Can we say bye bye to Beta blockers in the Management of Hypertension without angina and heart failure

Vidyut Jain
MD FACC FSCAI FESC
Choithram hospital ,Indore

Can we say bye bye to Betablockers in the Management of Hypertension without angina and heart failure

Beta blockers in uncomplicated Hypertension

Current status


HYPERTENSION
HIPERTENZIJA
NADCIŚNIENIE
HIPERTENSIE
HIPERTENSIO
இரத்த
அழுத்தம
NOMFUTHO
VÉRNYOMÁS
JINI
OPHEZULU
فشار
ÁP
HIPERTONI
VYSOKÝ
HIPERTENSIUNE
ДАРАЛТ
ΥΠΕΡΤΑΣΗ
HIPIRTHEANNAS
LATLAK
TĂNG
ALTA
DAMU
ارتفاع
BLUTHOCHDRUCK
高血压
HYPERTENSIÓN
ضغط
HYPERTENSIE
ГИПЕРТОНИЯ
АРТЕРИЙН
HIPERTANSIYON
HIPERTENSI
IPERTENSIONE
WEGAZI
SHINIKIZO
MAGAS
HUYẾT ÁP
ARTERIALĂ
MGBALIHAUHAWAR
HIPERTENSÃO
HIPERTONIJA
ỌBARA
PRESYON
ХИПЕРТЕНЗИЈА

How Aggressive to Treat Hypertension

Some Early Views on the Controversy

- "The greatest danger to a man with high blood pressure lies in its discovery, because then some *fool* is certain to try and reduce it."-

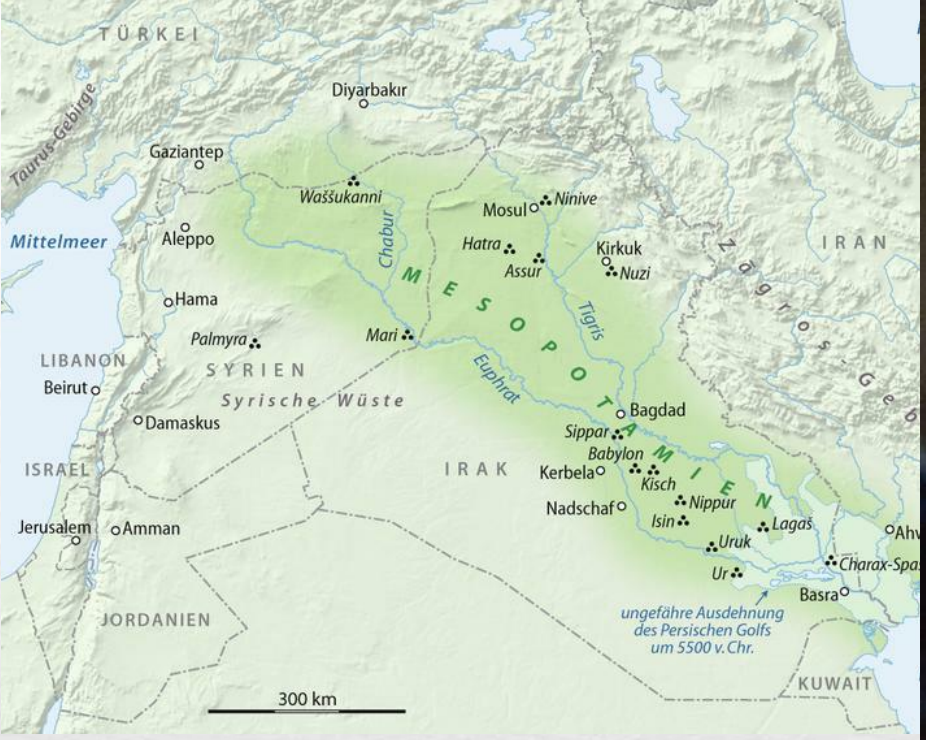
  J.H. Hay, 1931.

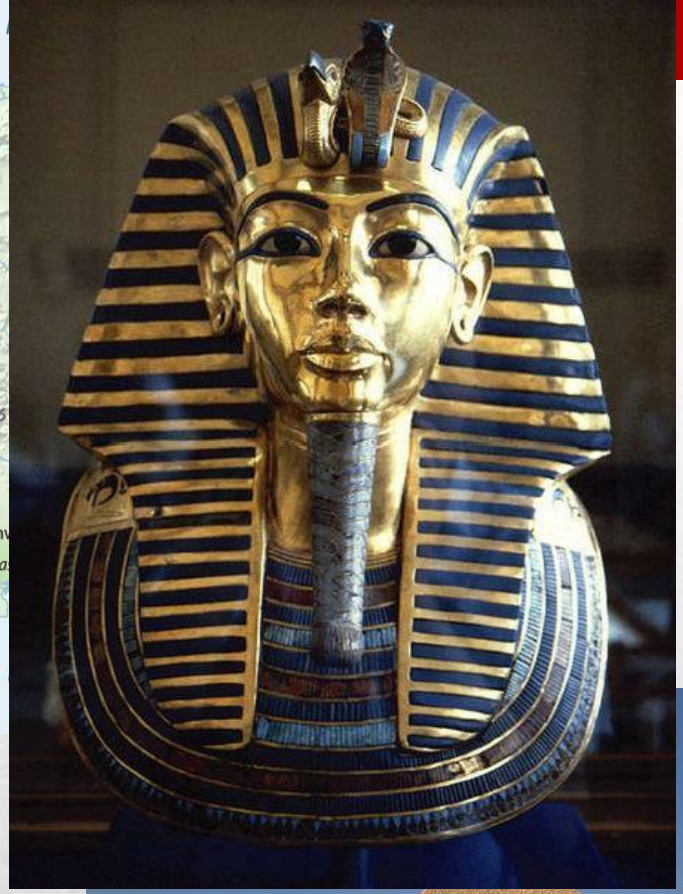
- "Hypertension may be an important compensatory mechanism which should not be tampered with, even were it certain that we could control it."

  Paul Dudley White, 1937

Benefits of Lowering BP

	Average Percent Reduction
Stroke incidence	35–40%
Myocardial infarction	20–25%
Heart failure	50%



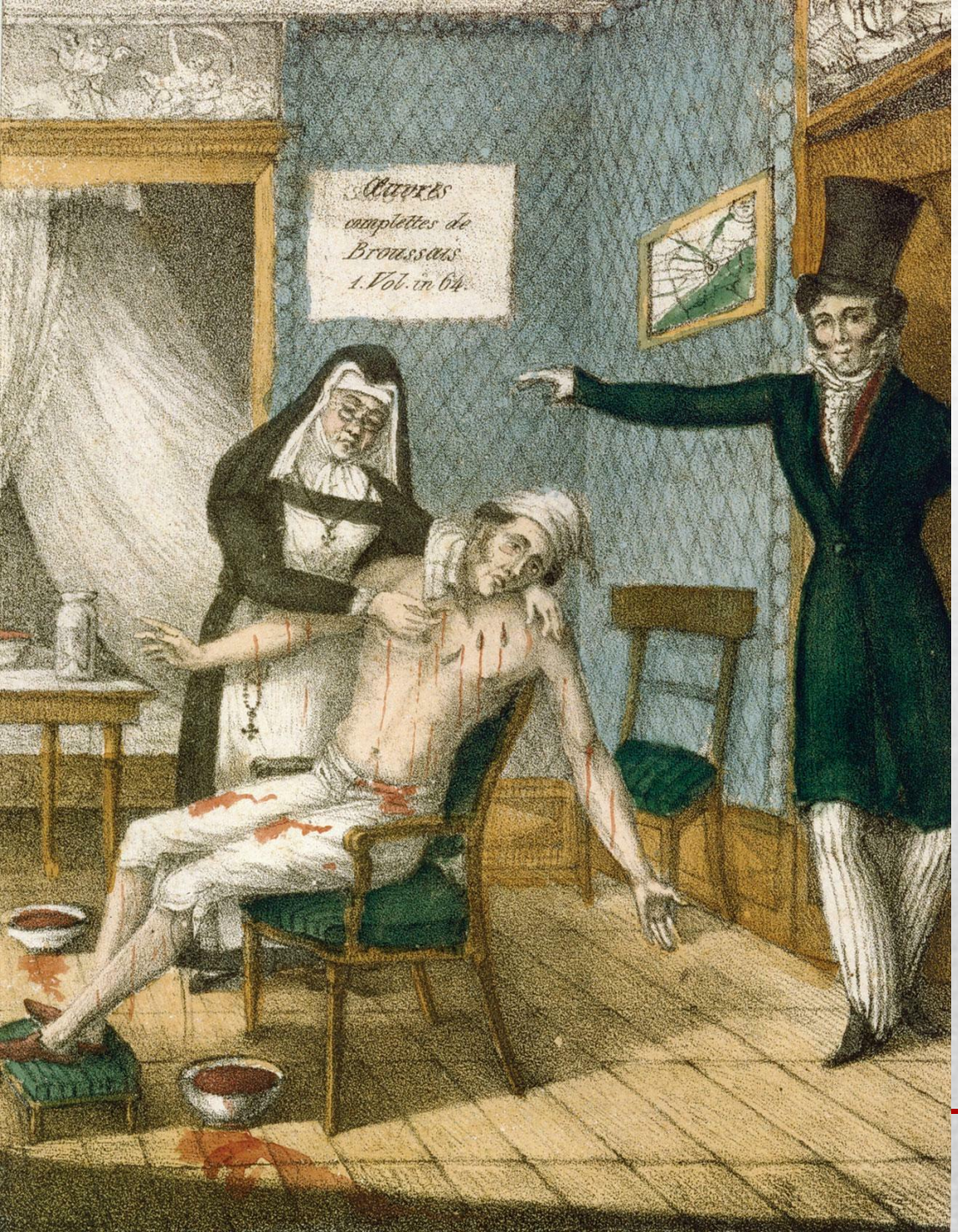


Treatment of Hypertension

History of Hypertension

2600 B.C. mention of **“hard pulse disease”**

- First treatments: Leeching/phlebotomy, acupuncture
- Hippocrates recommended phlebotomy 120 AD
- Cupping of the spine to draw animal spirits down and out was recommended



Lithograph showing the leeching of a patient, date unknown.

National Library of Medicine,
Bethesda, Maryland

An ideal antihypertensive drug

- Effective as monotherapy
- Reduced peripheral vascular resistance.
- Preserves cardiac out put, and perfusion to vital organs at rest and during exercise.
- Does not cause reflex stimulation in neurohumoral mechanisms.
- Favorable quality of life and side effect profile.
- Reduces hypertensive end organ damage.
- Drug compatibility with other drugs.
- Can be given in co existing disorder
- Once a day dosage.
- *Reduces Stroke IHD and Renal event*

Choice of Pharmacological Treatment

- Associated risk factors?
- Target organ damage
- Concomitant diseases/conditions?

- Individualized Treatment
- Compelling indications AND
- Guidelines ,Opinions

High Blood Pressure : To treat or not

Table 6 Relative risk reduction of fatal events and combined fatal and non-fatal events in patients on active antihypertensive treatment versus placebo or no treatment

	Systolic–diastolic hypertension		Isolated systolic hypertension	
	Risk reduction	*P*	Risk reduction	*P*
Mortality				
all cause	−14%	<0.01	−13%	0.02
cardiovascular	−21%	<0.001	−18%	0.01
non-cardiovascular	−1%	NS		NS
Fatal and non-fatal events				
stroke	−42%	<0.001	−30%	<0.001
coronary	−14%	<0.01	−23%	<0.001

Weber M, J Hypertens 2006

Treatment of Hypertension in different era

- Sodium thiocynate ,1900
- Diuretics
- Rice diet
- Surgical sympethectomy
- Tetramethyle ammonium chloride
- Hexamethonium
- Hydralzine
- Rauwolfia serpentina .
- Beta blockers 1970

The role of Beta blocker in hypertension

TO BE OR NOT TO BE??

BETA BLOCKERS

1948: Ahlquist classified adrenergic receptors in to alpha and beta receptor

1958: Dichloroisoprenaline first BB

1963: Propronolol J.W Black (Nobel 1988)

1980: BB became the most popular anti hypertensive drug after diuretics .

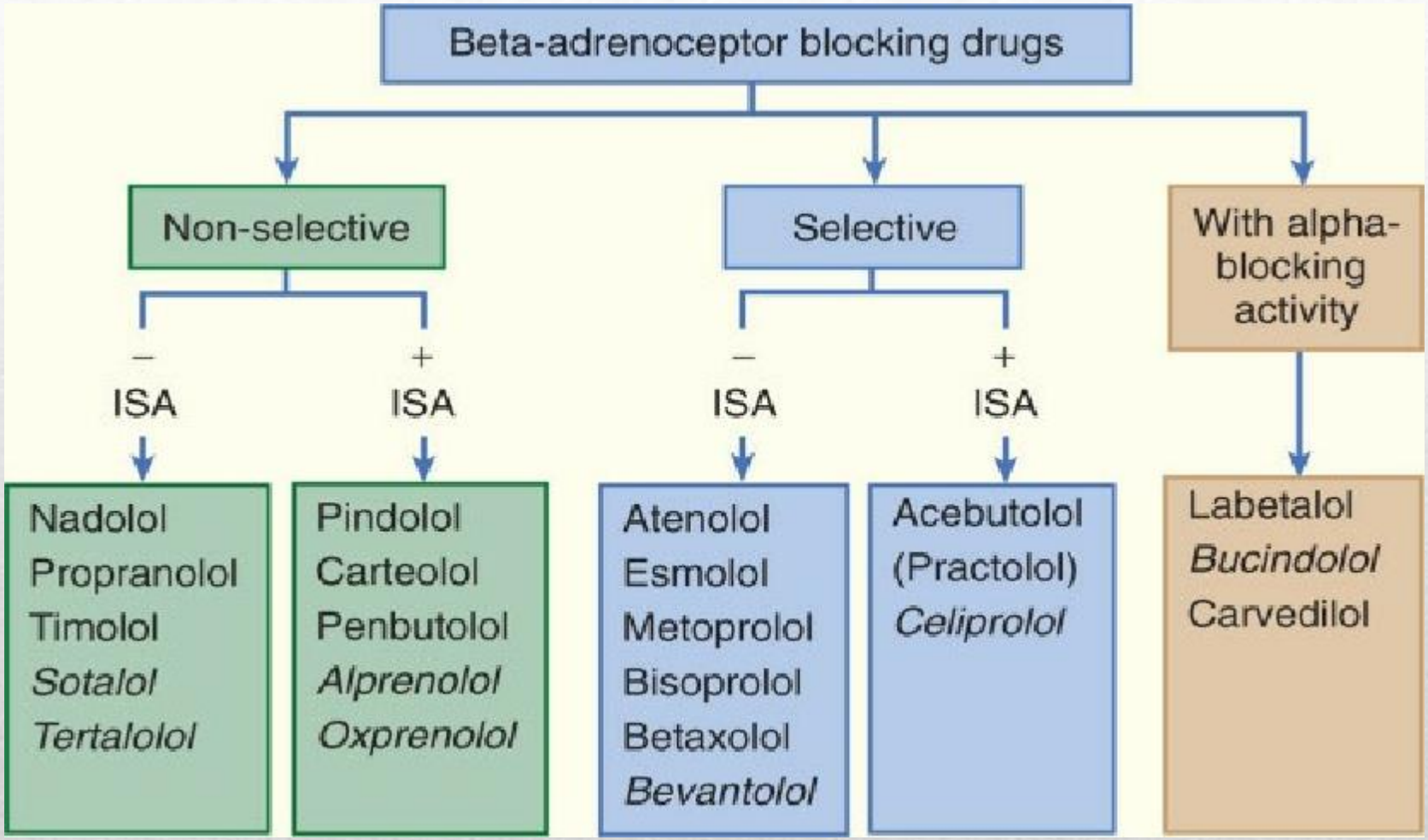
2003: Most controversial

2010: Guidelines on HTN treatment moved away from recommending BB as first line anti hypertensive

Raymond Ahlquist
Department of Pharmacology
Medical College of Georgia

J.W. Black
Pharmacology Department
University College of London,
England

CLASSIFICATION OF BETA BLOCKER



Consider factors before prescribing Beta blocker

- Non selective BB can precipitate Bronchial asthma
- Avoid in conduction block
- Avoid in suspected Pheochomocytoma
- Sexual dysfunction in male
- Increase in depression
  suicidal tendency as compared with CCB/ACEi
- Use with caution in DM ,elderly patients

Consider factors before prescribing Beta blocker

- **Bradycardia and SSS**
- **Impairment of carbohydrate tolerance in pre diabetic**
- **Alteration of lipid problem**
- **Sudden withdrawal, Rebound HTN, Angina**
- **Decreased exercise capacity**
- **Worsening of peripheral artery Disease.(PAD)**

WHAT THE JNC 7 SAYS…

Table 1. Classification and management of blood pressure for adults*

BP Classification	SBP* mmHg	DBP* mmHg	Lifestyle Modification	Initial drug therapy	
				Without Compelling Indication	With Compelling Indications (See Table 8)
Normal	<120	and <80	Encourage		
Prehypertension	120–139	or 80–89	Yes	No antihypertensive drug indicated.	Drug(s) for compelling indications.‡
Stage 1 Hypertension	140–159	or 90–99	Yes	Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.	Drug(s) for the compelling indications.‡ Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.
Stage 2 Hypertension	≥160	or ≥100	Yes	Two-drug combination for most† (usually thiazide-type diuretic and ACEI or ARB or BB or CCB).	

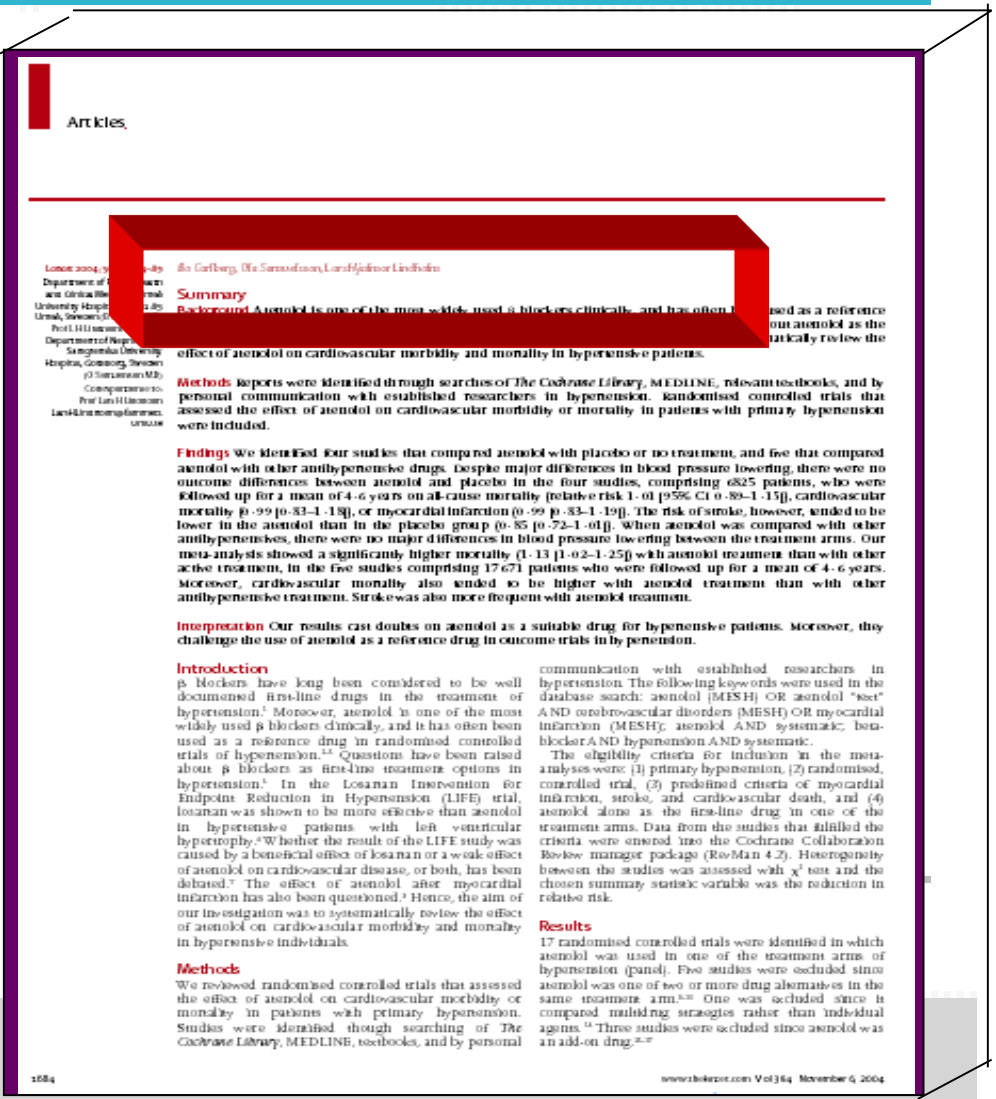
DBP, diastolic blood pressure; SBP, systolic blood pressure.

Drug abbreviations: ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta-blocker; CCB, calcium channel blocker.

* Treatment determined by highest BP category.

† Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.

‡ Treat patients with chronic kidney disease or diabetes to BP goal of <130/80 mmHg.



THE LANCET

Articles

Ola Carlberg, Ola Samuelsson, Lars-Hjalmar Lindholm

Summary

Background A-blockers clinically, and has often been used as a reference drug in randomised controlled trials of hypertension. Questions have been raised about atenolol as the first-line treatment option in hypertension. We systematically review the effect of atenolol on cardiovascular morbidity and mortality in hypertensive patients.

Methods Reports were identified through searches of *The Cochrane Library*, MEDLINE, relevant textbooks, and by personal communication with established researchers in hypertension. Randomised controlled trials that assessed the effect of atenolol on cardiovascular morbidity or mortality in patients with primary hypertension were included.

Findings We identified four studies that compared atenolol with placebo or no treatment, and five that compared atenolol with other antihypertensive drugs. Despite major differences in blood pressure lowering, there were no outcome differences between atenolol and placebo in the four studies, comprising 6825 patients, who were followed up for a mean of 4·6 years on all-cause mortality (relative risk 1·01 [95% CI 0·89–1·15]), cardiovascular mortality (0·99 [0·83–1·18]), or myocardial infarction (0·99 [0·83–1·19]). The risk of stroke, however, tended to be lower in the atenolol than in the placebo group (0·85 [0·72–1·01]). When atenolol was compared with other antihypertensives, there were no major differences in blood pressure lowering between the treatment arms. Our meta-analysis showed a significantly higher mortality (1·13 [1·02–1·25]) with atenolol treatment than with other active treatment, in the five studies comprising 17 671 patients who were followed up for a mean of 4·6 years. Moreover, cardiovascular mortality also tended to be higher with atenolol treatment than with other antihypertensive treatment. Stroke was also more frequent with atenolol treatment.

Interpretation Our results cast doubts on atenolol as a suitable drug for hypertensive patients. Moreover, they challenge the use of atenolol as a reference drug in outcome trials in hypertension.

Introduction

β blockers have long been considered to be well documented first-line drugs in the treatment of hypertension.[1] Moreover, atenolol is one of the most widely used β blockers clinically, and it has often been used as a reference drug in randomised controlled trials of hypertension.[2,3] Questions have been raised about β blockers as first-line treatment options in hypertension.[4] In the Losartan Intervention for Endpoint Reduction in Hypertension (LIFE) trial, losartan was shown to be more effective than atenolol in hypertensive patients with left ventricular hypertrophy.[5] Whether the result of the LIFE study was caused by a beneficial effect of losartan or a weak effect of atenolol on cardiovascular disease, or both, has been debated.[6,7] The effect of atenolol after myocardial infarction has also been questioned.[8] Hence, the aim of our investigation was to systematically review the effect of atenolol on cardiovascular morbidity and mortality in hypertensive individuals.

Methods

We reviewed randomised controlled trials that assessed the effect of atenolol on cardiovascular morbidity or mortality in patients with primary hypertension. Studies were identified through searching of *The Cochrane Library*, MEDLINE, textbooks, and by personal communication with established researchers in hypertension. The following keywords were used in the database search: atenolol (MESH) OR atenolol "text" AND cerebrovascular disorders (MESH) OR myocardial infarction (MESH); atenolol AND systematic; beta-blocker AND hypertension AND systematic.

The eligibility criteria for inclusion in the meta-analyses were: (1) primary hypertension, (2) randomised, controlled trial, (3) predefined criteria of myocardial infarction, stroke, and cardiovascular death, and (4) atenolol alone as the first-line drug in one of the treatment arms. Data from the studies that fulfilled the criteria were entered into the Cochrane Collaboration Review manager package (RevMan 4.2). Heterogeneity between the studies was assessed with χ^2 test and the chosen summary statistic variable was the reduction in relative risk.

Results

17 randomised controlled trials were identified in which atenolol was used in one of the treatment arms of hypertension (panel). Five studies were excluded since atenolol was one of two or more drug alternatives in the same treatment arm.[9,10] One was excluded since it compared multidrug strategies rather than individual agents.[11] Three studies were excluded since atenolol was an add-on drug.[12–14]

2004

9 RCT

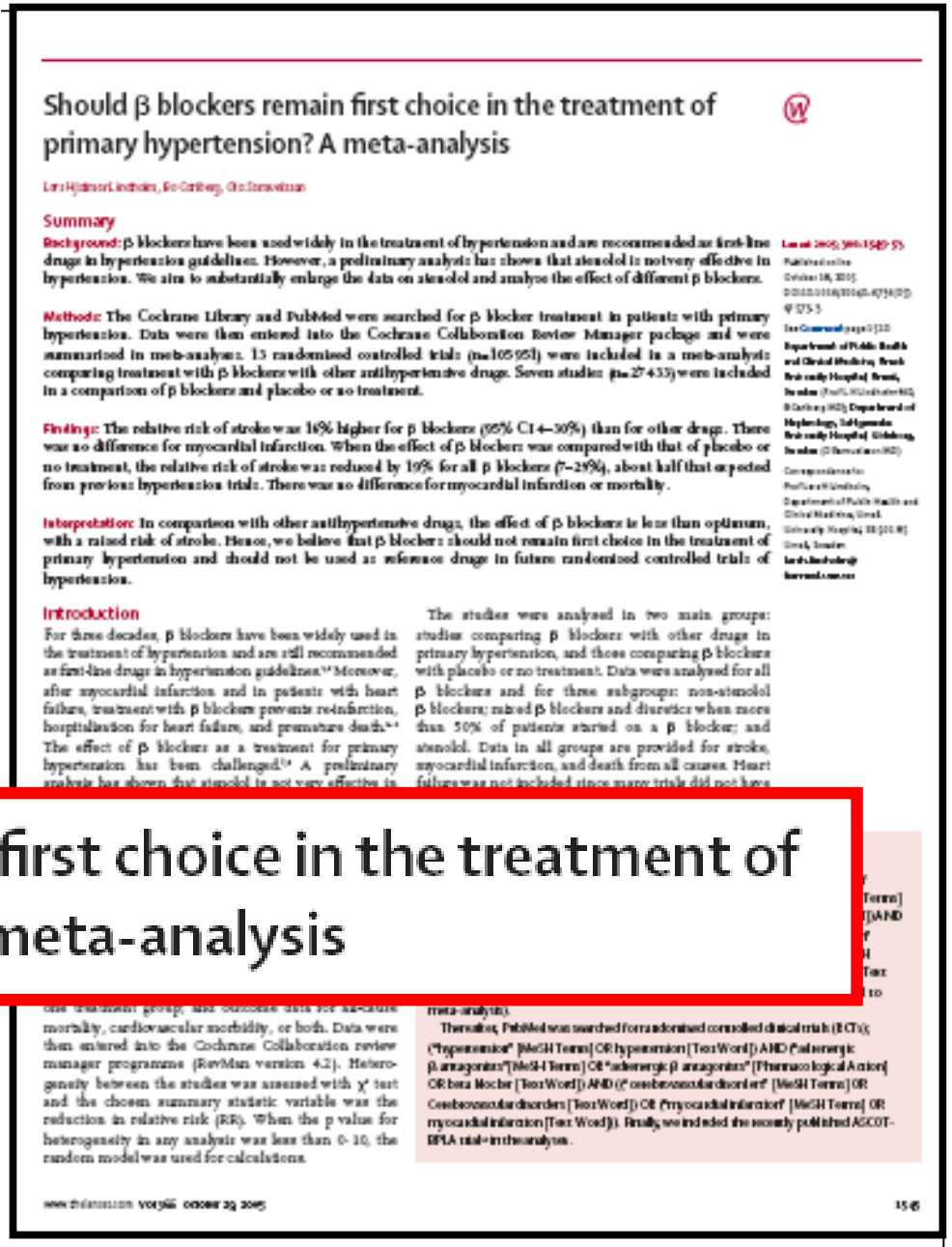
N= 23078

Pateints

In 2005 an article in Lancet was published which challenged the experience of more than 2 decades -

THE LANCET

Reprint



Should β blockers remain first choice in the treatment of primary hypertension? A meta-analysis

Should β blockers remain first choice in the treatment of primary hypertension? A meta-analysis

Lars Hjalmar Lindholm, Bo Carlberg, Ola Samuelsson

Summary

Background: β blockers have been used widely in the treatment of hypertension and are recommended as first-line drugs in hypertension guidelines. However, a preliminary analysis has shown that atenolol is not very effective in hypertension. We aim to substantially enlarge the data on atenolol and analyse the effect of different β blockers.

Methods: The Cochrane Library and PubMed were searched for β blocker treatment in patients with primary hypertension. Data were then entered into the Cochrane Collaboration Review Manager package and were summarised in meta-analyses. 13 randomised controlled trials (n=105 955) were included in a meta-analysis comparing treatment with β blockers with other antihypertensive drugs. Seven studies (n=27 433) were included in a comparison of β blockers and placebo or no treatment.

Findings: The relative risk of stroke was 16% higher for β blockers (95% CI 4–30%) than for other drugs. There was no difference for myocardial infarction. When the effect of β blockers was compared with that of placebo or no treatment, the relative risk of stroke was reduced by 19% for all β blockers (7–29%), about half that expected from previous hypertension trials. There was no difference for myocardial infarction or mortality.

Interpretation: In comparison with other antihypertensive drugs, the effect of β blockers is less than optimum, with a raised risk of stroke. Hence, we believe that β blockers should not remain first choice in the treatment of primary hypertension and should not be used as reference drugs in future randomised controlled trials of hypertension.

Introduction

For three decades, β blockers have been widely used in the treatment of hypertension and are still recommended as first-line drugs in hypertension guidelines.[1–3] Moreover, after myocardial infarction and in patients with heart failure, treatment with β blockers prevents re-infarction, hospitalisation for heart failure, and premature death.[4–6] The effect of β blockers as a treatment for primary hypertension has been challenged.[7,8] A preliminary analysis has shown that atenolol is not very effective in

The studies were analysed in two main groups: studies comparing β blockers with other drugs in primary hypertension, and those comparing β blockers with placebo or no treatment. Data were analysed for all β blockers and for three subgroups: non-atenolol β blockers; mixed β blockers and diuretics when more than 50% of patients started on a β blocker; and atenolol. Data in all groups are provided for stroke, myocardial infarction, and death from all causes. Heart failure was not included since many trials did not have

one treatment group, and outcome data for all-cause mortality, cardiovascular morbidity, or both. Data were then entered into the Cochrane Collaboration review manager programme (RevMan version 4.2). Heterogeneity between the studies was assessed with χ^2 test and the chosen summary statistic variable was the reduction in relative risk (RR). When the p value for heterogeneity in any analysis was less than 0·10, the random model was used for calculations.

meta-analysis).

Thereafter, PubMed was searched for randomised controlled clinical trials (RCTs): ("hypertension"[MeSH Terms] OR hypertension[Text Word]) AND ("adrenergic β antagonists"[MeSH Terms] OR "adrenergic β antagonists"[Pharmacological Action] OR beta blocker[Text Word]) AND (("cerebrovascular disorders"[MeSH Terms] OR Cerebrovascular disorders[Text Word]) OR ("myocardial infarction"[MeSH Terms] OR myocardial infarction[Text Word])). Finally, we included the recently published ASCOT-BPLA trial in the analysis.

www.thelancet.com Vol 366 October 29, 2005 1545

Beta blocker

- Beta blockers are not recommended as initial treatment of uncomplicated hypertension

- Beta-blockers has **reduced ability to protect against stroke**, though being equally effective for protection from coronary events and mortality

A meta-analysis with pooled data from 13 RCT

"Excess risk of STROKE (16%) associated with the use of BB compared with other Antihypertensives"

Relative risk of major events with atenolol vs placebo (n = 6825)

End point	RR	95% CI
All-cause mortality	1.01	0.89-1.15
Cardiovascular mortality	0.99	0.83-1.18
MI	0.99	0.83-1.19
Stroke	0.85	0.72-1.01

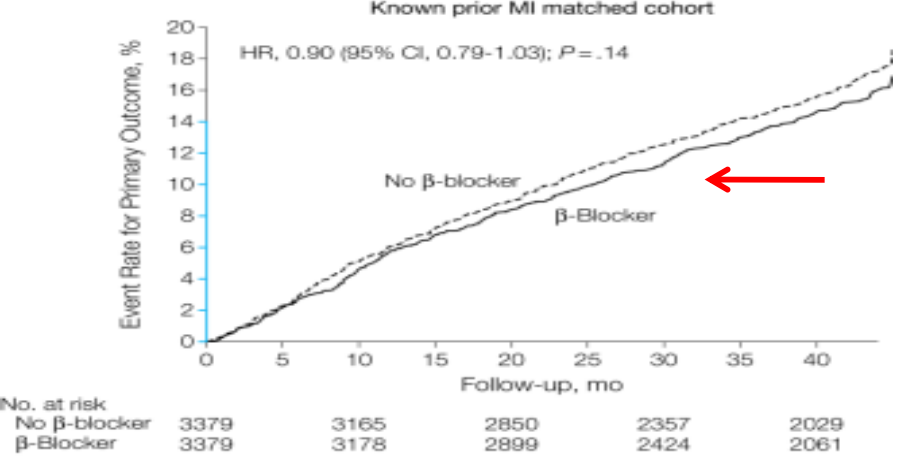
Carlberg B et al. *Lancet* 2004; 364:1684–1689.

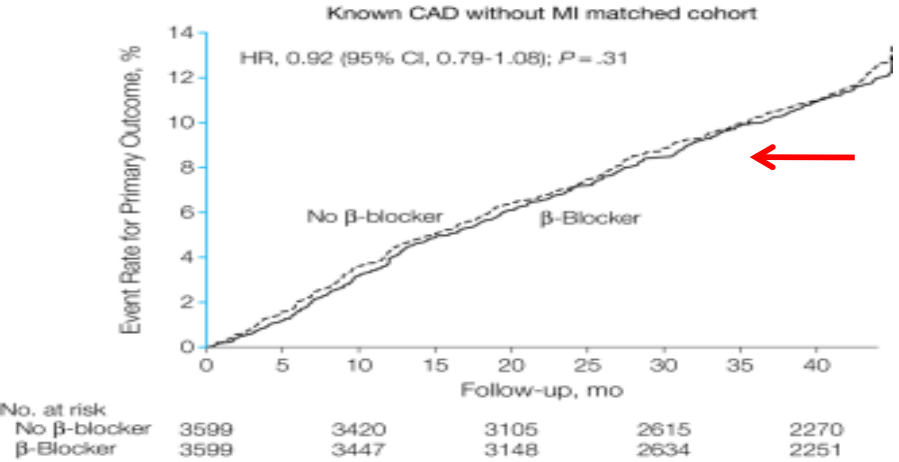
The REACH Registry

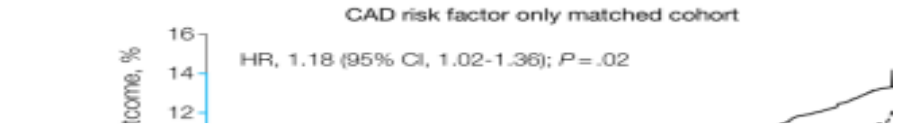
An International, Prospective Observational Study in Subjects at Risk of Atherothrombotic Events in an Outpatient Setting

reach REGISTRY

REduction of Atherothrombosis for Continued Health







	β-Blocker, No.		No β-Blocker, No.				Favors β-Blocker	Favors No β-Blocker	P Value for Interaction
	Events	Total Sample	Events	Total Sample	HR (95% CI)	P Value			
Primary outcome									
Prior MI	489	3379	532	3379	0.90 (0.79-1.03)	.14			.14
Known CAD without MI	391	3599	405	3599	0.92 (0.79-1.08)	.31			
Risk factor without MI	467	3952	403	3952	1.18 (1.02-1.36)	.02			
Secondary outcome[a]									
Prior MI	1046	3379	1119	3379	0.91 (0.82-1.00)	.06			.003
Known CAD without MI	1101	3599	1002	3599	1.14 (1.03-1.27)	.01			
Risk factor without MI	870	3952	797	3952	1.12 (1.00-1.24)	.04			
Death									
Prior MI	406	3379	430	3379	0.93 (0.80-1.08)	.34			.53
Known CAD without MI	312	3599	353	3599	0.91 (0.77-1.07)	.25			
Risk factor without MI	348	3952	365	3952	0.97 (0.82-1.14)	.71			
Cardiovascular death									
Prior MI	273	3379	291	3379	0.91 (0.76-1.09)	.31			.51
Known CAD without MI	178	3599	207	3599	0.90 (0.72-1.11)	.32			
Risk factor without MI	207	3952	203	3952	1.05 (0.85-1.30)	.66			
Nonfatal MI									
Prior MI	157	3379	150	3379	1.10 (0.87-1.41)	.42			.29
Known CAD without MI	110	3599	84	3599	1.24 (0.91-1.69)	.16			
Risk factor without MI	89	3952	68	3952	1.36 (0.97-1.90)	.08			
Nonfatal stroke									
Prior MI	123	3379	142	3379	0.87 (0.66-1.13)	.28			.08
Known CAD without MI	141	3599	140	3599	0.89 (0.69-1.16)	.39			
[illegible]	[illegible]		[illegible]		[illegible]				.03

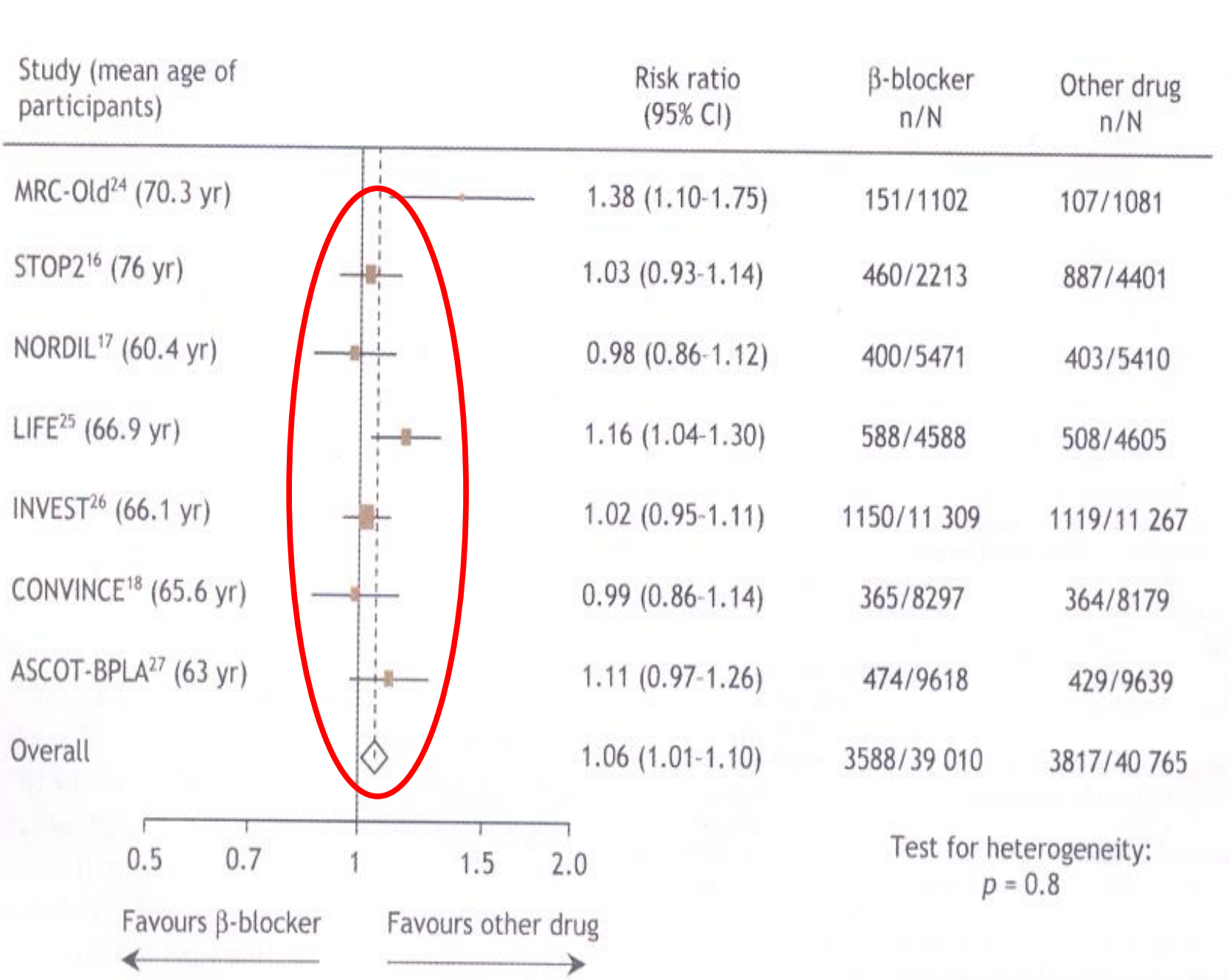
β-blocker use was not associated with a lower event rate of cardiovascular events at 44-month follow-up, even among patients with prior history of MI

Insight in to REACH registry: Beta-blocker use

Patients with just only coronary risk factors but no CAD

- BB was associated with worse outcome:-
- Increase risk of primary composite end point-CV death, non fatal MI, or non fatal stroke
- Increase risk of secondary outcome

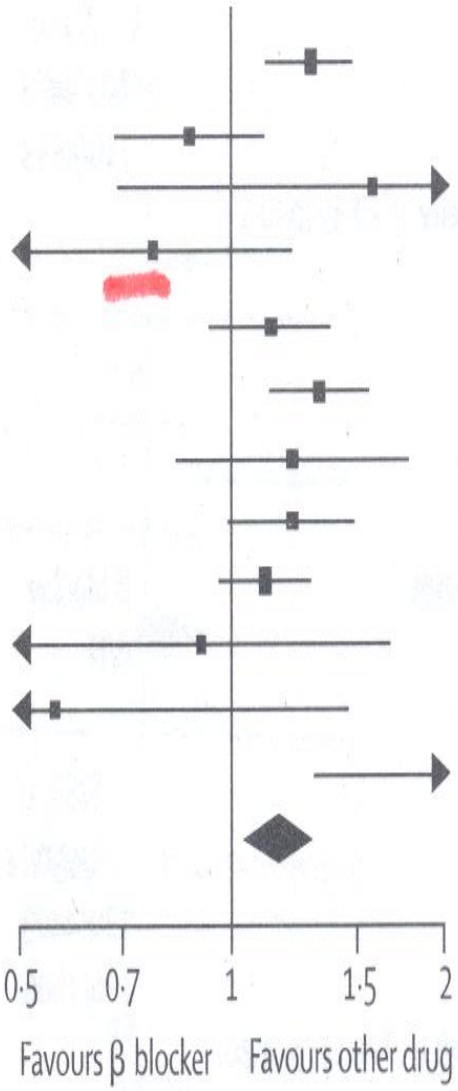
BB v/s OTHER DRUGS



1A Stroke **STROKE**

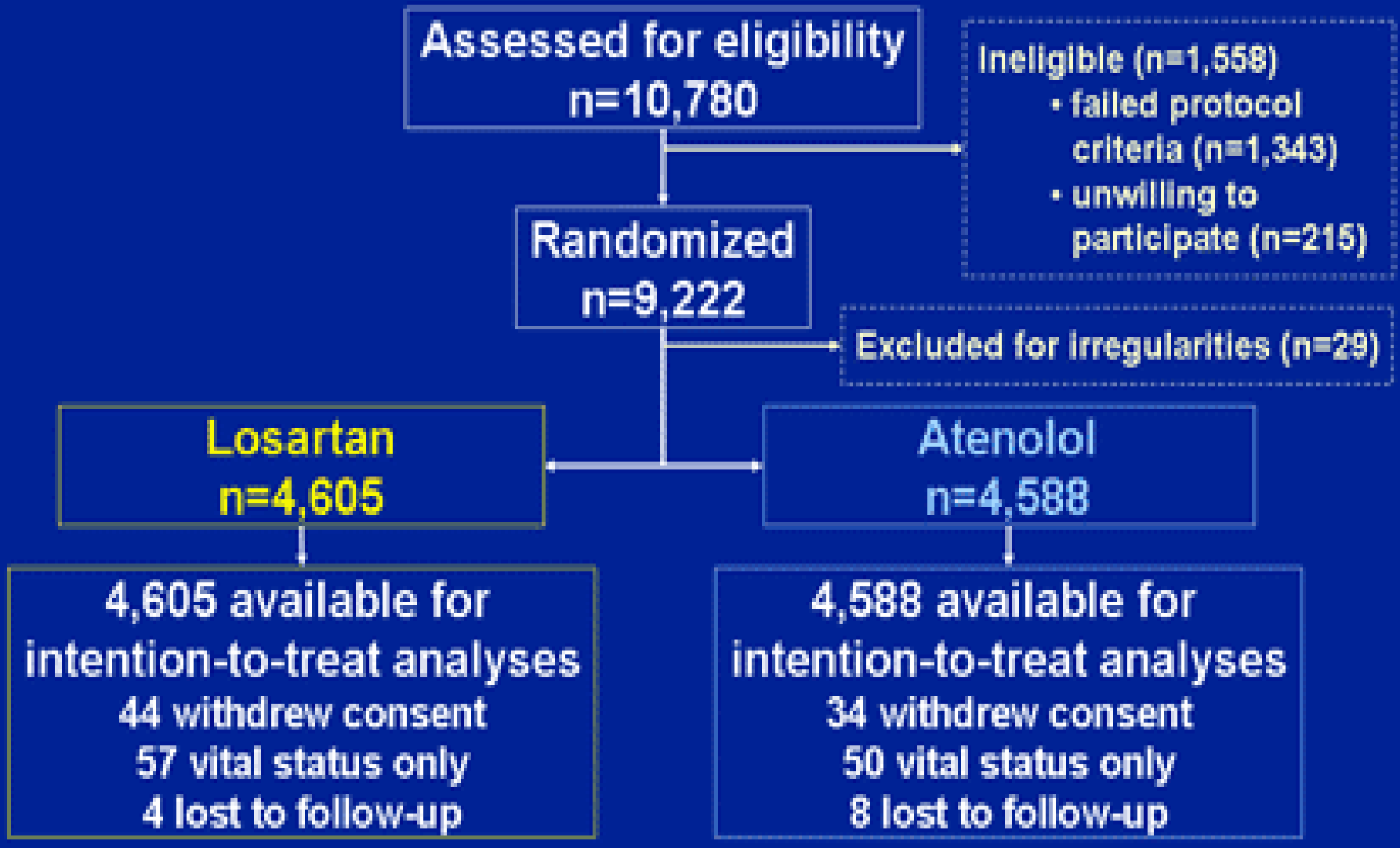
	β blocker n/N	Other drug n/N	RR 95% CI	RR 95% CI
ASCOT-BPLA	422/9618	327/9639		1·29 (1·12–1·49)
CONVINCE	118/8297	133/8179		0·87 (0·68–1·12)
ELSA	14/1157	9/1177		1·58 (0·69–3·64)
HAPPHY	32/3297	41/3272		0·77 (0·49–1·23)
INVEST	201/11309	176/11267		1·14 (0·93–1·39)
LIFE	309/4588	232/4605		1·34 (1·13–1·58)
MRC Old	56/1102	45/1081		1·22 (0·83–1·79)
NORDIL	196/5471	159/5410		1·22 (0·99–1·50)
STOP-2	237/2213	422/4401		1·12 (0·96–1·30)
UKPDS	17/358	21/400		0·90 (0·48–1·69)
Yurenev	6/150	11/154		0·56 (0·21–1·48)
MRC	42/4403	18/4297		2·28 (1·31–3·95)
Total events	1650/51963	1594/53882		1·16 (1·04–1·30)

Test for heterogeneity: χ^2=22·39 (p=0·02)



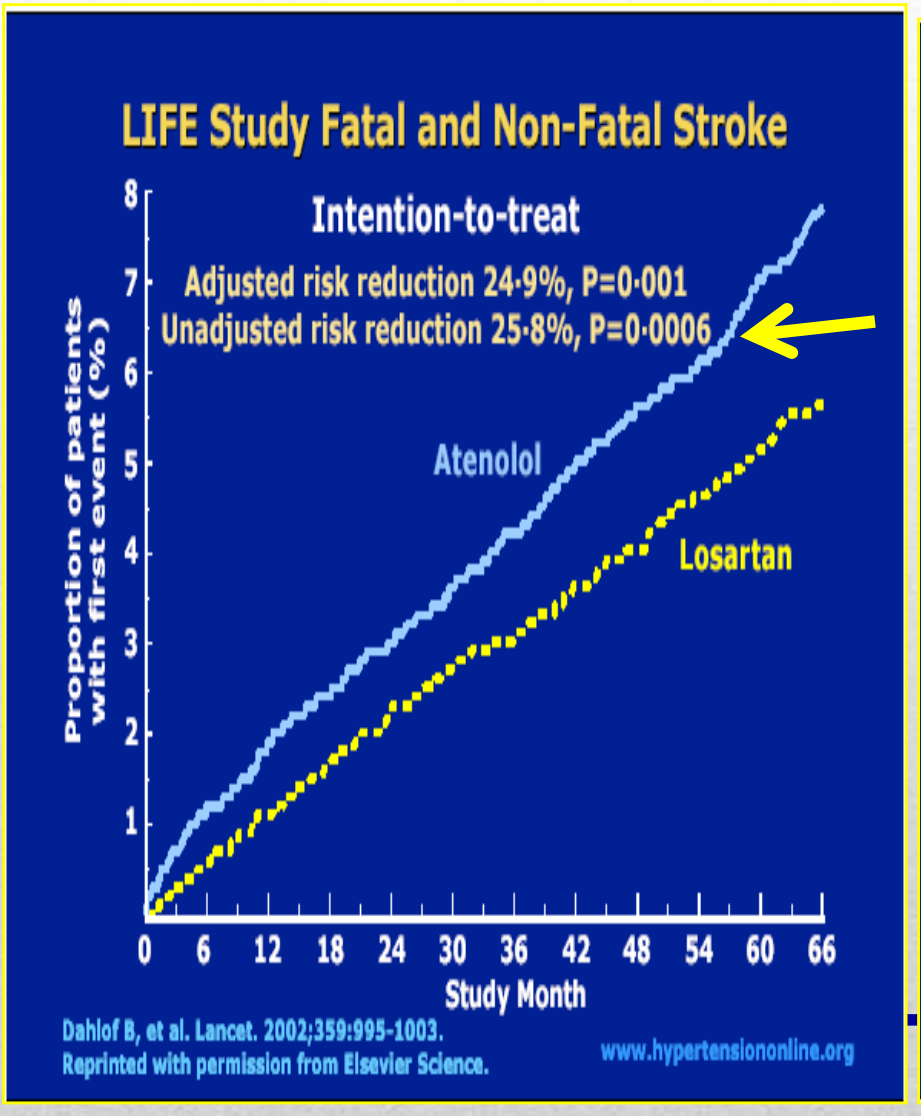
Myocardial infarction	β blocker	Other drug	RR	RR
	n/N	n/N	95% CI	95% CI

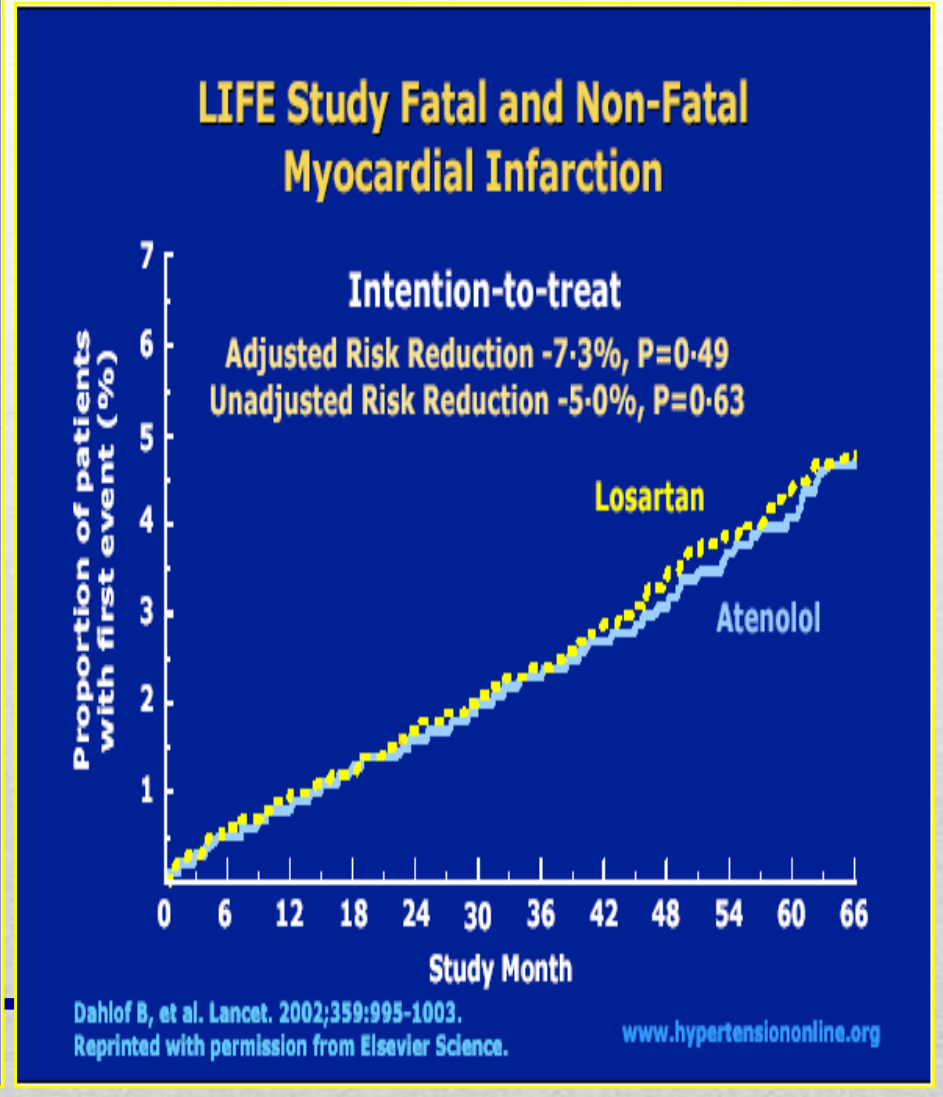
LIFE Study Design



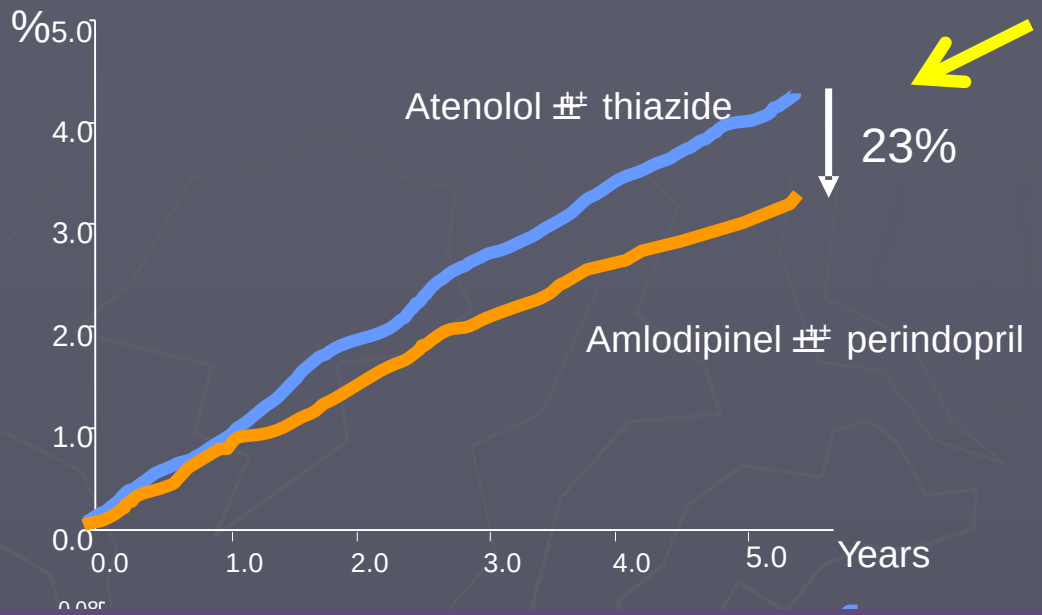
Dahlof B, et al. Lancet. 2002;359:995-1003.
Reprinted with permission from Elsevier Science.

Beta blocker LIFE Study Stroke MI

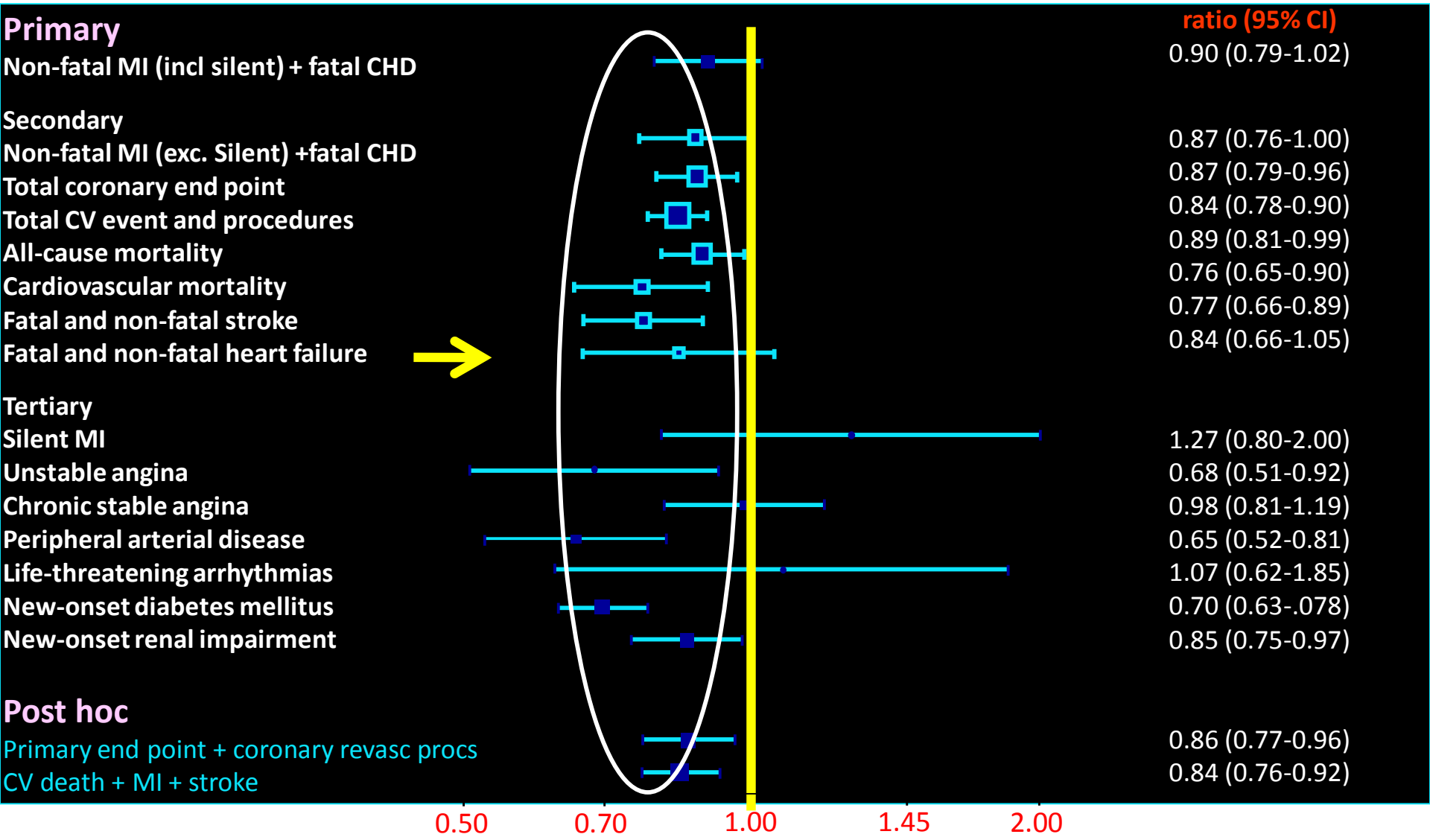




Fatal and non fatal stroke : ββ Blockers vs. Amlo β

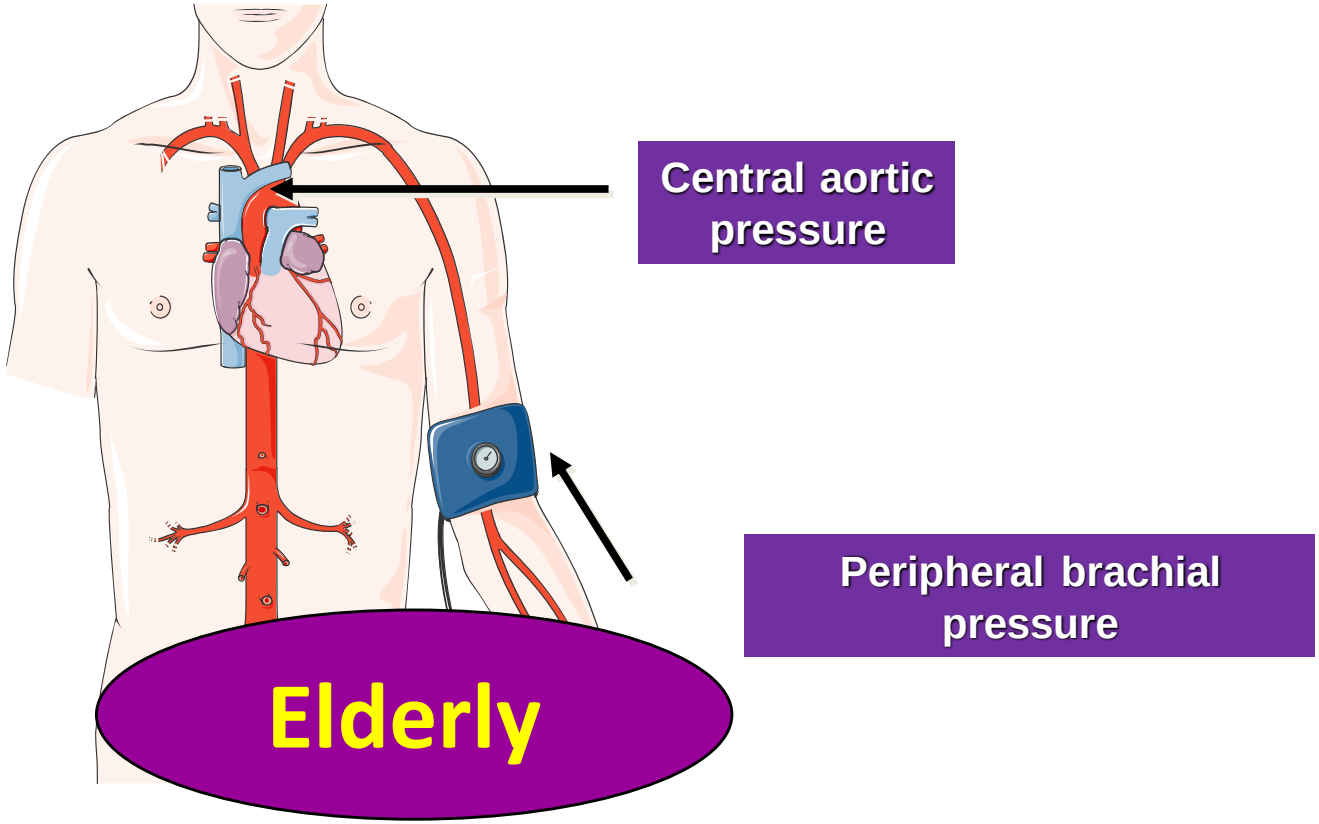


Summary of all end points



Central Aortic Pressure?

- Blood pressure in the aorta, closer to the vital organs
- CAP is a better predictor of CV events, that's the reason why Atenolol didn't work well in ASCOT



CENTRAL AORTIC PRESSURE

- Beta blockers does not reduce cental aortic pressure equally
- They reduces heart rate and increase peripheral resistance so that the arterial wave reflection from the periphery returns during systole rather than during diastole
- This leads to systolic augmentation of BP

- Williams Bet al: differential impact of blood pressure lowering drugs on central aortic pressure and clinicaL outcomes CAFÉ study . CIRCULATION 113:1213,2006

CAFE TRIAL

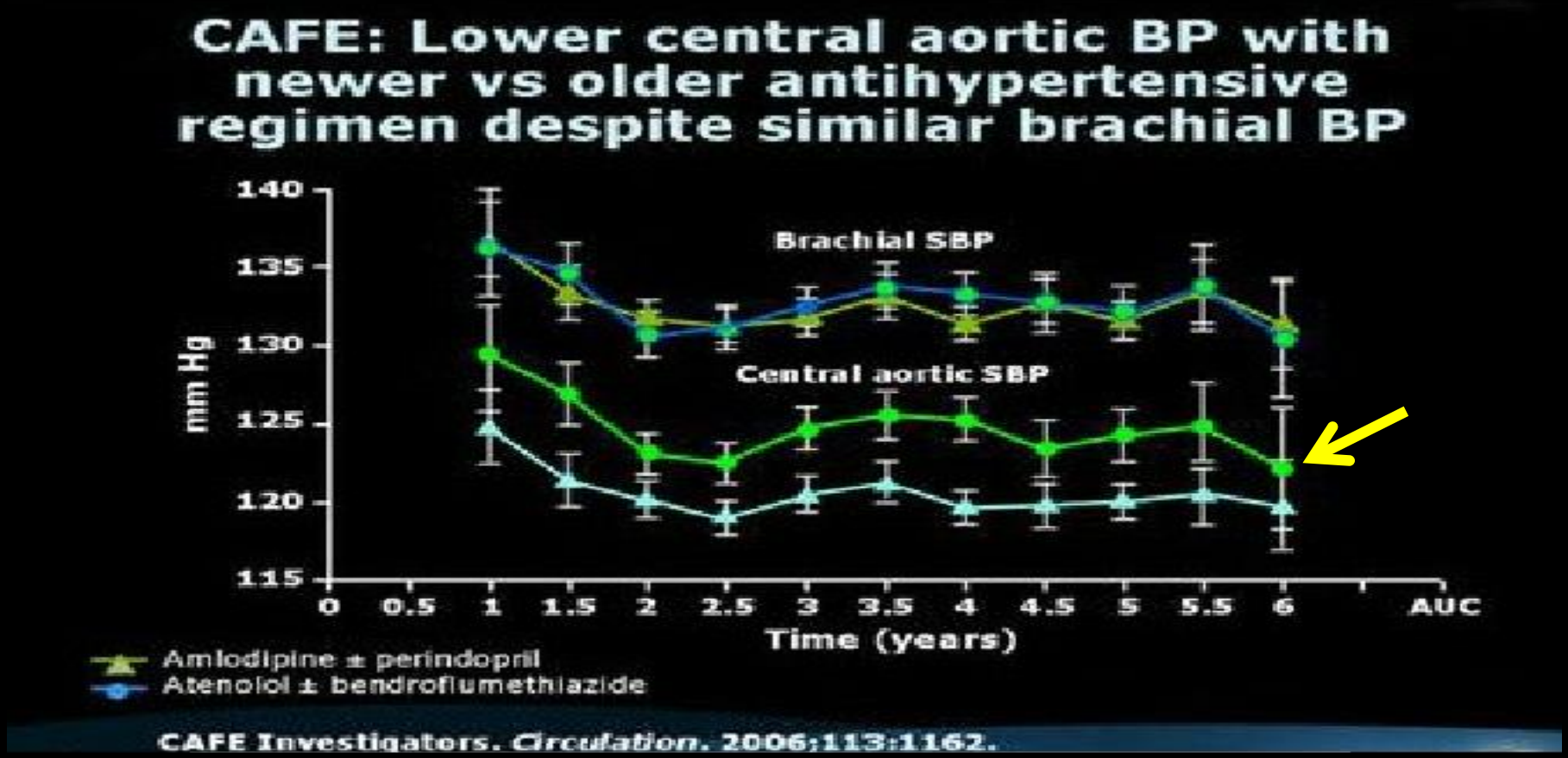
(Prototype: Atenolol)

- The greater vasodilation seen with amlodipine-based treatment might translate into a reduction in the strength of the reflected wave velocity from the periphery, thereby reducing central arterial pressures.

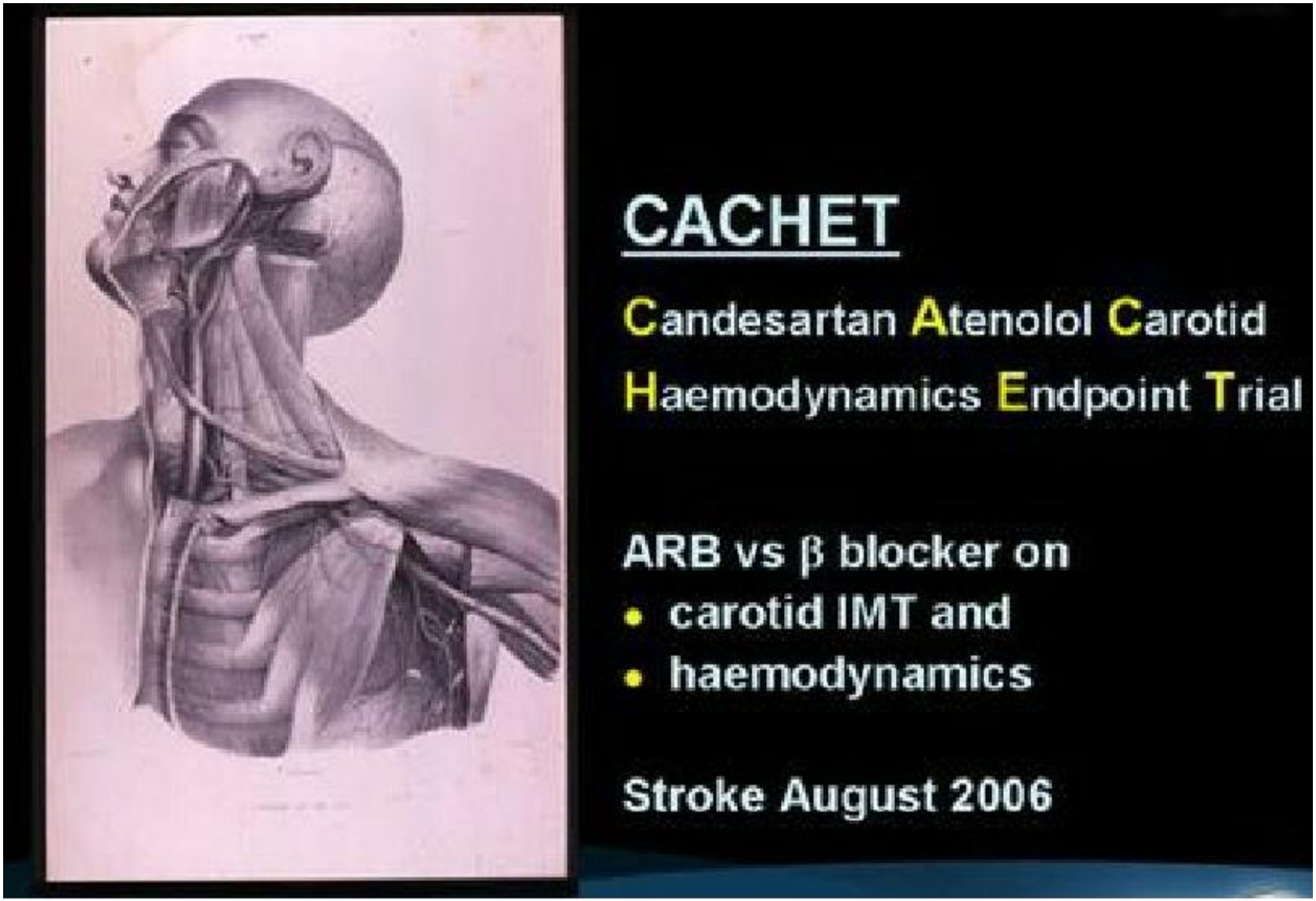
- Williams pointed out that a 3- to 4-mm-Hg difference in BP seen between groups in central aortic pressures translates into roughly a **25% difference in stroke risk**— (*similar to the 27% reduction in stroke risk seen in ASCOT in the amlodipine/perindopril arm,*

CAFE TRIAL

(Prototype: Atenolol)

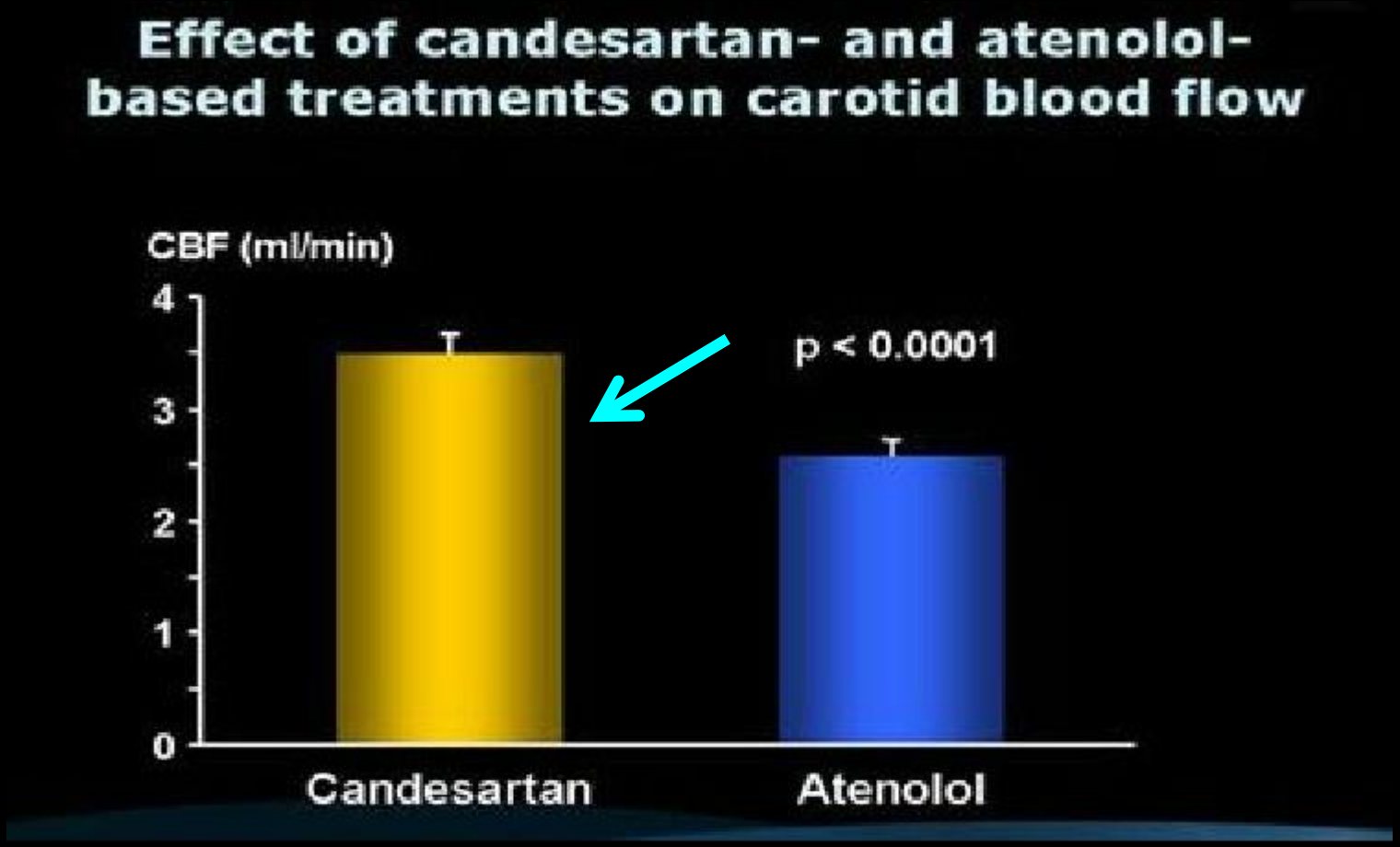


CACHET Trial

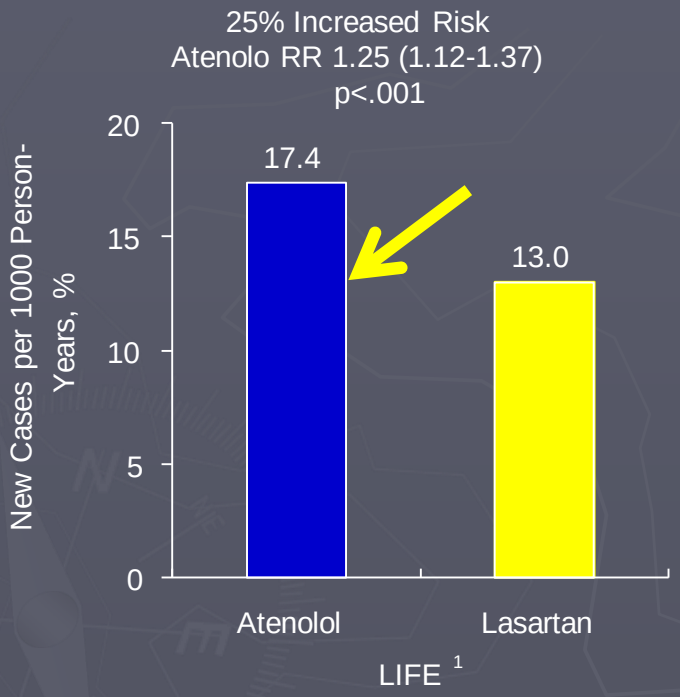


CACHET TRIAL

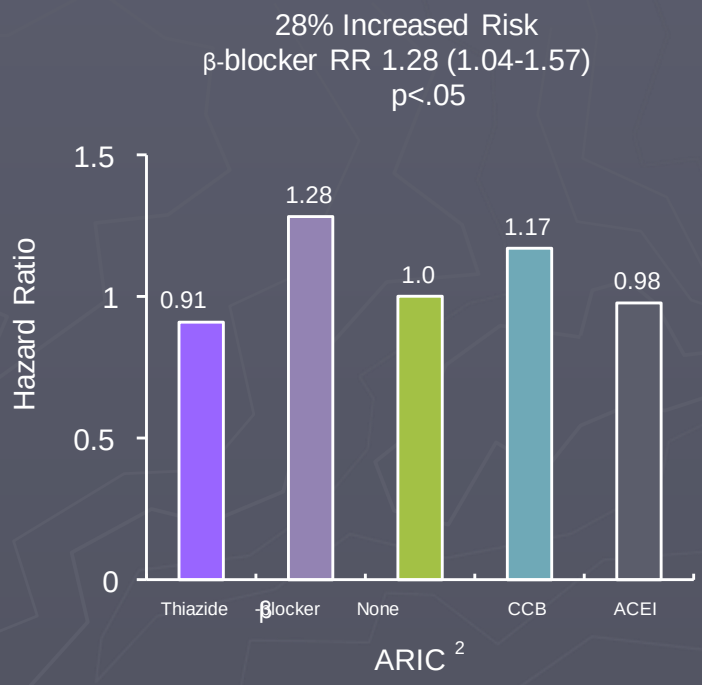
(Prototype: Atenolol)



β Blockers and the Risk of - New onset DM



Prospective study of 9193 patients with hypertension aged 55 to 80 and followed for 4.8 years. Analysis of 7998 without diabetes at baseline



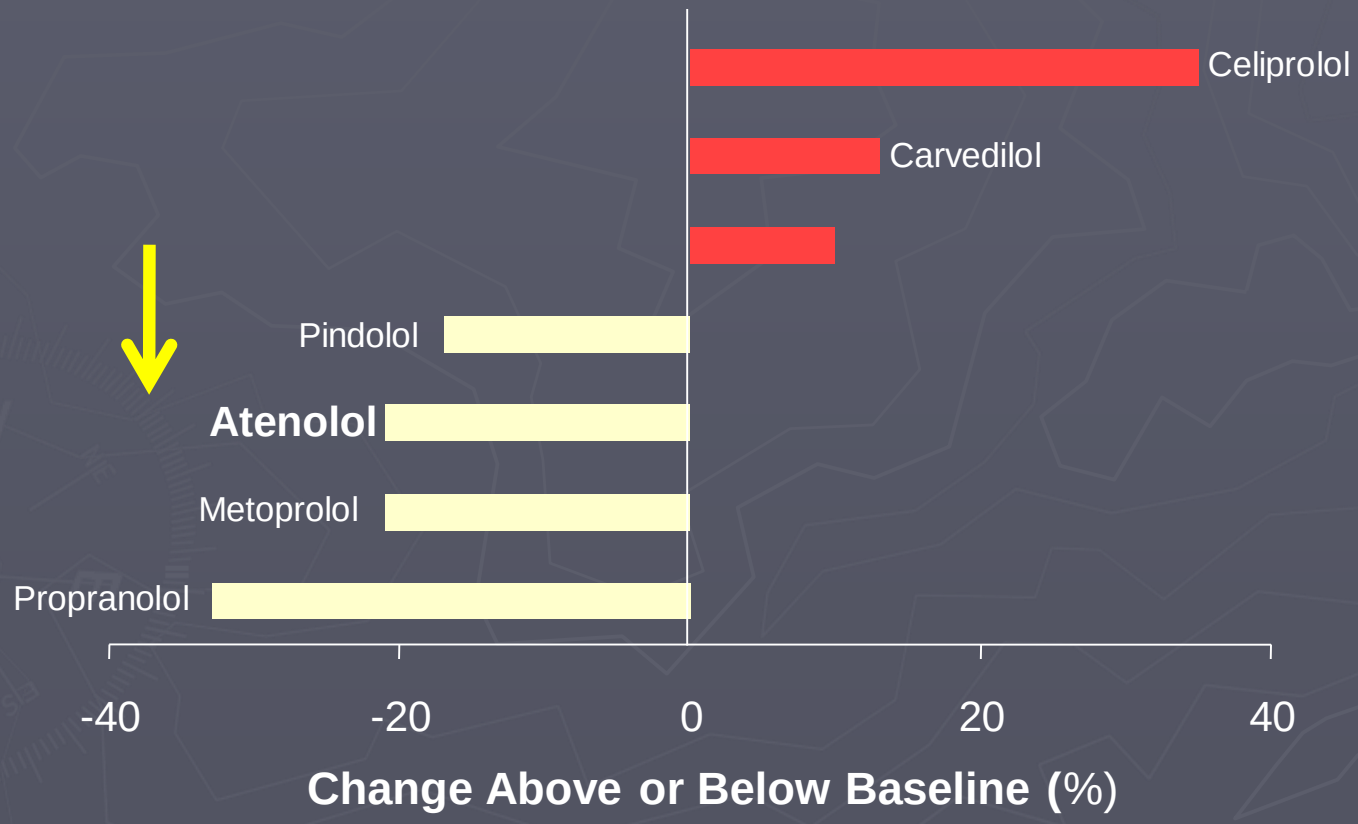
Prospective study of 12,550 patients with diabetes aged 45 to 64 and followed for 6 years. Multivanate analysis of 3804 who had hypertension at baseline.

LIFE. Losartan intervention For Endpoint Reduction; ARIC. Atherosclerosis Risk in Communities.

[1]Dahiof B, et al. Lancet. 2002;359:995-1003. [2]Gress TW. Et al. N Engl J Med. 2000;342:90

Comparison

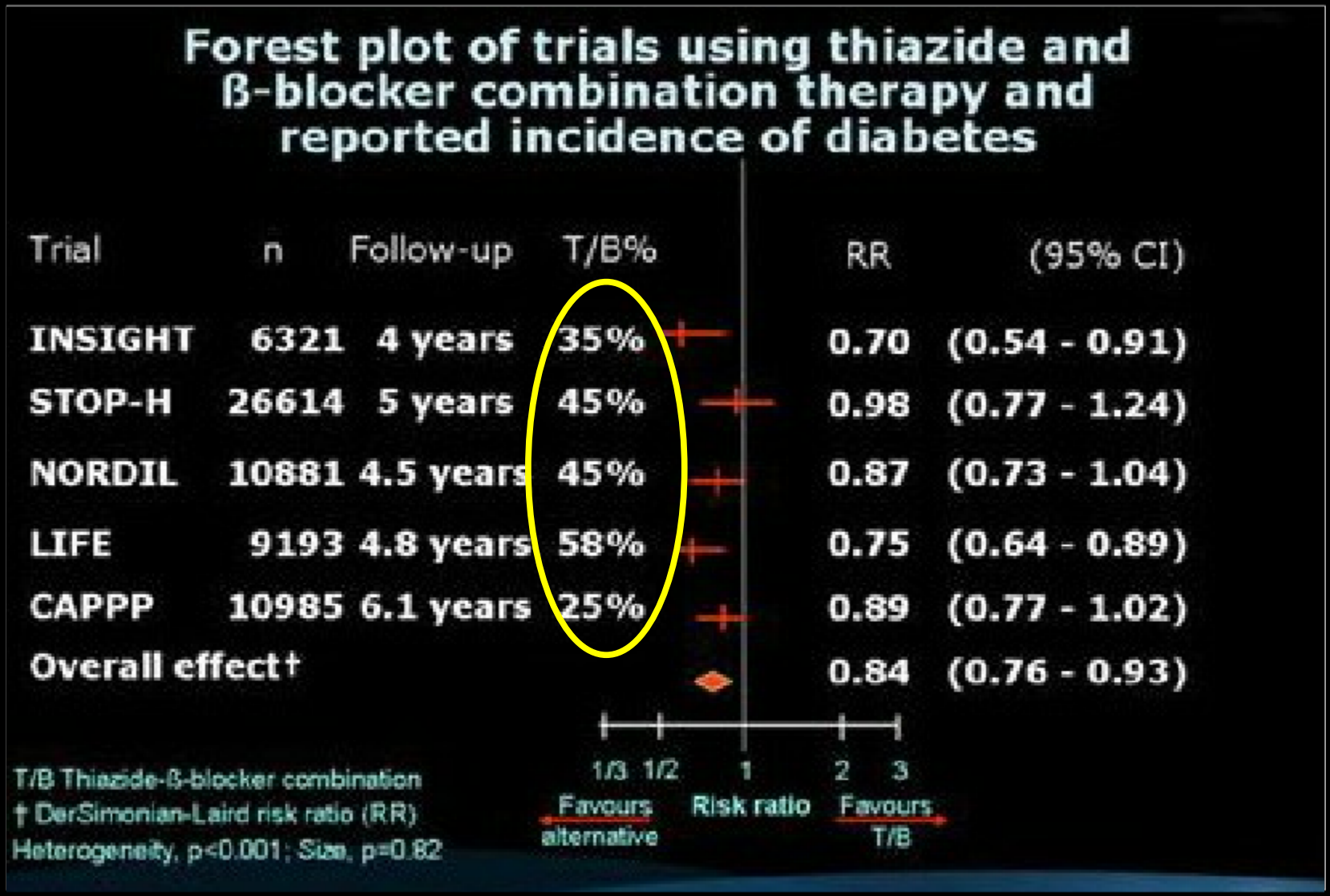
EFFECT OF BETA BLOCKER ON INSULIN SENSITIVITY



Jacob S et al. Am J Hypertens. 1998;11:1258-1265.

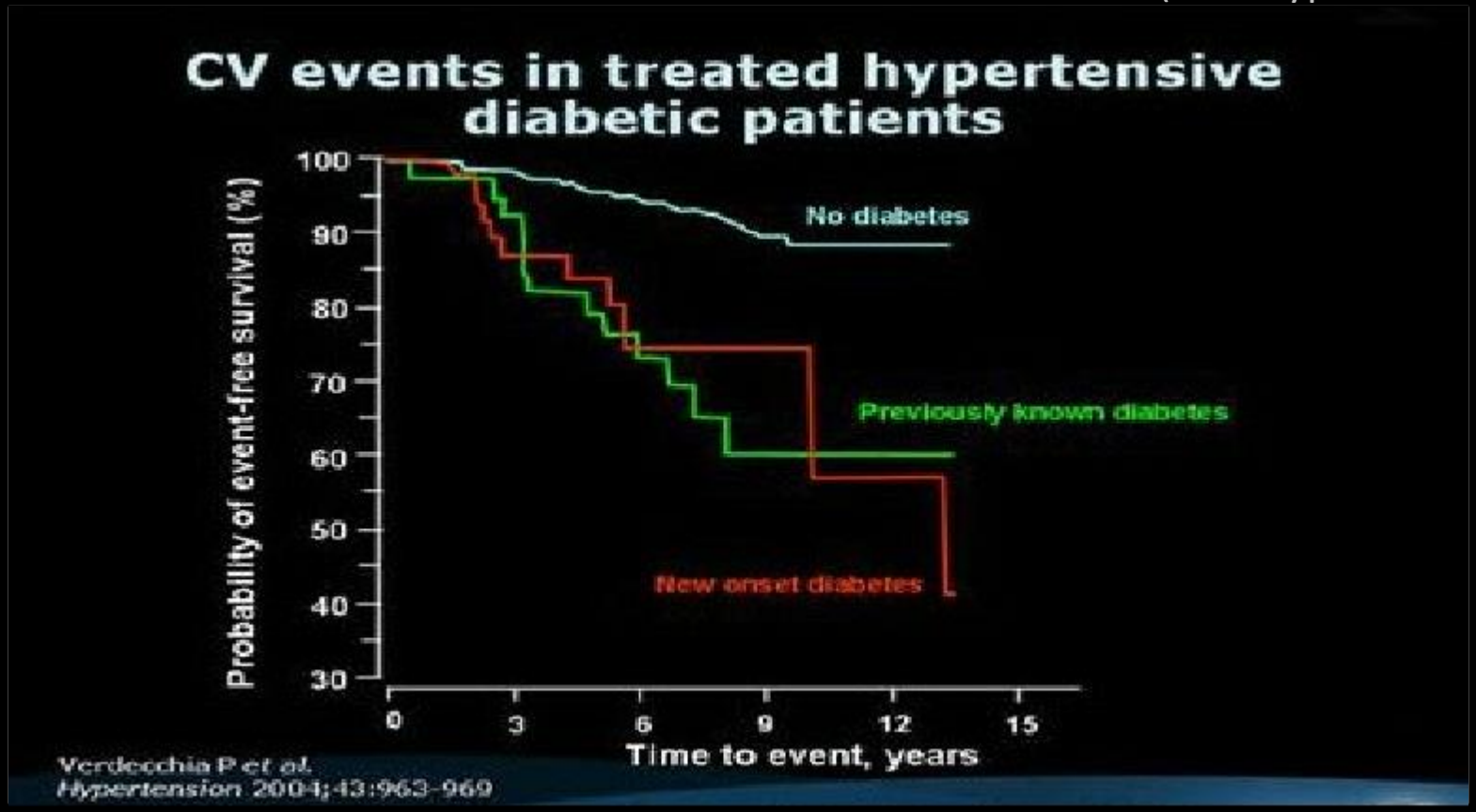
Comparison

NEW ONSET DIABETES: TRIALS



ASCOT-BPLA:
PRIMARY AND SECONDARY END POINTS

(Prototype: Atenolol)

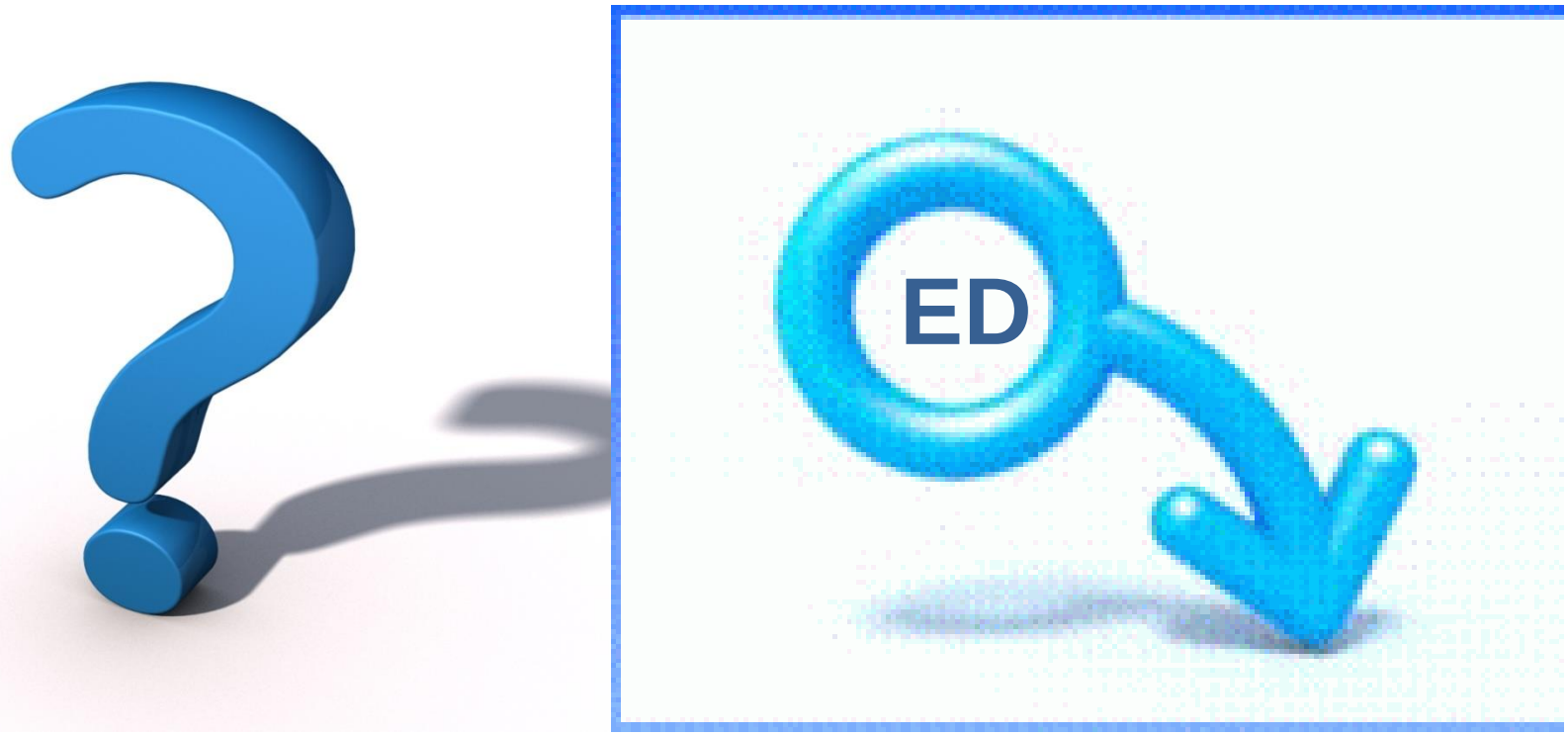


Patients with new or prior diabetes were = 3x more likely to have a CV event than those without diabetes.

Beta blocker in Diabetic and pre diabetic

- Worsening of glycemic control
- Induced new cases of diabetes
- Masking of hypoglycemic symptoms
- Other metabolic adverse effects (dyslipidemias)
- Less nephro-protective than ACE inhibitors

Beta blocker in young



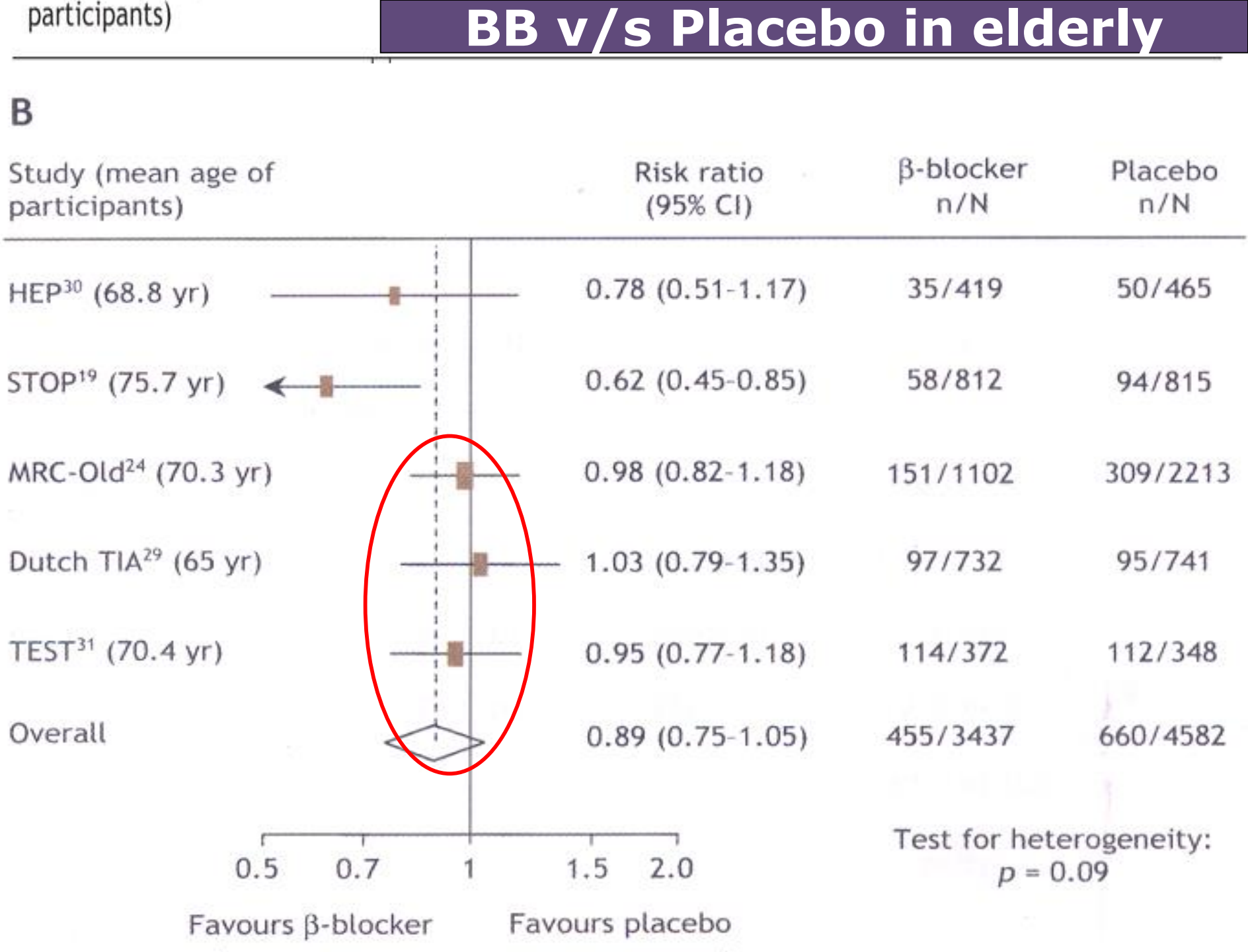
Different beta blockers and sexual dysfunction v/s placebo

Beta blockers	sexual dysfunction %increase v/s placebo	references
Carvedilol	13.5	Fogari et al 2001
Propranolol	5.0	MRC- 1995
Atenolol	3.0	Silvestri et al 2003
Bisoprolol	0.0	Boeckman et al 1992

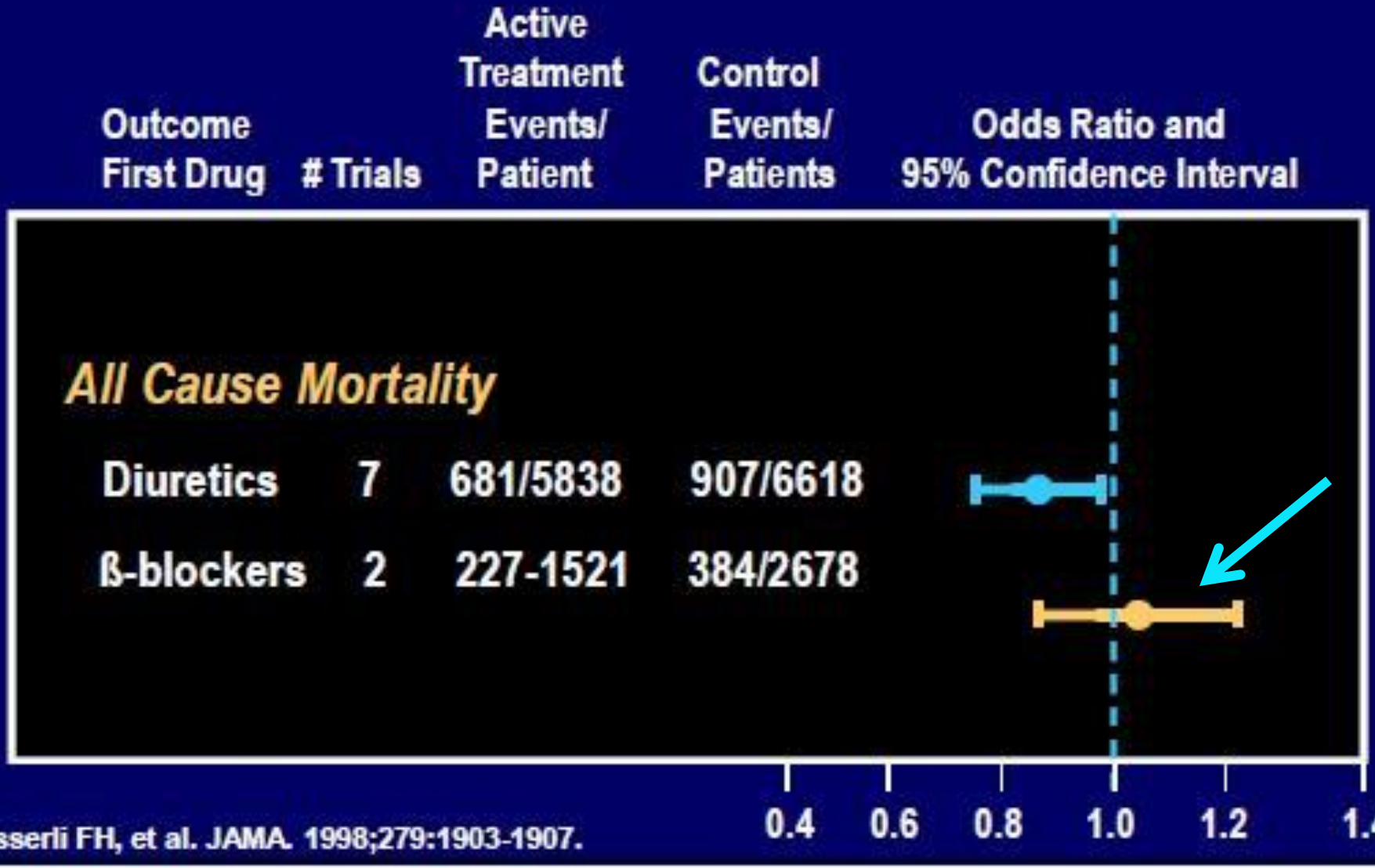
Beta blockers in elderly

- Decreased density of Beta receptors results in decreased efficacy in the elderly.
- Vasodilating BB do not just work by blocking the Beta Receptors.

BB v/s Placebo in elderly



Meta-Analysis of Prospective Clinical Trials in Hypertension in the Elderly



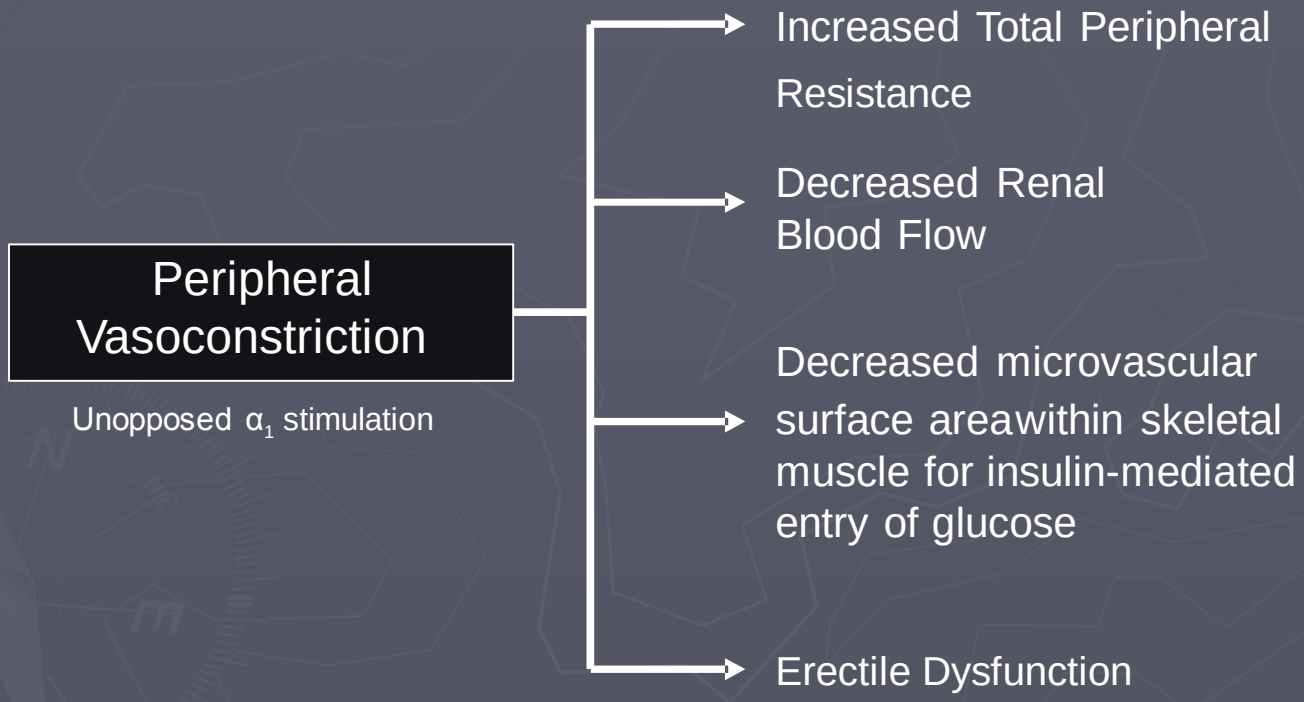
Messerli FH, et al. JAMA. 1998;279:1903-1907.

Beta blocker in obese patient

- Traditional Beta Blockers may results in 1.2 Kg/Yr weight gain due to
- Reduced resting energy expenditure, and
- Thermogenesis

(by as much as 10% in some trials).

Traditional β Blocker Effects on Peripheral Vasculature



Bell DSH. Endocrinologist. 2003;13:116-123. Packer M. Prog Cardiovasc Dis. 1998;41:39-52. Man In't Veld AJ. Am J Hypertens. 1998;1:91-96.

What about guidelines ?

COCHRANE ON BB in HTN

(Prototype: Atenolol)

- The review, published online January 24, 2007, bases this conclusion on *"the* ***relatively weak effect of beta blockers to reduce stroke and the absence of an effe on coronary heart disease when compared with placebo or no treatment"***

  and

  "the trend toward worse outcomes in comparison with calcium-channel blockers, renin-angiotensin-system inhibitors, and thiazide diuretics.“

- Most of the evidence for these conclusions comes from trials where atenolol was the beta blocker used, and it is not known at present whether there are differences between the different subtypes of beta blockers or whether beta blockers have differential effects on younger and elderly patients.

COCHRANE ON BB in HTN

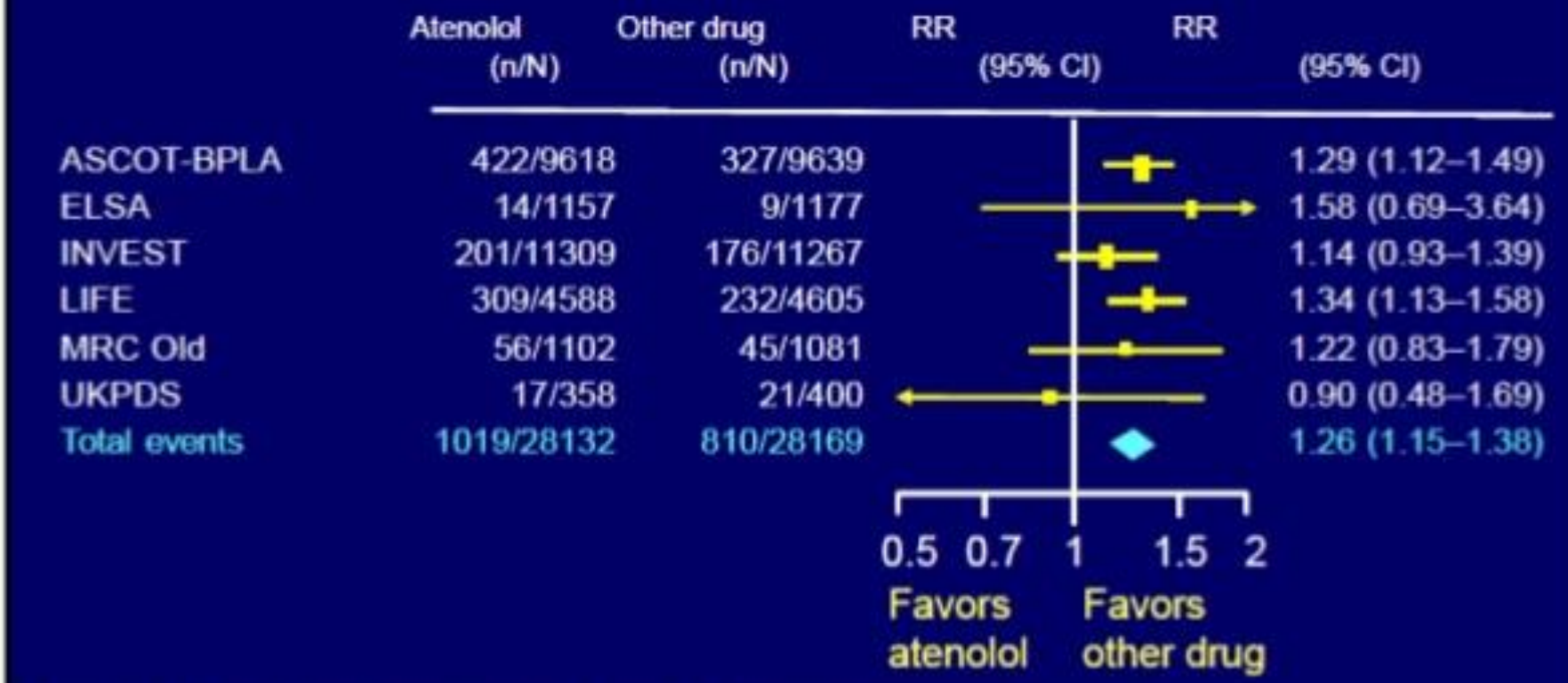
(Prototype: Atenolol)

- Results showed that the risk of all-cause mortality was not different between first-line beta blockers and placebo, diuretics, or inhibitors of the renin angiotensin system but was higher for beta blockers compared with calcium blockers.

Comparative drug	RR of all-cause mortality for beta blockers	95% CI
Placebo	0.99	0.88-1.11
Diuretics	1.04	0.91-1.19
ACE inhibitors/ARBs	1.10	0.98-1.24
Calcium blockers	**1.07**	**1.00-1.14**

β-Blocker Meta-analysis

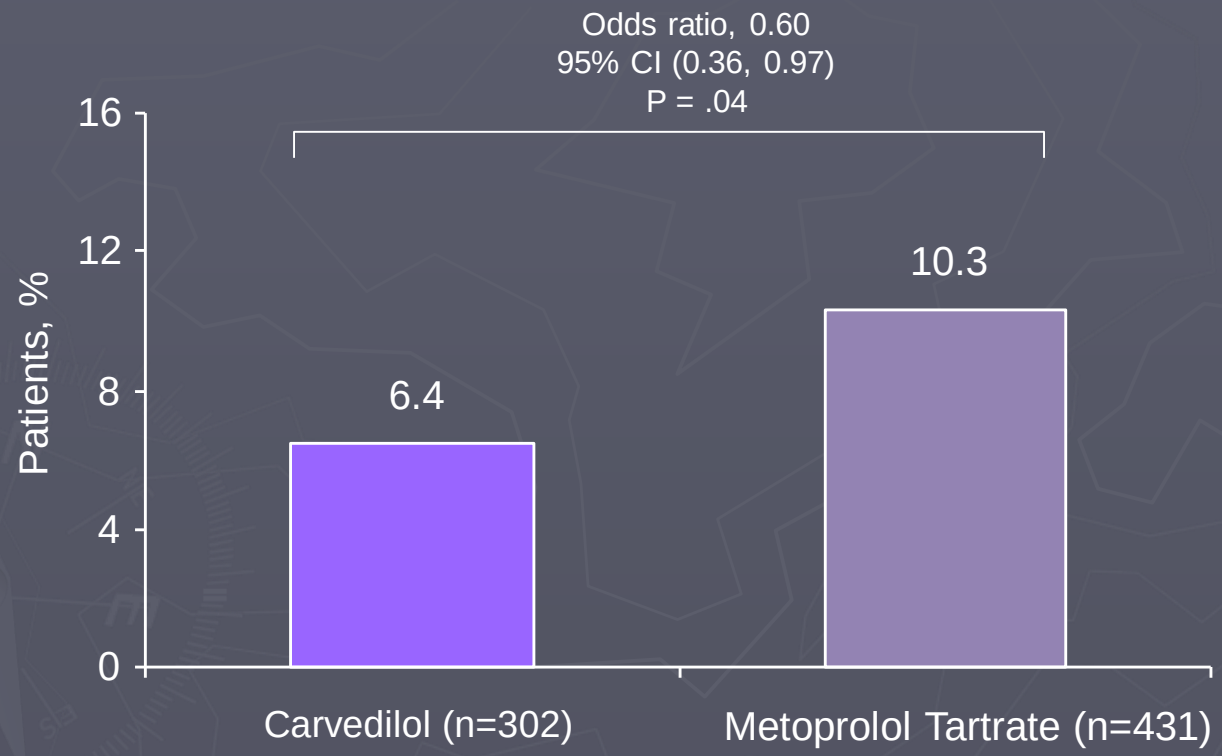
Stroke: Atenolol vs Other Antihypertensive Agents



ASCOT-BPLA, Anglo-Scandinavian Cardiac Outcomes Trial–Blood Pressure Lowering Arm; CI, confidence interval; ELSA, European Lacidipine Study on Atherosclerosis; INVEST, International Verapamil-Trandolapril Study; LIFE, Losartan Intervention For Endpoint reduction; MRC, Medical Research Council; RR, relative risk; UKPDS, United Kingdom Prospective Diabetes Study.

Lindholm LH et al. *Lancet*. 2005;366(9496):1545-1553.

Development of Microalbminuria in Previously NormoalbuminuricParticipants



*81% of patients did not have microalbuminuria at screening.

Bakris GL. et al. JAMA. 2004:292:2227-2236.

Comparison

Summary : *BB may be considered in HTN*

- **Younger individual with increased sympathetic drive**
- **Younger woman with child bearing age**
- **Intolerance and contraindication to ACE I and ARB**
- **In these circumstance initial therapy is with BB and second drug is required add CCB rather than thiazide type diuretic to avoid metabolic disturbance**

BETA BLOCKERS IN HTN – WHERE DO THEY STAND??

- Atenolol may not br as a first line drug in uncomplicated HTN.
- **NOT ALL BETA BLOCKERS ARE SAME.**
- The outcomes seen in the recent clinical trials seem to be more of a **DRUG EFFECT than a CLASS EFFECT**!!
- **Newer BB, esp. vasodilatory** BB like nebivolol may be given consideration
- Lack of clinical data on these drugs has limited their recommendation by international guidelines.
- BB can remain a first line drug in HTN **in HF** (? Dual benefit).