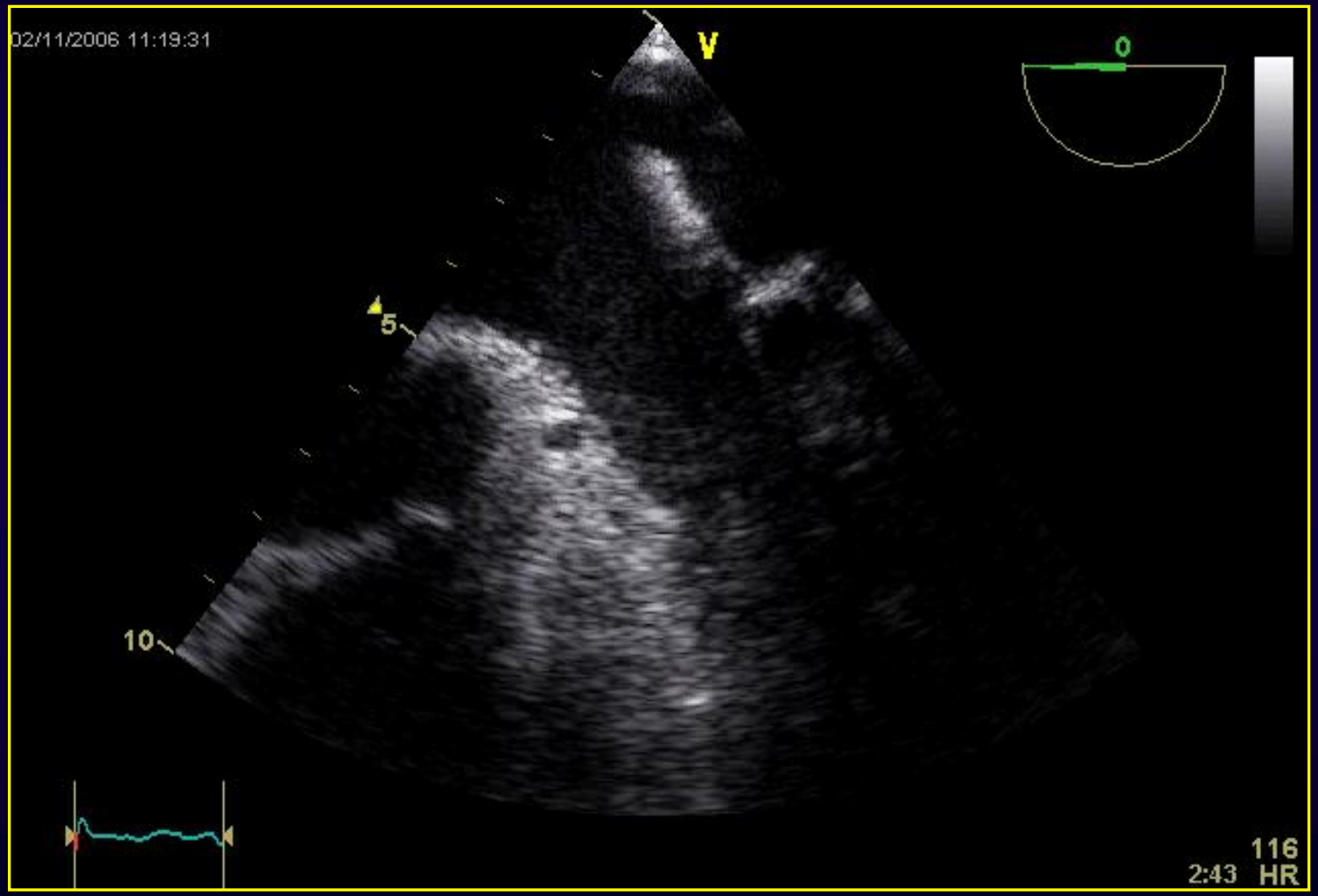
Clinically silent diseases







Assess thromboembolic risk



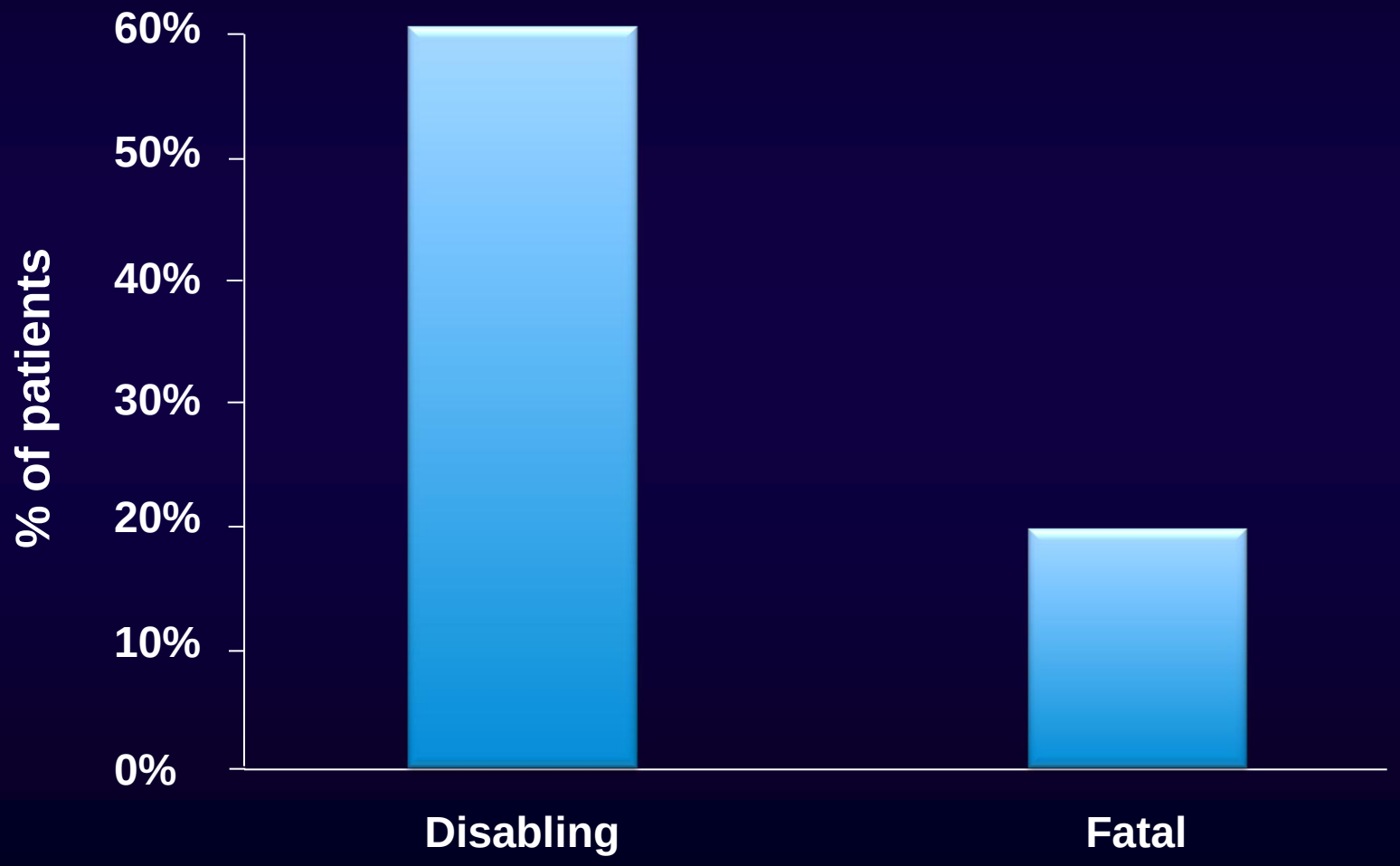
AF increases the risk of stroke

- AF is associated with a pro-thrombotic state
  - ~5 fold increase in stroke risk
- Risk of stroke is the same in AF patients regardless of whether they have paroxysmal or sustained AF
- Cardioembolic stroke has a 30-day mortality of 25%
- AF-related stroke has a 1-year mortality of ~50%

1. Wolf PA, et al. *Stroke* 1991;22:983-988; 2. Rosamond W et al. *Circulation.* 2008;117:e25–146; 3.Hart RG, et al. *J Am Coll Cardiol* 2000;35:183-187; 4. Lin H-J, et al. *Stroke* 1996; 27:1760-1764; 5. Marini C, et al. *Stroke* 2005;36:1115-1119.

Stroke severity in patients with AF

Effect of first ischemic stroke in patients with AF



1. Gladstone DJ et al. *Stroke*. 2009; 40:235-240

Clinical Assessment Tool:

Congestive Heart Failure or EF<40%

Hypertension

Age : > 65 score 1 > 75 score 2

Diabetes

Stroke / embolic event : Score 2

Vascular disease

Gender : Female Score 1

CHA_2DS_2-VASc

$CHADS_2$ -> CHA_2DS_2VASc

$CHADS_2$ score	Patients (*n* = 1733)	Adjusted stroke rate %/year
0	120	1.9
1	463	2.8
2	523	4.0
3	337	5.9
4	220	8.5
5	65	12.5
6	5	18.2

CHA_2DS_2-VASc score	Patients (*n* = 7329)	Adjusted stroke rate (%/year)
0	1	0
1	422	1.3
2	1230	2.2
3	1730	3.2
4	1718	4.0
5	1159	6.7
6	679	9.8
7	294	9.6
8	82	6.7
9	14	15.2

From ESC AF Guidelines: http://www.escardio.org/guidelines

Clinical Assessment Tool:

- Hypertension
- Abnormal liver /renal function 1 each
- Stroke
- Bleeding predisposition

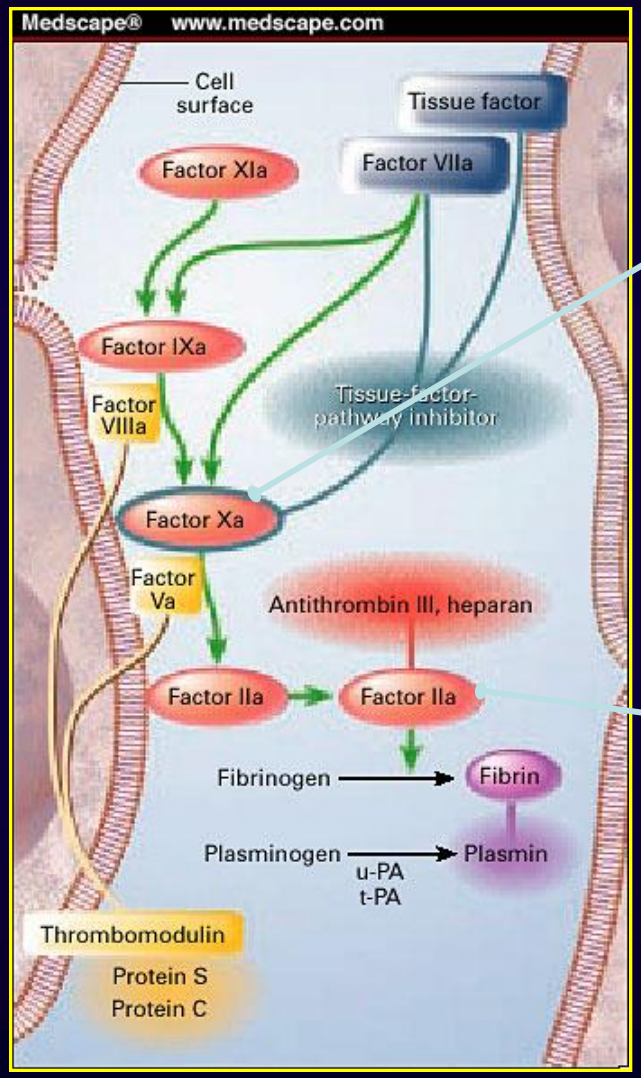
HAS-BLED

- Labile INR
- Elderly (>65)
- Drugs / Ethanol 1 each

Incidence of Bleeds (EURO-AF)

Risk Score	Number	No. bleeds	Bleeds/100 pt years
0	798	9	1.13
1	1286	13	1.02
2	744	14	1.88
3	187	7	3.74
4	46	4	8.7
5	8	1	12.5
6	2	0	0
7-9	0	0	0
Any score	3071	48	1.56
P value			0.007

Drug therapy



Anti Factor Xa agents

- Indraparinux
- Rivaroxoban
- Apixaban

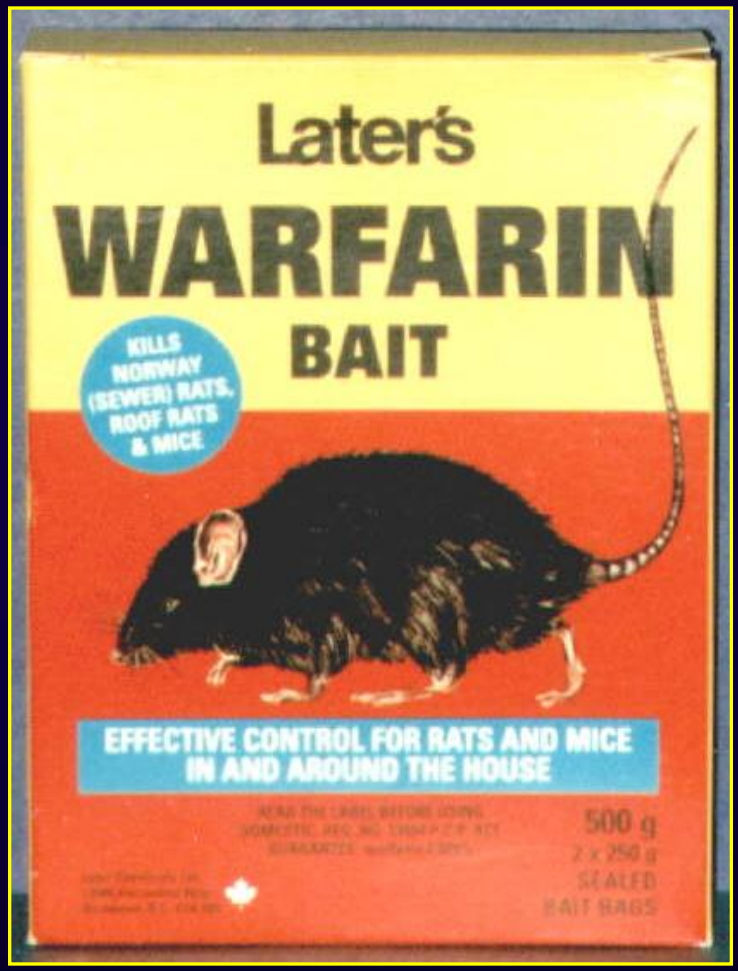
Direct Thrombin Inhibitors

- Ximelegatran
- Dabigatran

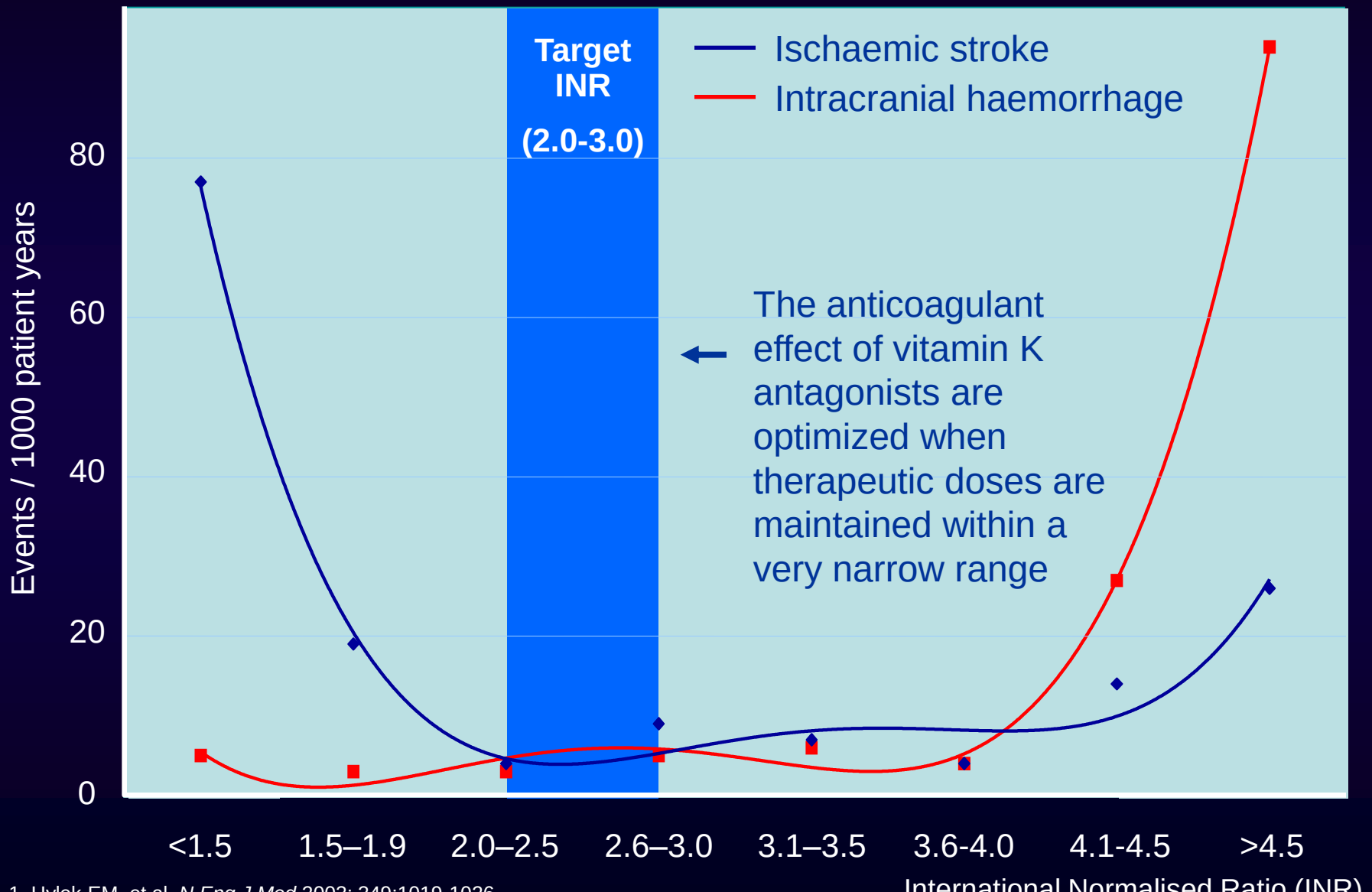
Warfarin

- Well known drug
- Proven effective
- Side-effects well known
  - Bleeding
  - Drug / dietary interactions

- Multilevel issues around dosing / monitoring
- Public perception



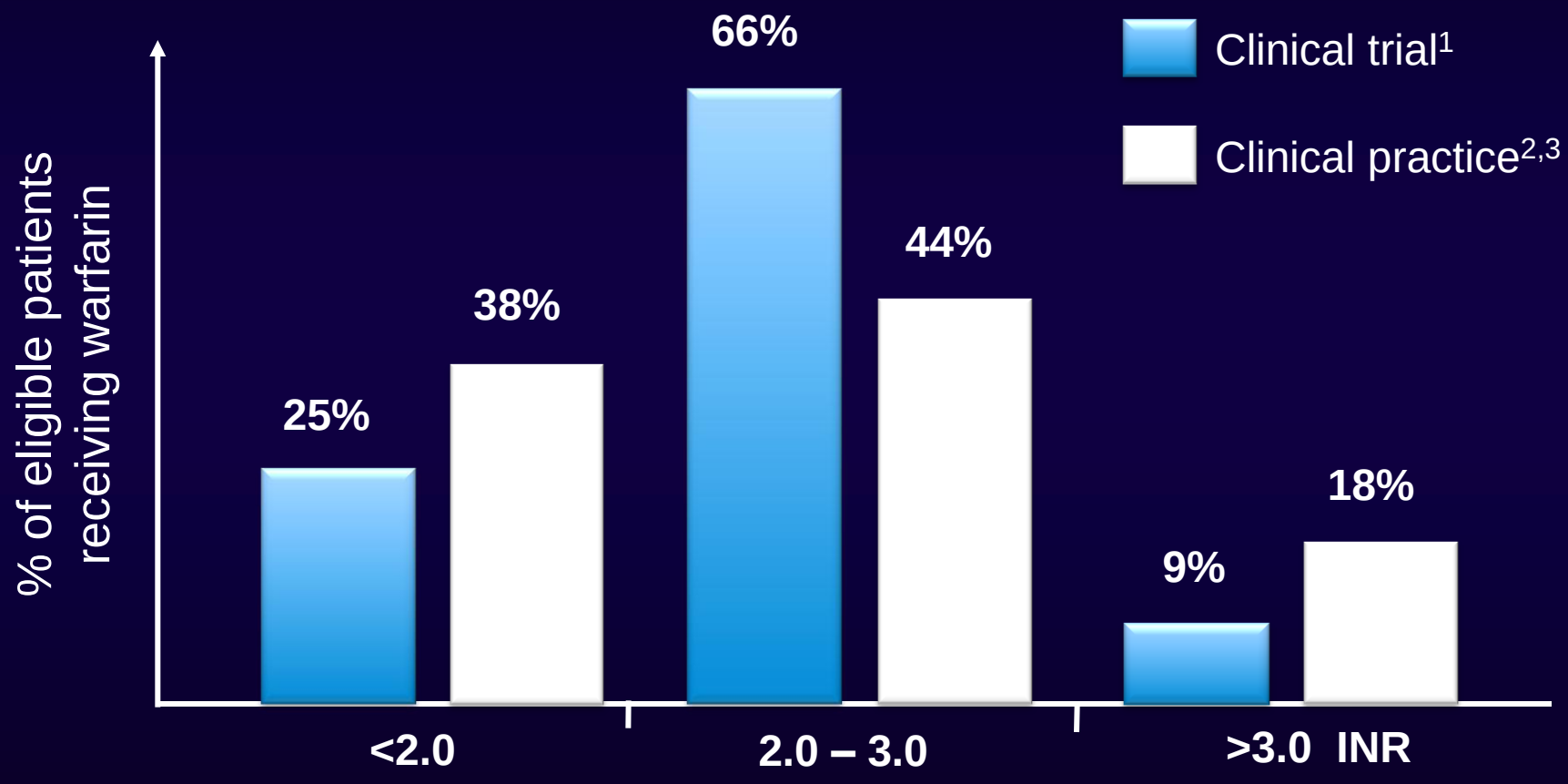
Narrow therapeutic range with VKA



1. Hylek EM, et al. *N Eng J Med* 2003; 349:1019-1026.

INR control: clinical trials v. clinical practice

INR* control in clinical trial versus clinical practice (TTR**)



*INR = International normalized ratio

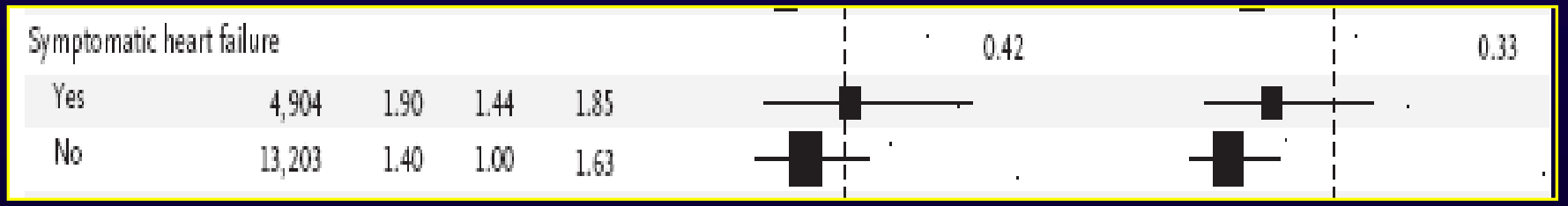
** TTR = Time in Therapeutic Range (INR2.0-3.0)

1. Kalra L, et al. *BMJ* 2000;320:1236-1239 * Pooled data: up to 83% to 71% in individualized trials; 2. Samsa GP, et al. Arch Int Med 2000
3. Matchar DB, et al. *Am J Med* 2002; 113:42-51.

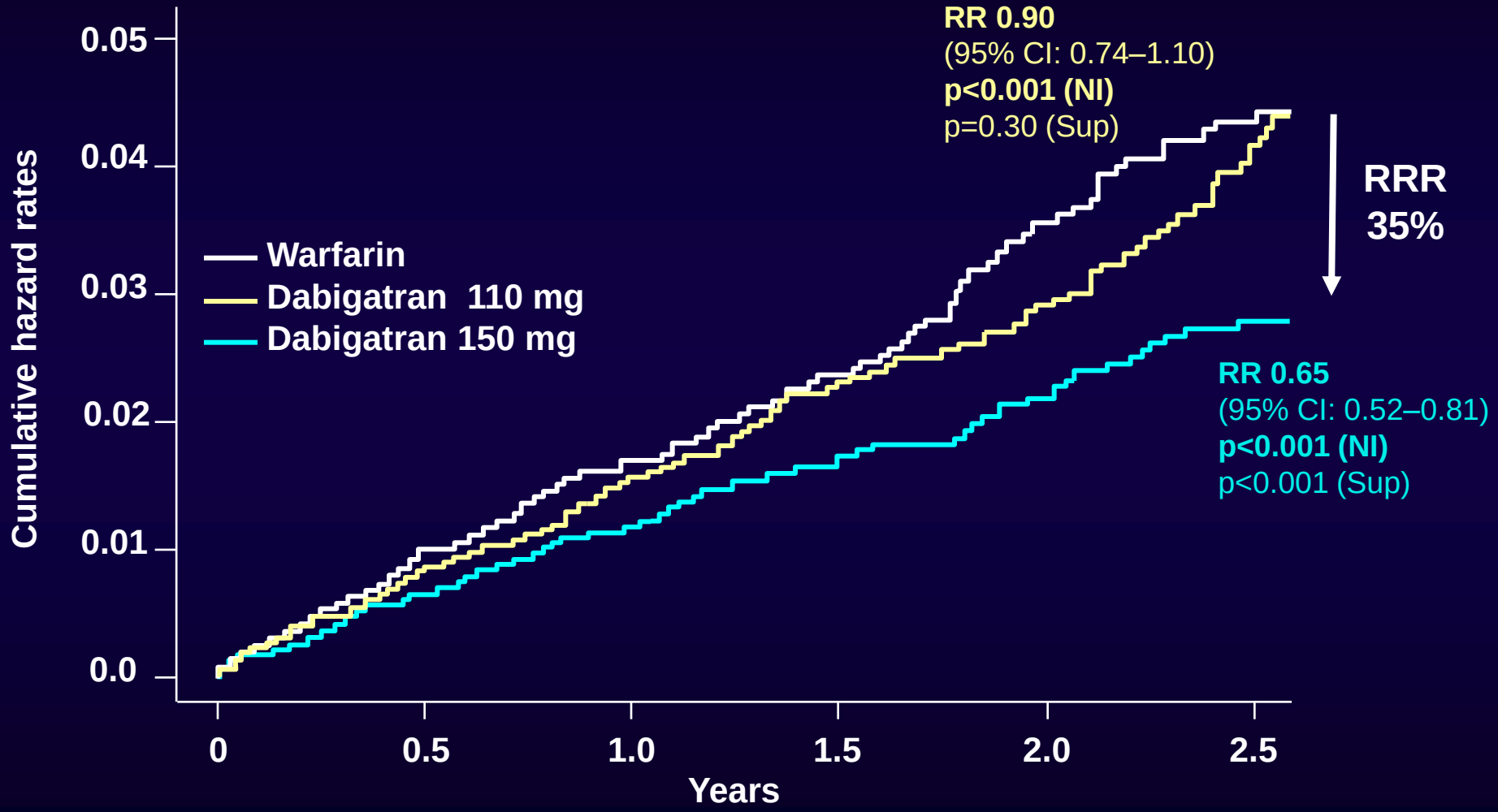
Warfarin: Is there an Alternative?

Direct Thombin Inhibitors

- Dabigatran (Pradaxa)
  - 110mg bd as effective as warfarin with lower bleeding risk
  - 150mg bd high risk reduction with equvalent bleeding risk



Time to first stroke / SSE

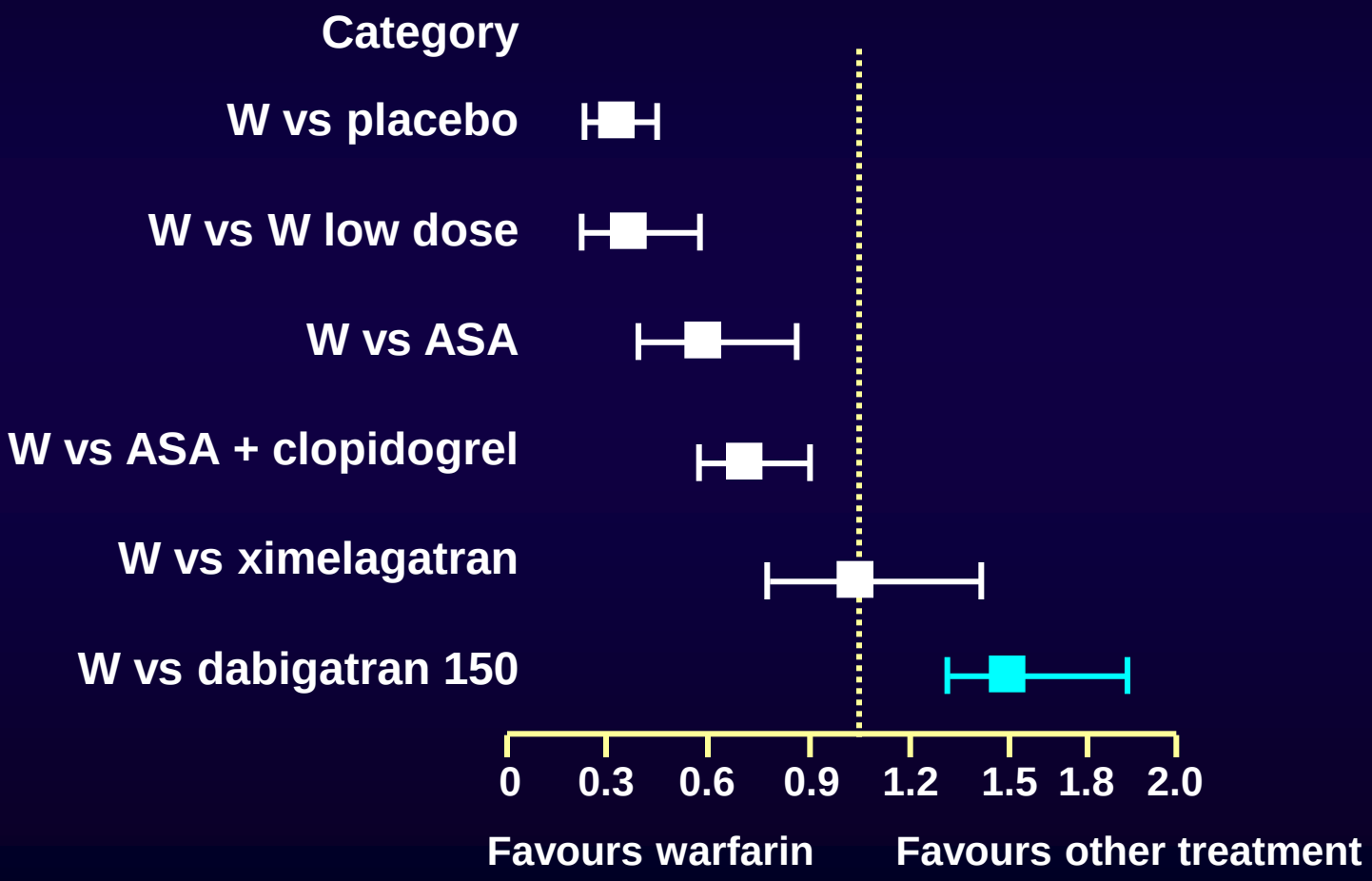


RR, relative risk; CI, confidence interval; NI, non-inferior; Sup, superior

Connolly SJ., et al. *N Engl J Med* 2009; 361:1139-1151.

RE-LY in perspective

Meta-analysis of ischaemic stroke or systemic embolism

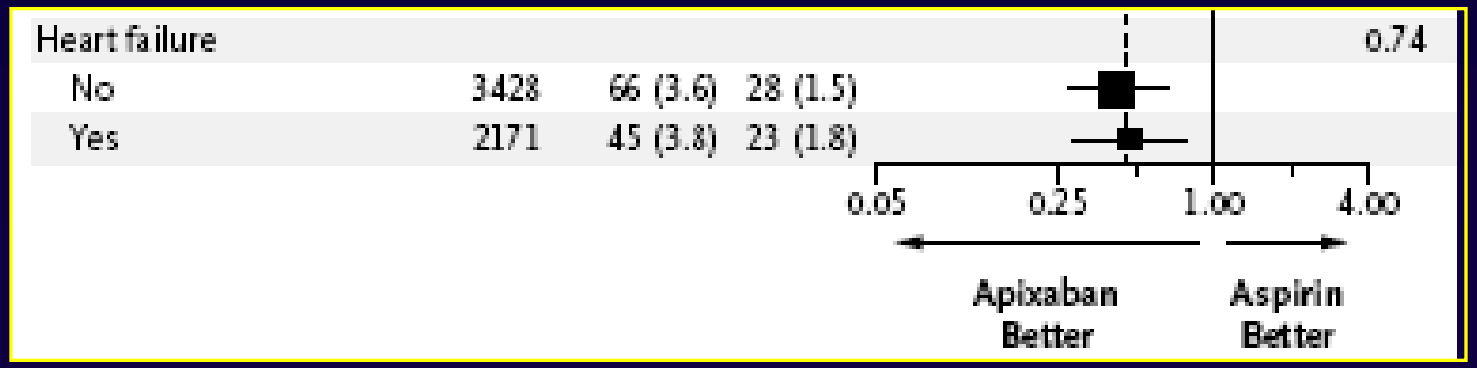


Camm J.: Oral presentation at ESC on Aug 30th 2009
http://www.escardio.org/congresses/esc-2009/webcasts/pages/sunday.aspx

Are they any Competitors?

Anti factor Xa agents

- Apixaban



- Rivaroxiban
- Edoxaban

So at the end…

- Patient feeling well
- Rate controlled without side-effects
- Aetiology of AF defined and underlying disease process attended to
- Appropriate thromboprophylaxis

Does this really work?